FEDERAL ENERGY REGULATORY COMMISSION

TECHNICAL CONFERENCE

IN RE:

CONNECTICUT INFRASTRUCTURE

OCTOBER 13, 2004

LEGISLATIVE OFFICE BUILDING

300 CAPITOL AVENUE

HARTFORD, CONNECTICUT

. . .Verbatim proceedings of the Technical Conference of the Federal Energy Regulatory Commission, In Re: Connecticut Infrastructure, held October 13, 2004, at 9:00 A.M., at the Legislative Office Building, 300 Capitol Avenue, Hartford, Connecticut. . .

P R O C E E D I N G S

MR. DOWNES: Good morning, ladies and gentlemen. Before we begin today's proceedings, I want to do some quick housekeeping with you, if I might. First off, in the interest of safety, I would like to ask you to note the location of the exits from the hearing room. The two doors from which you entered are the emergency exits, and are marked with the appropriate signs. In the event of an emergency, please walk quickly to the nearest exit. As for having exited the room, proceed to the main stairs or follow the exit signs to one of the fire stairs. Please quickly exit and follow any instructions from Capital Police. Do not delay, and do not return unless and until you are advised it is safe to do so. And now messages brought to you directly from our friends with Capital Security Group.

And for panelists and people who are on the diocese, it will be important that you have your microphone in the on position when you wish to speak.

In front of you there is a button marked "microphone". Please press the button and the light will come on and that means your mike is live. These proceedings are being taped by the Connecticut Television Network. They're also being simulcast live for us; all the offices in the legislative office building, and the state capital building. So please try and remember to use your microphone when you're speaking, and please turn them off when you are finished. Those who have cell phones are requested to turn the cell phone off or put it in a silent mode. And to the extent that people find it necessary to maintain conversations, we appreciate it if you would kindly take them outside.

Okay. With all the housekeeping done, good morning everyone. My name is Don Downes, I'm the Chairman of the Public Utility Control Authority and the head of the Department of Public Utility Control. On behalf of Governor Rowland and the general assembly, we are pleased to host the commissioners of the Federal Energy Regulatory Commission, as well as the chairmen of the Maine, New Hampshire, and Rhode Island public utilities commissions on this technical conference of New England and Connecticut public utility issues.

This event would not have been possible without the help of a variety of people that I'm going

to pause briefly and thank them. For openers, David Cumanchca with my office and Sarah McKinley from the FERC staff have done an outstanding job putting this together, and we thank them. Our friends in the general assembly have been instrumental in putting this together, particularly Kelly Gilbert, Clerk of Energy and Technology, Sue Kien, Clerk of Appropriations, and our friend, Chief Phil Morgan, of the Capital Police.

We're very pleased by the broad turnout for this event. While there is not time to recognize everyone, we have with us, among others, acting commissioner, Jane K. Stahl, of the Department of Environmental Protection who's been one of our chief partners in developing utility policy through CEAB. We also have a number of distinguished legislators and representatives of various executive and legislative agencies, and I want to thank all of you for coming.

At this time it's my honor and pleasure to introduce my friend and colleague, the distinguished House Chairman of the Energy and Technology Committee. Terry Backer has represented the 121st District in the city's Stratford and the General Assembly for some six terms -- a real double threat. Representative Backer is recognized as an authority not only on energy issues, but environmental issues as well. In his real life,

Terry can generally be found out on the water performing his duties as Long Island Sound Keeper. I'd like to introduce my friend, the honorable, Terry Backer.

MR. BACKER: I'd like to stand these mikes after a long time. I know they the don't lend themselves to standing. You can never hear it.

First, I want to say that the Senate Chair, Melanie Peters, is away handling business along with the Ranking Senate Member, Tom Hurley, who has another family issue, so you won't be seeing them today.

I want to start out by saying we're really proud to be able to provide this venue for this technical conference.

Connecticut is challenged in so many challenges and so many ways in our dealings with energy. We're challenged by either misconceptions or we're challenged by real things that we haven't been able to sort out because of the political process that we have here. Everything becomes politically bound to the point where we can't sort through what's real and what isn't real anymore. This conference may help us do that. It may help us find out what we're allowed to do, who has authority over us, and where we can go. So with that, we're going turn it over to the guys who are running the show. Thank you.

MR. DOWNES: Thank you Terry. I should point out before we move further down the road, that there is an overflow room, which is room 2E, in the event that this becomes more crowded. People can start moving there, and we'll be simulcast there as well.

At this time let me do some very brief introductions of my colleagues from our surrounding New England states. To my right, my friend and colleague, the Dean of New England Commissioners, Tom Welch, is the Chairman of the Maine Public Utility Commission. Tom Getz is the Chairman of the New Hampshire Public Service Commission, and is the sitting President of the New England Conference of Public Utility Commissioners. Elia Germani is the Chairman of the Rhode Island Public Utility Commission, and representing Chairman of Funds, his general counsel and chief aid is Ron LeComte from the great state of Massachusetts -- excuse me. The Commonwealth of Massachusetts -- pardon me.

Also on the dais, our distinguished guests include Attorney General Blumenthal, who I guess I haven't actually seen yet, but he will be here, I promise. And Gordon van Welie, the President and CEO of the New England Independent System Operator. Also on my left are the members of the Connecticut Public Utility Commission. From your left to right, Commissioner Anne

George, Commissioner Linda Kelly, and Commissioner John Betkoski.

When Chairman Wooden and Commissioner Brownell called me to talk over the idea of a technical meeting here in Connecticut, I frankly jumped at the chance. We face a number of challenges with our electric system here in Connecticut. Our transmission and generation resources need to be improved and upgraded, and as the industry and the government move to meet these challenges, public interest, and frankly concern, grows very quickly. Proposals like the electric transmission upgrades in Fairfield County have brought these issues into sharp focus, and our citizens look to their public officials, both executive and legislative, for answers.

It so happens that Connecticut faces these issues today. A number of other states are fortunate and are in somewhat different positions with less critical problems than we face, but make no mistake, every state will face these issues sooner or later. On a broader scale, regional authorities like ISO New England, NEPOOL, and the new regional state commission working with our federal partners at FERC, have been working to create a true New England electric market. These two efforts are inextricably linked together, and

without an adequate physical generation transmission distribution system we cannot have reliability or a single-functioning market. Without a true single-liquid market where all generation can serve all load, the economic inefficiencies and the rate payer benefits promised by a market system will not materialize. And without rate payer benefits the political consensus that supports restructuring will collapse, and we'll face the nightmare of trying to reregulate this industry.

All of us regional and state and federal officials have been working hard on these issues for some time, and now it's time for us to turn to the public to understand these issues and hear the differing approaches for meeting the challenges. I want to extend our thanks to FERC for providing the forum that will give every interested citizen the opportunity to see that here are some of the most knowledgeable experts in the field to discuss these matters. And now, at long last, let me introduce the Chairman of the FERC, my friend, Pat Wood, who will introduce his colleagues and preside through the rest of today's proceedings.

Chairman Wood and the FERC commissioners have one of the toughest jobs in America, and they perform it with great dignity, authority, and poise. It may come as a surprise that not every region of the

country has enthusiastically embraced electric restructuring. Speaking on behalf of the Connecticut Public Utility Commission, FERC has provided the example and the guidance that's brought us to the creation and the operation of a real electric market in New England.

While Connecticut and the FERC have not always agreed on every single last issue, our relationship is a very strong and positive one because we agree on the underlying goals and the underlying principles, and we work toward the common resolutions with good faith, each toward the other. It's my pleasure at this time to turn the chair over to my colleague, Chairman Pat wood.

MR. WOOD: Thank you, Don, and thank you all for being here. Representative Backer, thank you for your comments. I can't frame it anymore succinctly than you did that the point of what today is to talk about misconceptions in reality and try to distinguish between the two.

I'd like to, before going into the backgrounds today, introduce my friends and colleagues. Nora Brownell, a Commissioner here at FERC and Suedeen Kelly, who's our newest commissioner at FERC as well, and we're glad to be up here today. Thank you and the members of the Connecticut Commission for your

leadership of the past energy issues in this state, and we're glad to be here among you.

The FERC's role is two-fold with regard to electric power. First, it's to oversee the wholesale power markets, the sales for resale, which is, I guess, an upstream role -- upstream of the retail companies that serve the users here in Connecticut. As the wholesale regulator, we oversee the interconnected grid on the transmission side, which is the second role that we play. Those two things come together very cleanly in New England where you have six states coming together under a common grid that has operated for a number of years relatively coherently and succinctly as a single grid and as a single marketplace. That effort has, under the leadership of the ISO New England and the NEPOL, two multi-state organizations that include a lot of the market participants here, done a number of things to improve the workings of this power market.

One of the things that we've identified -- certainly not us alone, but practically everybody in almost every pleading before our commission as we talk about everything from rates to proper terms of service to credit worthiness -- is the status of the infrastructure. And that's really the bulk of the focus today, is focussing on this particular part of New

England and looking at the status of the Connecticut electric transmission infrastructure and the importance that that very critical piece in this nation's grid -- and, I mean, here you are at the corner of New England and not shouting distance away from the New York power grid and the from the PJM -- Pennsylvania, New Jersey, Maryland power grid -- coming together right here on the eastern side of New York City, our largest energy market in the country, and so the infrastructure issues here are of not only state significance but regional and national significance.

So in recognition of that in the hope that we won't make the same mistake twice as was done in California, before commissioner Brownell and I joined the commission, we thought it was very important to come up here and just focus on the facts, find out what it is about the Connecticut issues we need to know more about, what are the pros and cons of different sides, and then get to a point with the decision makers here in the state -- and there are some very capable ones here -- to focus on the issues related to transmission infrastructure and to some extent on the generation infrastructure because at some stage those become interchangeable. In some states they're not, but I think we'll explore some of that today.

It's our hope, certainly, as we have seen elsewhere across this great country, that people of goodwill can come together and, again, focus on the facts and make decisions that while not popular are important to be done for the long-term future and for the betterment of the citizens not just today, but for the foreseeable future. That's what leadership is about, and we want to be focused on that today.

I want to thank, again, Chairman Downes for your leadership and your kind invitation to come here. I want to thank, the legislature for the use of this nice space, and at this time, I would like to -- before we pass it over the Miss McKinley to MC the rest of the day -- I'd like to introduce two gentlemen from our reliability division at the Commission, the head of that division, Joe Maclelan, who's down here on the audience's left, and next to him Sied Faraplay, who's one of our senior engineers. The format for today, again, for the panel up here, if we just want to pepper the people, the participants here with questions, probably, you know, as -- again, informal as we can be just to try to find out facts, not necessarily great diatribes, but just make some point and try to elucidate the record.

This is being recorded today on television

and with a transcriber, so this record will be included in FERC's docket of the ELO-14, and that will be used to inform any decisions that may come before our commission on issues relating to the transmission; to the rates, to the market rules of New England. I understand that Attorney General Blumenthal is here and would like to make a statement. Welcome, Mr. Attorney General.

MR. BLUMENTHAL: Thank you Mr. Chairman, Chairman Wood. I want to thank you for being here, and so graciously with other members of the Commission and your staff from Washington making the trip to be here and, of course, Chairman Downes for your leadership in helping to organize this event today -- which certainly is historic in Connecticut's energy development. And I just want to thank everyone who is here in this very distinguished group, both on this side of the room and in the audience, because the citizen participation and involvement of the public as well as interested parties is certainly critical to the intelligent and enlightened development of energy and transmission and generation in Connecticut. And I just want to make very clear that we are here with a common purpose, although we may disagree from time to time as we have done, I think there's a clear consensus that we need to upgrade our infrastructure here in Connecticut to improve the

reliability and efficiency of transmission and generation.

There is absolutely no question, and I want to say very emphatically, no question in my mind that those upgrades are absolutely necessary. The real question is how and where, and on that point, there is more than ample room for legitimate disagreement. We will continue to fight for undergrounding as much as possible of all of the segments of this line because it is Connecticut's law, and our legislature, in fact, deliberating in this very room has taken that position.

We will continue to fight for regionalization of costs because the entire New England region really benefits from upgrading infrastructure, even when it is underground or, most especially, when it is placed in ways that is -- that are environmentally sensitive, responsive to health needs, as well as to other values. And we will continue to also fight what we regard as unwise and unwarranted intrusions on our consumer interests and our state interests such as LICAP, Standard Market Design, the RTO Expansion, because they raise costs for consumers and enhance industry revenue without tangible benefits for our consumers and our citizens.

And I want to thank the Federal Energy

Regulatory Commission for coming here and really listening to us -- which is so important for any agency. I know very often agencies in Washington tend to view problems from 10,000 feet and see the big picture. We welcome your coming to the trenches and seeing what the problems are on the ground, so to speak, what people's concerns are, and I think that step is very, very, important.

Let me just close by saying that there has been delay in the infrastructure upgrades, particularly as they affect the third and fourth segments, Phase 2 as it's known. I think it has to be recognized that that delay in no way has been caused by opposition from local communities or recalcitrants on the part of the state. It is very directly the result of mismanagement by the applicants and by ISO New England, and I say that very reluctantly and apologetically, but I think it needs to be on the table here. It needs to be a subject of debate.

We are 10 months into this case, and we still do not have a final proposal that the applicants are willing to stand behind and submit for scrutiny; a specific route that can be evaluated by the siting council. Others have expressed similar frustration with those delays. 8 months into this case, we were informed

for the first time that the Third Harmonic Standard would be the applicable standard, just as another example of the kinds of delays that we have seen in this case. So we still await the decision from the applicants and from ISO New England as to what the specific proposal is, but we are ready and willing and able as a state to move forward with infrastructure improvements that are necessary to the entire region and needs of the country. They are absolutely essential for the economic, as well as electricity and power benefits, of the entire region, and, again, Mr. Chairman, thank you for giving me this opportunity and for coming here to Connecticut, and for arranging for all of the parties to be together on this very, very, important occasion.

MR. WOOD: Thank you, Mr. Attorney General. We appreciate you being here and your time today. At this time I'd like to ask our lead for this conference, Sarah McKinley -- who's sitting over here in the purple dress -- to introduce our first panel and kick off the day's events.

MS. MC KINLEY: Thank you, Mr. Chairman. Our first presentation today is by John Schnagl from the Office's Energy Projects at FERC who will present an overview of infrastructure needs in Connecticut and the region.

MR. SCHNAGL: Thank you. This morning I'd like to present an overview of the energy infrastructure of Connecticut. Focusing primarily on electric transmission infrastructure, but touching on generation and the fuels that fire that generation.

Over the last 10 years, Connecticut's energy use has increased approximately 1 percent per year. But if you look specifically at southwest Connecticut, that energy use has increased 2 percent per year, double the amounts of the rest of Connecticut. 2 percent is pretty much on par with the rest of New England, and it is in excess of that of the national average. Let's take a look specifically now at the electric generation infrastructure.

Since the year 2000, a great deal of new capacity has been added in terms of electric generation capacity in New England and Connecticut. Approximately 9,500 megawatts of new generation capacity has been built. 18 percent of that has been built in Connecticut. These bars show the new capacity in the green and the retired capacity in the pink and the red. One can see that the new capacity far exceeds that which has been retired. However, if one looks into the future, one sees that in 2005 through 2008 virtually no additional new generation is being planned at this point

in time. However, we are hearing more and more that additional retirements are going to be occurring during that period of time.

The new generation has been almost exclusively fired by natural gas. This is a trend that not only occurs throughout New England, but also the rest of the country. Currently, natural gas, as one can see here, is the increase in new generation and corresponds to the increase in the amount of natural gas fire in this area right here. In New England we have roughly a third of the generation supplied with oil. A third of the generation is fired by natural gas. We look at electric generation output, since 2000 -- between 2000 and 2003, there has been a significant increase in output in electric generation for new England as a whole, roughly 21 percent increase. But for Connecticut, there has been an actual decrease of 7 percent.

Okay. So we talked a little earlier about the fact that energy use in new England has been increasing year by year. But this shows that electric output in Connecticut has actually dropped. So where's the difference being made up? Connecticut is increasingly using generation generated in other states, and bringing it in through the interties that are

indicated in red that are on this map. There are other interties that are much smaller. One thing is -- to be noted is that these interties are clearly remote from the area in southwest Connecticut that I said was using so much of the electricity. We took a look at the overall electric transmission system, and looked at it for three different factors. Distribution, the ability to distribute the generation produced in the state, the size and the robustness of the interties, and load and stability. In terms of distribution, the existing electric transmission system cannot distribute the electricity that is currently produced within the state. In other words, some of the newer electric generation facilities must throttle back their production because of transmission limitations.

In terms of the interties, the interties allow approximately 2,000 megawatts to be brought into the state. Looking into the future, this limitation will not meet Connecticut's future demands. And in terms of load and stability -- well, I mentioned that the energy that is being brought in through these interties are fairly remote from where it's actually used, so the energy that comes in must traverse much of the existing grid to get down to its point of use. This adds additional congestion to the system, and in deed,

Connecticut has one of the most highly congested electric transmission systems of anywhere in the country.

Stability, it's an old system that's been through upgrades recently. A recent study by the ISO identified greater instability than they had originally anticipated. There are several proposals to add new transmission to be able to move generation to load. This slide shows the tan areas here are the load centers, the urban load centers in the state, and the dotted lines indicate some of the proposed transmission lines, certainly these lines would help to move the generation to load. But these proposals must be converted from proposals to operational projects before they're going to help solve the problem.

We've heard a lot over the last several years about merchant transmission projects. Five merchant transmission projects have been proposed for the northeast. Yet only one of these projects has been built and is operational and able. Two additional projects, the Empire Nation and the Neptune Project, have received recent interest in the trade press and investors are now looking more favorably at those project and they may actually be built. And even if those projects were built, they will have no direct

affect on electric transmission in Connecticut.

Let's take a look at the fuels that fire electric generation. Since 1997, the greatest single increase in use of natural gas in this region has been to fire electric generation. In deed natural gas has become the fuel of choice for electric generation. There's no native supplies of natural gas in New England, so all natural gas must be brought into the area either through interstate natural gas pipelines or in the form of L and G. This flow diagram is what we anticipate the flows will be into the region in January 2005 -- actually coming up fairly quickly. The green arrows indicate the source of the supply, from western and eastern Canada, the eastern United States then coming up all the way from the Gulf of Mexico, and this one is in the form of L and G coming into the Everett facility in Massachusetts. The supply has been distributed through the interstate pipeline system and intrastate pipeline systems that are not shown on this map throughout the region. One thing that we do note is that no new intrastate/interstate pipelines are proposed between now and 2008. This is problematic.

During the winter, natural gas demand comes dangerously close to exceeding capacity of the existing pipeline system. Demand is projected to exceed pipeline

capacity beginning in 2007, and one place here in Connecticut already knows during a cold snap this year, the system did exceed the capabilities. We've heard an awful lot about new L and G facilities, and these are just some of those that could affect the Connecticut market. If all of them were constructed, they would add an additional 8.5 billion cubic feet per day in terms of new supply for the region. This is in comparison to the existing maximum, roughly 1 BCF per day that is being provided at the Everett facility. However, even if all of this additional supply becomes available, as I mentioned earlier, during the winter the existing pipes are full so there will need to be a new natural gas pipeline infrastructure built in order to move this supply to where it is actually consumed.

Oil has historically been an important source in this region. It fires roughly 30 percent of the electric generation, and is very important for home heating. We expect it to continue to be a very important source of duel fuel capability for electric generation. Meeting Connecticut's electric demands requires concurrent actions in multiple areas. As you've seen, there's no one silver bullet here. Certainly the transmission system has to be made more robust so that it can move generation to load. The

interties need to be upgraded so that Connecticut can take advantage of some of the surpluses in its neighboring states, and move more of that generation to -- into Connecticut where it's needed.

Once the transmission system is made more robust, then they can strategically locate and size new generation within the load pockets that I showed you, and in order to fire that new generation, new natural gas pipeline infrastructure is going to have to be built.

And last, the demand response programs should be upgraded in order to be able to meet demands most economically. Demand response programs can help to insure that infrastructure is not overbuilt. Thanks very much.

MS. MC KINLEY: Thank you John. (SMALL PORTION MISSING DUE TO NO SOUND ON COMPUTER) -- you're paying congestion costs even if you don't see them, and they do have a growing impact.

MR. VAN WELIE: Right, I don't have a number off the top of my head. We could probably do a collation, but basically congestion is when you're running more expensive generation inside a transmission constraint when there's less expensive generation available outside of the constraint, and what we've seen

actually is that congestion has been somewhat evaded recently because of a high natural gas price, so it's actually made oil relatively less expensive than natural gas. So it depends which is the marginal fuel for generation. Which is going to be setting the price of electricity. In general, though, when you look at Connecticut relative to the rest of New England, it is by far the most extensive, or has the most extensive impact both at the wholesale level and retail level when it comes to congestion costs. So it stands out amongst all of regions in New England with respect to congestion costs.

MS. MC KINLEY: Thank you. Our next presentation is by Kevin Kirby, Vice President of Marketing Operations for ISO New England, and he will give a presentation of infrastructure needs specifically in connect.

MR. KIRBY: Good morning. I'd like to thank FERC for inviting ISO New England to speak at this conference. My presentation today -- I'll be providing a preview of the electricity situation in Connecticut. Especially the states in the southwest area, which per cap rate, it is one of the nation's top ten reliability risks. New England overall has sufficient capacity to likely meet peak demands, but only for the next few

years. Building off some of John's points and in looking at this chart, you can see that the net generating capacity which is a total of installed capacity with typical adjustment for the units that are not available at any given point in time, starts to approach deficiency by the year 2006. Although we've added 10,000 megawatts of new capacity in New England since the beginning of the market in 1999, we do see little net change in new additions over the next several years. At the same time we're seeing increases in demand. That's in spite of and in reflection of the demand-side programs. We are looking to increase those, but even with that, we're still seeing a trend, an upward trend in demand.

The upper red line is -- represents the higher than expected load case, but I would point out that we've hit that three times since the opening of the markets in 1999. So it's a very realistic point for planning purposes that we need to prepare to meet. Some of our major concerns that we're seeing at ISO New England, first, the situation even more tenuous in certain areas of the region, the transmission investment for major upgrades has lagged the investment in the generation that we have seen over the past years, northwest Vermont, Greater Boston, and Connecticut,

particularly southwest Connecticut, have turned to project the transmission constraints to result in load pockets, meaning areas where you have constraints and difficulty in serving the existing load. The load pockets threaten not only the local reliability, but can expand to threaten the reliability at a regional level.

In addition, certain resources are critical for reliability within those areas; both to serve demand, but also to provide contingency coverage and to allow for construction and maintenance outages of existing facilities. Even with the planned transmission upgrades that we've been talking about, the additional resources over and above the existing will be needed to offset anticipated retirements as well as meeting the demand growth. Current revenues are not sufficient to sustain all the existing facilities or attract investment in the market. Because of that, the existing -- the continued availability of some of those existing resources is by no means certain. Additionally, if we have an increasing dependence on natural gas-fired units, as John had mentioned, the infrastructure of the gas delivery system in the L and G systems are limited in New England and has put some of the region's capacity as risk particularly during the peak winter hours. So our ability to maintain a diverse

mix of resources is an important part of our ongoing system reliability.

Turning to Connecticut, even today Connecticut's capacity is not adequate to serve demand and meet reliability requirements without special measures. We're using emergency resources and operating procedures to keep the lights on now in southwest Connecticut. And the outlook is not much better. Existing generation is needed to provide the bulk of our system support, but more than 2,000 megawatts of capacity in Connecticut has been proposed to deactivation, and has been deactivated or is operating under -- what we term as a "reliability agreement" with ISO New England in order the maintain those units in an active state. This amplifies in a capacity situation in Connecticut.

The state's net generating capacity is about 6,000 megawatts. Meanwhile, the end is more than 8,000 megawatts, but looking at this existing capacity situation doesn't tell the full story. It does not reflect the fact that a transmission system within Connecticut is not adequate to move that power from where it's needed. That's important because a difference between a demand and net generating capacity in Connecticut is covered by imports from out of state.

The transmission constraints limit the imports to about 2,000 megawatts as you heard earlier. The remaining capacity needed for reliability comes from the emergency resources that I mentioned a moment ago. There are reinforcements to the 345 A/V transmission lines that will be needed in Connecticut as well as Massachusetts and Rhode Island to provide reliability over the longer term.

Turning more specifically to the southwest Connecticut situation, it's more severe than the rest of the state, but about half of the demand met through imports in and as I mentioned those imports to the state, into the -- between the other regions of the state and southwest Connecticut are severely limited. The situation is more discouraging because there are limits on the ability to move electricity around within southwest Connecticut, so even if you can get across those transmission constraints to the southwest Connecticut region, the current situation is that we cannot move that power efficiently within the southwest region. That need for the transmission reliability is driving the Southwest Connecticut Reliability Project, that includes the transmission lines to major upgrades, you know, improve the limit coming into southwest Connecticut area by 1400 megawatts, enough to meet the

demand over the next several years. It also provides some flexibility for deactivation for repowering of existing units.

As we look forward to reliability and that balance, of not only the transmission upgrades to be able to move the power, but to be able to add generation, you need some headroom in the system to be able to deactivate, repower, or to have new generation. It's important that these -- that the projects advance in a timely fashion. And the additional retirements that we're facing could even put more pressure on the system on an interim basis.

Another focal point with respect to the generation, half the units are under 10 years old, which reflect some of the major new additions we've had in generation in New England over the past decade, but nearly a third of the generation in Connecticut is over 40 years old. And as you can see, approximately half are at least 30 years old. Aging power plants, in terms of their ability to compete, to be maintained, require ongoing investment, and at some point require repowering or replacement. Again, the current infrastructure within Connecticut prevents or provides at least some barriers to that happening on a cost-effective basis.

This graph illustrates some of the overload

potentials that we're seeing in some of our modeling techniques. The red lines essentially show where there is a prospect of thermal loads under various contingency conditions or both under collapsed conditions that could occur under certain contingencies. It's an example of the risks that are faced within southwest Connecticut and why the infrastructure improvements are so sorely needed.

In conclusion, we do face significant challenges in Connecticut. We are faced today with an inadequate system to fully meet the reliability needs of this state. We're depending on special measures such as the Southwest Connecticut Gap RFP for emergency resources, primarily filled by demand-side resources. We have various RMR agreements, a significant number, nearly 2,000 megawatts of agreements for generation within the state. The transmission upgrades are planned, but they -- again, they're two or three years away, possibly we could actually get sited and built.

And finally, we need to continue to develop enhancements to the New England Wholesale Market Powers System to encourage specific outcomes -- mainly those would include investment in capacity where it's needed most, in southwest Connecticut. We need new generation resources focused on peaking duty with an eye towards

continued fuel diversity. We need to begin consideration for outer repower, or allow repowering of older plants so they can continue to provide from those sites, the needed energy within southwest Connecticut and Connecticut as a whole, as well as increased promotion of the demand response and conservation.

Again, those programs have been critical for us in the last year or two in particular within the state of Connecticut, and the dependency on those and the value of those will continue to grow to us to meet the reliability. So at some -- to hit at the high points in the initiative that we're undertaking and are needed and essential for reliability, the timely action on those is going to become important for us to be able to maintain reliability in the coming years, and hopefully this conference will shed some light on that and help facilitate the progress of many of those initiatives. Thank you.

MR. KIRBY: -- So it's not just a question of needing the transmission to bring in generation from another state. It's to -- even if you built generation on the grid here, that to move it around over these spots and around these hot spots here, the transmission is not just needed for import reasons only.

MR. VAN WELIE: Right. That's correct.

MR. KIRBY: Okay.

MR. VAN WELIE: Transmission of circuits, for example, and other equipment within the region itself that prevents significant new addition.

MR. KIRBY: Explain to me what the red spots on this map mean. What does --

MR. VAN WELIE: The red spots really are the areas in jeopardy, going through one of the -- we use a model, power world simulator program, which identifies circuits that are susceptible to thermal overload, voltage violation, in terms of maintaining proper voltages or possibly voltage collapse under various CPC scenarios. And so with that highlight are the margins that without improvement that we could face one of those adverse conditions that would then jeopardize the (indiscernible) if you have to be forced to load release --

MR. KIRBY: Is the Phase 2 plan intended to eliminate all of that or could some more focused surgical work be done today to avoid these particular problems in addition to those?

MR. VAN WELIE: The Phase 1 and Phase 2 together are designed to alleviate most of these conditions.

MR. KIRBY: Because they take some of the

traffic, so to speak, and put it on a different electrical highway?

MR. VAN WELIE: Yes, bring in a 345. Much of this area is not only difficult to do, but it's not a 345. It's at a 115-kV level, which is a borderline distribution level.

MR. KIRBY: Right.

MR. VAN WELIE: And it really just gets -- it's not really sufficient to deal with the problem of the power distribution regarding these lines.

CHAIRPERSON WOOD: Pat Wood. Could I just add something to that? I think this is a very, very good slide because what it does is it illustrates the problem that we're facing with respect to operating the system every day. That slide shows you something which has been 20 years in the making. So I just wanted to say that when we come to the discussion about why is it taking so long to find a viable engineering solution to this, the problem is that we've let the system deteriorate over a period of over two decades to a point now where we are highly constrained. And so what I'm hoping we will get out of this conference is some discussion about how we relieve some of those constraints because in the end you've got to have engineers build something that will work and that will be reliable. And in that situation,

you've got to give them some ability to engineer a robust solution.

And I think part of what's causing the problem at the moment in terms of finding solutions is that we've got an over-constrained situation. And so part of the process going forward I think is how do we work together collectively to relieve some of those constraints.

MR. KIRBY: Thanks, Gordon.

CHAIRPERSON WOOD: Would you hit the next slide? The bottom four items there, certainly I know the state's really in the driver's seat on these. But some of these are still on FERC's agenda as well. And I just want to understand that first bullet there, investment and capacity where it's needed most, that would be generation capacity or both generation and transmission?

MR. VAN WELIE: That is -- well, these are in terms of the marketing aspect, what I call it. We do need both. This particular bullet was emphasizing on the market side, meaning the generation.

CHAIRPERSON WOOD: So that -- so looking back at the slide where you had southwest Connecticut, then you had the net generation bar -- I'll call it being a green colored bar back on Slide No. 5? So you're basically saying increase that bright green line upward?

MR. VAN WELIE: Yes. Total -- both in Connecticut as a whole in the long-term and in southwest Connecticut in general we need strength in terms of both supply in the area and generating ability measures as well as the import capability. We'll need to expand those.

CHAIRPERSON WOOD: Okay. And maybe, Don, you can you help me on this one. Is it as difficult to build a generation plant as it is transmission plant in this part of the state?

COMMISSIONER DOWNES: Perhaps even more so, conceivably. To the extent that -- most of the plants in southwestern Connecticut happen to be on the coast. And the reason is because they need an access to deep water and heavy rail service for fuels. Those are sites which we intend to hold onto. We're a very small, densely populated state. We don't have a lot of options for new sites.

To the extent that those existing sites are transformed, we take down the old generation that's not appropriate any longer and build new peaking generation, for example. So, to that extent, the siting process is much easier because you're using a brownfield site and there's already the data behind it.

CHAIRPERSON WOOD: Right.

COMMISSIONER DOWNES: But in terms of new greenfield site generation, I'd suggest that's very, very difficult.

CHAIRPERSON WOOD: Well, he had mentioned -- I think on that last slide, he mentioned repairing of older units. I mean what, from an electrical view -- I'm looking down at Gordon, too. What can be done on that? Because it avoids a lot of the, you know, the environmental and siting issues if you're using a site that's been doing that for 40-plus years.

MR. VAN WELIE: Well, let me try and answer it. I think there's two things. The first is Kevin mentioned the concept of head room. So you can't start disconnecting and connecting generation if you're right up against the ceiling of your available transmission capacity. So the first problem we've got today is that it's very difficult for us to even do that because we're so close to the available -- we've passed the limit really of essentially the transmission system.

So building out the transmission infrastructure not only -- it solves a number of problems. Not only does it allow you to import more generation, but it allows -- gives you the head room to start the process of repowering some of that 30-40-year-old generation. So that's step one.

The other part of the solution is you've got to make it financially viable to be part of the generation. Hence, the discussion around some form of capacity market. So you've got to have both elements in order to solve this problem. This is not something Connecticut can turn away from. It needs both parts of the solution in order to have a robust energy infrastructure.

CHAIRPERSON WOOD: I think our intention is to try and begin, as Gordon suggested, by addressing the transmission problem in order to put us in a position to transform the generation. There are really two kinds of problems. As Kevin's slide showed, first we have just a general shortage of capacity. The good news is we have several plants. We have one in Meriden. We have one in Oxford. There are perhaps some others that are partially finished. Those are fairly good-sized, combined-cycle, essentially base load plants.

The ones in Fairfield County and the ones along the coast essentially have a different problem. They are mismatched to the load. They are, as a general proposition, giant base load units which in many cases are being run in effect as peakers. We keep them running in 24-hour spinning reserve for months and months and months on end because we might need that power at some

point. And it takes us three to four days to bring those plants up.

So that piece of it really is a matter of transformation of the existing units down there in Fairfield County. And I think -- I think there are a variety of strategies we can take. I think this is probably going to have to be one of those things where the industry and the government work together in order to find the siting solutions and the political solutions as well. I mean at the end of the day, none of the -- Gordon's points are well taken. But the third leg of that stool is any solution has to be one that is politically acceptable.

To the extent that we take large, obsolete, fairly heavily polluting base load plants off line and replace them with relatively new, much cleaner peaking units that run much less time -- so to that extent, from the point of view of the residents in the area, it's not a bad trade. I mean nobody wants a power plant in their back yard. But if you're going to have one, let's at least have one that's relatively clean and considerably smaller and runs less time.

So I think some of the elements are in place. But it's clearly going to require a forward-looking plan. This is what -- this is basically what the

new Connecticut Energy Advisory Board is about; is developing an energy plan assessing the needs and the shortages and then literally going out and finding people to pursue those projects.

ATTORNEY GENERAL BLUMENTHAL: Mr. Chairman?

CHAIRPERSON WOOD: Yes, Attorney General?

ATTORNEY GENERAL BLUMENTHAL: Going back to your thermal overload slide, I think I recognize most of Phase 1 and Phase 2 in the routes here. Would all of these thermal overload problems be solved by the proposed 345-kV line, Phase 1 and Phase 2?

MR. KIRBY: My understanding is essentially all of them would be.

ATTORNEY GENERAL BLUMENTHAL: And this slide says nothing about the specific route of that line or how it's configured or what the rights-of-way are going to be or any of the other characteristics of it.

MR. KIRBY: No. The functional capability of the Phase 1 and Phase 2 (indiscernible).

ATTORNEY GENERAL BLUMENTHAL: Thank you.

CHAIRPERSON WOOD: You mentioned I think on that same chart the Attorney General is talking about -- you've got a time line that assumes Phase 1 was on in -- this is No. 6 -- 2006 and that Phase 2 would then come

on in 2008. Is that where the current timetable is for these projects?

MR. KIRBY: We're looking at those as the earliest dates that this project -- this stage --

MR. VAN WELIE: Let me just jump in there. I draw your attention to the note in the bottom right-hand corner, which is those were the optimistic dates some while back. And so what we've probably shown is the information from our most recent regional transmission expansion plan.

Obviously, what's happening is that we are seeing the dates slide out as a result of the difficulties of finding a solution that meets both the reliability and operability criteria. So the point is those dates are at risk and probably are no longer realistic.

MR. KIRBY: Just to point out, to expand on that, if you look at the chart, if you would take away the Phase 1, Phase 2, but keep in the emergency -- in those orange blocks, what you could see is we're just barely -- with the use of those emergency blocks we're just barely there in the current years 2006 - 2007.

CHAIRPERSON WOOD: So in order to do the swap-out that you're talking about to repower and replace the old, dirty, inefficient stuff with newer, cleaner,

more efficient plants, it's going to be -- it's a significant size, it's not going to be til '08, or until phase two is done until you can do the kind of environmentally benign swap-out.

MR. KIRBY: Yeah. As a general proposition, Phase 1 is of limited value to us because it runs essentially north and south from Bethel to Norwalk, essentially. It's the Phase 2 piece particularly -- well, we don't have a map. But the Phase 2 basically from the Norwalk area up to approximately Milford or so, which is really the key piece of Phase 2 in terms of having something to attach new generation to.

CHAIRPERSON WOOD: All right. Okay. Thank you.

Go ahead.

COMMISSIONER BROWNELL: I think Representative --

CHAIRPERSON WOOD: Oh. I'm sorry. I wanted to welcome Representative Kevin DelGobbo here. Appreciate you're being here.

REPRESENTATIVE DelGOBBO: Thank you, sir. Just a quick point and a question. The point is to follow on the Attorney General's question. And I'd invite anybody to correct this statement. My understanding is in addition to these infamous

transmission projects that there is, in addition to that, an existing substantial program ongoing throughout Connecticut for sort of transportation -- the underlying system improvements throughout Connecticut, which I think in some ways are identified in that sort of hot spot page -- and I just sort of invited comment on that.

My more direct question to you, Kevin, is the -- could you characterize for us briefly the regional planning for -- you've focused here just on Connecticut to some -- to a large degree in how you described the generation capacity outlook. One of the issues that we have in Connecticut is -- that's always put in our face is like, yeah, we believe this is the right plan. But we always tried to describe it as it is not just Connecticut that stands alone. Could you give us a little better picture on how we could feel comfortable that is regional planning, too? If we're going to put X amount of generation in Connecticut, that that, in fact, fits in our New England grid forward-looking plan to meet demand and that we can feel comfortable that that's, in fact, happening?

MR. KIRBY: I'd be happy to. At ISO New England, the -- we run an original expansion plan that's focused on both transmission and generation sources as well as the demand side resources. And that's a

comprehensive plan that's fairly rigorous. It's a very comprehensive plan that looks at the infrastructure throughout New England and it's broken up to quite a few sub-regions for analytical purposes. And that has identified other areas in need of improvement. It identified in the Greater Boston area and action is being taken to improve that situation. It really is, you know -- throughout this year, the Siting Board is acting on some applications there to make a major transmission improvement into the downtown area of Boston, as well as to the North Shore.

In northwest Vermont, we have a similar situation. Again, you know, there's a smaller quantity of load up there. But it's an area that needed some transmission improvement.

In addition to that, in any given year there are many incremental projects that are done on the transmission system to be able to get more out of -- more capability out of the current infrastructure. The generation supply potential is also examined in that proposal, as well as the demand response resources that are available to us to be able to look at our current situation as well as project the ability to move power throughout New England.

REP. DelGOBBO: Excuse me. Just to be

clear, what I want to understand is that what you presented to us today -- can we take that as contextual, meaning that these responses in Connecticut are very specifically needed, not just as we look at Connecticut but in the fact -- in the conditions that you foresee for the entire region, in other words, the new generation that you might contemplate throughout the New England region and the transportation issues that are being dealt with throughout New England.

So it's, in fact, when you present that conclusion for Connecticut, you're representing that that is in the context of what you foresee happening in the region. Correct?

MR. KIRBY: Yes. It is in the context of that overall plan.

REPRESENTATIVE DelGOBBO: Okay. Thank you. Thank you, Kevin.

MR. GETZ: Mr. Chairman?

CHAIRPERSON WOOD: I'm sorry.

MR. GETZ: If I could follow up? I guess I have kind of the opposite concern that -- about everything proceeding the way it should in the rest of New England and the concept of what's happening in Connecticut. Could you turn to that Slide A on the pre-contingency violations? I know Gordon raised the issue

of there's a problem long time in coming. And you've talked about the importance of timeliness in building a lot of these projects.

But putting that aside for the moment, could you speak to how these current reliability issues implicate the rest of New England? Is this a problem that's being current exported that's causing unreliability throughout the whole New England system?

MR. KIRBY: Currently for the rest of New England we are able to draw within the reliability criteria. Some of these issues, these post-contingency violations that could occur are handled through responses we have in the Connecticut area and our procedures would work to contain the problem, should it manifest itself, to keep it from cascading to the rest of New England. It becomes more difficult to do that over time, depending on the severity of the problem, to be able to address those post-contingency issues.

MR. BOGUSLAWSKI: If I could, Mr. Chairman?

Chairman Getz, I think that what Kevin was saying is that we do go through a regional assessment and we do look at the various load areas on a sub-region by sub-region basis throughout New England. And it is not uncommon at all to find these purplish areas in spots

throughout New England as you look out into the future.

And in your state, New Hampshire, there are several projects that we have built, several lines we have upgraded, several substations we have had to upgrade because of thermal overloads, voltage sags and so forth.

So when Gordon Van Welie says that this has been 20 years in the making, I think the context that you need with that statement is really that -- is really one of the world in which we live in. Electricity is really one of the marvels of our day. It is a relatively simple system identified decades ago and, as computer technology advances and our equipment sophistication advances and our customers' equipment sophistication advances, the need for reliability grows and grows and grows.

And the modeling capability that we in the industry have today is far more sophisticated than it was even five or ten years ago. And as a result, what you see when you do planning today is you expose where those reliability needs are today and will be tomorrow. And so it is not at all uncommon when you do long-term transmission planning to see that there are problems that are evolving.

And I think what everyone in our society wants is they want a system that's not only reliable

today but will be reliable tomorrow.

MR. WHITLEY: Steve Whitley. I'd like to add a comment, too, as far as the real time operation of the system. We certainly operate the system every day to make sure that we don't have contingencies that overload and cause cascading. And we do that by dispatching the system out of order many times and, if we have to, we will shed load to prevent these overloads from happening.

But this is a planning snapshot, like Dave and Kevin have just said, looking at the future and showing us we really have a system that is collapsing if we don't do something about it. And our ability to continue to operate like that, you know, we're running out of room.

MR. McCLELLAND: Kevin -- I think I'm on.

Kevin, you mentioned that there should be some levels of must-run generation. I think that's an important distinction. How much generation are you talking about and what is the impact to the transmission system?

MR. KIRBY: Let me just clarify. In any area, you do need local generation to be running to meet the demand up to -- certainly to cover what you cannot economically import to the area. So the quantity varies hour to hour throughout the year in terms of what's

actually on. I refer to what we call reliability must-run contracts, does not necessarily mean that those contracts or those power plants need to run continuously throughout the year, but they need to be available to us certainly during the peak hours or in hours where there might be other outages, transmission outages or generation, where those units need to be run periodically.

So it really gets into the standby capability. And as Chairman Downes mentioned earlier, that the -- to the extent that they're being used for a limited number of hours in a given day, what we end up with sometimes is a mismatch between the characteristics of those units and the operating characteristics that would be most efficient or the most cost-effective. And those are paid for through contractual agreements that are approved.

MR. McCLELLAND: The studies that I've seen for the contingency analysis -- let me try this again. I'm having a little trouble with the microphone. The studies I've seen for the contingency analysis on the alternatives for the transmission system, they link generation with transmission capabilities. How much generation -- if you could wave the magic wand over the system and you could look at import versus localized

generation, how much generation -- what level of generation would be necessary to stabilize the system or to complement the system design? And I'm referring, in particular, to, say, the underground configuration or the underground option.

MR. KIRBY: I'm not sure I follow the distinction with the underground option in terms of the question. But the balance in terms of generation, say on a major interface, you need to have sufficient that if that major interface -- one of the lines was out for repair or was forced out due to a lightning strike, in those types of contingencies, that you would have sufficient generation on the constraint side to be able to make up that difference and reliably serve load.

Steve?

MR. WHITLEY: I'd like to add a point that a lot of folks don't understand, also, about the weakness of this network in southwest Connecticut. It's a 115-kV mesh network that's tightly connected and we're right at the limits of short-circuit availability, along with the circuit breakers there. So we actually have to design one with what you can buy to operate and the safety limit for substation operators to work. And so we really can't take a new generating plant and put it down there unless we get the transmission system that is being proposed to

work and get it in place so that we can move some of the generation over essentially to the 345 and then reconfigure the 115 to do what it needs to do.

So that's one of the core problems is the inability, even if we had generation that we wanted to locate there, because of the weakness of the system today, it can't be done.

MR. KIRBY: I mean just to illustrate that point. We've seen this year in the Milford area, which is right in the heart of this, you know, some of this area, we had some new generation added to that area. And with that new generation, that displaced some of the existing generation because we weren't able to move all of that power to where it was needed. So we ended up with those internal limits on that, not being able to absorb the new plus keep the old.

MS. McKINLEY: We have a comment from Roger Zaklukiewicz.

MR. ZAKLUKIEWICZ: In response to Chairman Getz's comments, recognize that the overloaded 115-kV system in Connecticut has an impact on transfers between New England and New York on a minute-to-minute basis. So when the underlying 115-kV systems that are shown here are overloaded, it has a direct impact on the operating capabilities of the New York power pool along with ISO

New England and the transfers that can occur minute to minute between New York and New England.

So to characterize this as a Connecticut only problem -- I just want to make certain we understand regionally, upon the loss of any two 345-kV ties which carry most of the power between New York and New England -- upon the loss of any one of those, the power then will flow on to the underlying 115-kV and 230-kV systems which interconnect the two areas. And if the 115-kV system is already pre-loaded, then the overall transfer limit has to be much lower than what it would be if the underlying system could handle the overflow for the loss of any of the 345-kV lines between New England and New York.

MR. GERMANI: I want to just take a quick second and thank you, Kevin, for your presentation. I know you've got two more speakers before this panel goes.

To paraphrase Bill O'Reilly, this thing should stop here. We're not just having this meeting today in Connecticut because it's a nice place to visit or it's the middle of New England. We're having this meeting here in Connecticut because Connecticut has some major, major problems. And, yeah, we are all interconnected, but this is a product of many years of Connecticut not doing what it should do.

And I'm not going into political office or

I'm not an electrical engineer. But let's inject some reality. This is basically a Connecticut problem which is spilling over into the rest of New England. And it's not because we in Rhode Island, for example, have not done what we should do.

CHAIRPERSON WOOD: Representative Vicky Nardello, who is from the House Energy Committee, I think is down here on the dais. I want to welcome the legislators to our forum here and thank you for being here.

Kevin, thank you for your presentation. We will probably be visiting with you more during the day.

Sarah?

MS. McKINLEY: Thank you very much. Next we're going to hear from Derek Phelps, Executive Director of the Connecticut Siting Council, with an update of their activity.

MR. PHELPS: Thank you. Good morning.

COMMISSIONER DOWNES: Mr. Phelps, before you begin, may I just quickly interject?

Mr. Phelps is the Executive Director of the Connecticut Siting Council. As many of you know, the Connecticut Siting Council has before it a number of matters, including Phases 1 and 2, various stages.

Therefore, while we would like to take a statement from Mr. Phelps, it will not be possible for him to answer questions for that Council. Just one speaker, I'm sure he will make a statement and we will have the chance to ask questions later.

MR. PHELPS: Mr. Chairman, I extend to you my heartfelt thanks and sincerest appreciation for that opener.

COMMISSIONER DOWNES: You only get one free bite, Derek.

MR. PHELPS: Yes, sir.

Chairman Wood, Chairman Downes, Attorney General Blumenthal, distinguished guests, ladies and gentlemen, I extend to you greetings from Siting Council Chairman Pam Katz. And I thank you for this opportunity to be here today and participate in this important forum.

As indicated, my name is Derek Phelps. I'm the Executive Director of the Connecticut Siting Council, an executive branch agency of Connecticut State Government. The Council has jurisdiction to objectively balance the statewide public need for adequate and reliable services at the lowest reasonable cost to consumers with the need to protect the environment and ecology of the state.

The Council jurisdiction exists in certain

narrowly defined areas involving the siting and development of specified facilities. Such facilities include power generation and electric transmission infrastructure.

The good news for you today is I do not have a Power Point presentation. Bad news is I'm perhaps likely to take as long as some of my previous speakers. I intend today to describe for you, for your benefit, in summary, an explanation, a little bit of the history of this and what the Siting Council has done thus far insofar as the projects are concerned that you heard about this morning already. That includes what's known as Phase 1, the Bethel to Norwalk transmission line project, and Phase 2, the status of that docket that is before us right now, where we stand in that process and a little bit of what the schedule is that lies ahead of us. That is the Middletown to Norwalk project that you have also heard about.

On October 15, 2001, Northeast Utilities, which I will hereafter refer to as NU, filed an application to construct a new 345-kV transmission line and reconstruct an existing 115-kV transmission line within an existing right-of-way between Bethel and Norwalk, Connecticut. The right-of-way is about 20 miles long.

The Council held public hearings to hear local residents' comments in each of the five affected towns during the winter and spring of 2002. Each town became a party in the proceeding and retained legal counsel. Several community groups formed in opposition to the project and also retained counsel.

The Siting Council began evidentiary hearings in December of 2002. But in March of 2003, NU and four of the five towns entered what's known as a joint submission which proposed a route design that the utility company and the four towns had agreed to on their own, referred to as Configuration X. This route configuration involved a hybrid design of cross-linked polyethylene -- that's sometimes referred to as XLPE -- and high-pressure fluid-filled, HPFF, technologies. Overall, about half of the transmission line design configuration involves underground construction and half is overhead. Again, half overhead and half underground in the Bethel to Norwalk project.

The configuration proposed in this design involved a substantial amount of porpoising, a term which denotes a line traversing from overhead to underground and back again. According to testimony contained in the record, this Configuration X design adds 15 to 20 million dollars in additional costs over the initial all-overhead

345-kV design proposed by the applicants.

The Council rendered a decision on July 13 of '03 approving the configuration design with a modification that involved underground construction of one of the existing 115-kV lines in Norwalk. Norwalk was the one municipality not included in the joint submission. And an alteration to the design of the 345-kV overhead structures in an effort to limit visibility to the urban residents in that area in Norwalk. Also, the Council ordered that the 345-kV transmission line be installed underground in the vicinity of the town of Bethel school complex.

Nevertheless, the City of Norwalk filed an appeal with the Council's decision to Connecticut Superior Court on July 14, shortly after our decision, on the basis of several procedural issues as they saw it. The Superior Court denied the appeal on August 18 of '04, about a year later. No further appeal was taken by Norwalk, leaving the Superior Court decision as final. That just occurred a short time ago.

The final stage of the Council's actions involving the siting approval of transmission infrastructure such as electric transmission lines is the approval of what is known as D&M plans, development and management plans. Such D&M plans serve to address the

plan details for construction plans, site designs, including specific environmental mitigation measures and so on.

In the interest of efficiency, NU and the Siting Council have agreed to review the D&M details on that Bethel to Norwalk project in segmented stages. And to that end, the Council is currently in the process of reviewing and considering each of those D&M plans and has approved three such plans thus far, including the Hoyt's Hill Road transmission station in Bethel.

The Council intends to complete its review of these D&M plans by the end of this calendar year at the latest -- I wish to stress that point -- in order to facilitate the construction of this line as expeditiously as possible.

Now, I'll just describe for you a little bit about where the Phase 2 project stands right now with us. NU and UI, the two companies involved in that project, jointly filed an application to construct a new 345-kV transmission line and reconstruct existing 115-kV lines within an existing right-of-way between Middletown and Norwalk on October 9 of last year, slightly over a year ago.

The application submitted to the Council proposed a design which involved underground construction

of the transmission line project from the Norwalk substation in Norwalk to the East Devon substation in Milford. Thereafter, the transmission lines would run overhead to the Scoville-Warrick substation in Middletown.

The right-of-way route is 69 miles long, affecting no fewer than 18 Connecticut cities and towns. I think it might be 19. At a minimum. The Council held several public hearings this past winter in strategically chosen locations along the proposed route. Seven, as I recall. Most of the towns affected by the proposed routes -- most of the towns affected by the proposed route are parties in the proceeding with retained legal counsel and several of the community-based groups that were involved in the Phase 1 proceeding are now involved in the Phase 2 proceeding.

Evidentiary hearings in this proceeding began in April and are ongoing. We had our public hearings in the communities shortly thereafter in the spring. And we've had evidentiary hearings on this hours and hours and hours, days really, since April. And they are ongoing. We are in the middle of them now.

On June 7, Mr. Whitley I think, seated just a couple of seats to my right, Sr. Vice President and Chief Operating Officer of ISO, the region's bulk

power operator and a party in the proceeding, submitted prefiled testimony to the Council which stated with the project design that was the subject of the Phase 2 application as proposed by the applicants, quote, "will not operate reliably."

As evidence to support its concerns, ISO New England submitted a report entitled "Transience, Harmonics Study/Review" dated June 15 of this year. That essentially called for less underground construction than proposed by the applicants in order to, quote, "reduce the capacitance on the system and, therefore, increase the frequency at which resonance is likely to occur to higher order harmonics to which, if necessary, more practical harmonic filters can be applied."

Clearly, these developments occurring some seven months after receipt of the utility company's application to the Council resulted in significant impact to the progress of this docket proceeding. In direct response to the occurrence of Mr. Whitley's testimony and ISO New England, an ad hoc committee, including the principal participants in the proceeding, certainly the applicants, began efforts to assemble a project application to the Council that would meet the reliability concerns of ISO New England and reasonably address the siting concerns of the affected communities.

This group, known as the Reliability and Operability Committee or the ROC group, has now been meeting with regularity since July.

The Council is currently awaiting receipt of a report from the ROC group that will indicate what transmission line design is proposed for review and consideration by the Council. However, as recently as last week, the Council was advised that this report might not be submitted to the Council until some time in December.

Now, I'm going to continue a little further and explain that the Siting Council retained a respected firm with a global presence that is highly experienced at such transmission and distribution design projects as that is, as what is before us presently.

So I wish to advise that the Council is recently in receipt of its Executive Summary related to its report from KEMA, which is based in Fairfax, Virginia, the contractor hired to provide independent review and analysis of the Phase 2 project that is currently before us.

Please note, however, that because this docket is pending before the Council, I must respectfully decline to answer specific questions that might arise as to the technical merits or any of the other particulars

related to the following material which Christine I think has passed out to the audience. Dealing with such matters would best be discussed within the formal proceeding and on the record.

I will also remark that this Executive Summary has been sent to the service list as of this morning, as of today.

Pursuant to recently passed legislation, KEMA has been charged to explore all technologically feasible options for maximizing an underground solution of this project. To that end, I am pleased to provide a copy of the Executive Summary that is associated with KEMA's report on this project, the final report of which is scheduled to be delivered to the council this Friday. And I will post it. It's going to come to me electronically on Friday. I'll post it to the website by close of business. And for those who are present today -- and I know there are several -- who are on the service list as parties or intervenors in this proceeding, I commit to you that the hard copy will be sent out to you some time during next week. Perhaps Wednesday or Thursday you'll be receiving it.

I'm going to quote from the Executive Summary. And I think most of you have it in your hands. You'll find it on Page 2, sort of it in the middle of the

document. It reads as follows. "With regard to increased undergrounding between East Devon and Besick, KEMA's results confirm the harmonic resonance performance deteriorates as the amount of additional undergrounding increases. However, the results also indicate that passive filtering would be effective in mitigating these negative effects, especially for additional undergrounding in the range of 10 to 20 miles."

Based on these results alone, if effective mitigation is employed, additional undergrounding of up to 20 miles along the proposed corridor from East Devon north to Besick would be technologically feasible.

I'm also going to highlight a couple of recommendations that are contained in the Executive Summary and will certainly be contained in the final report. "Based on these study results, KEMA recommends the following two items. One, an optimal application of C-type filters, either alone or in combination with one or two stat coms, should be developed. In so doing, the two C-type filters should be optimized for specific substations and for the entire system. And, two, transient analysis studies should be conducted based on a detailed system model of the selected configuration."

Again, this material was being sent to the

service list.

Finally, let me mention and comment there's already been considerable remarks made here this morning about the consensus as to the frailty, the fragility of the grid in southwestern Connecticut. There's certainly no question that the Siting Council has seen evidence to that effect long before the Phase 1 and Phase 2 applications have been brought in to the Council.

There is ample material on file at the Siting Council going back as far as Docket 5, which is a project that the Siting Council undertook in the late 70's. So certainly the remarks about the need to improve the grid has been something that has been of record now for a good number of years.

In closing, I will merely remark that the Council hopes that the KEMA studies that you have in your hands will contribute to a dynamic discussion and to the technical issues related to this project and will help form a foundation for a solution that balances the concerns that are felt on all sides of this important issue.

Again, I thank you for the opportunity to participate in this very important forum here today.

MS. McKINLEY: Since Mr. Phelps will not be entertaining questions, we will go directly to David

Boguslawski, Vice President, Transmission Business for Northeast Utilities, who will discuss the recent proposed transmission upgrades.

MR. BOGUSLAWSKI: Thank you, Representative Backer, Representative DelGobbo, Representative Nardello, Chairman Wood, Chairman Downes, Commissioners and distinguished guests for holding this conference and attending today on this very important topic.

I have some slides here that I'd like to run through fairly quickly. I will try not to repeat what's already been said. I think that what my outline is for the day is basically just touching very briefly on the needs, which have already been covered, talking about the Connecticut siting process, giving you a project status and then talking a bit about finding the right balance. I mean a lot of this has been covered. So I will not dwell here at all. A lot has been said about the reliability of the system. I want to just hit the picture briefly.

What you see in this picture with southwest Connecticut is a quarter of the state's geography. It uses half of the power. It is the portion of the state that doesn't have any 345-kV lines. The rest of the state has roughly 300 miles of those lines.

With respect to the economic impacts, Commissioner Brownell asks, "What's the cost of not having these lines?" And that's a very difficult question to answer. But I might be able to provide a bit of perspective there.

When you consider the fact that we have to run more expensive power plants than we otherwise have to run, that are line losses. The power lost on the lower-voltage lines are more -- are greater than on the higher-voltage lines.

When you consider that we have to posture plants, have them ready to run because the transmission system is too weak, and when you add all these things up -- and there are certain other things as well that are costs -- you're probably over the 200-million-dollar-a-year range for Connecticut consumers today.

And our concern -- and we think we have a very valid concern -- is that those costs may well triple over the next few years, especially if we don't upgrade the system.

And there's been a lot said about the problem that's grown over the years. What I'd like to just briefly touch on in this slide is what have we done; because we've done a lot of things and the State has done a lot of things.

Connecticut, with respect to demand side management, probably has one of the most robust conservation and load management programs in the country, award-winning programs that we can be proud of. We have probably the highest per capita investment in conservation and load management in the country. We've added generation. We've added 57 transmission projects. We've used state-of-the-art technology, brand-new technology called static bar compensators and DFR's, which basically help regulate the voltage in a way that allows us to import power. With respect to southwest Connecticut, it allowed us to import about 200 to 300 megawatts, which is roughly 10 percent of the usage.

Now, where did we put it on the system? Well, we put it in places that we needed to do it. The main L's in the squares are line upgrades we've done. A lot of people don't know about them. A lot of people don't think about them. We've done a lot of this in the past several years, as we do throughout the system in New Hampshire and Massachusetts and Connecticut and other utilities in New England do throughout their areas as well.

But we're really out of these band-aids. We don't have any more. And we really have to upgrade the grid. We have proposed three projects, Bethel to

Norwalk, Middletown to Norwalk and a cable project running from Norwalk to Stamford called the Glenbrook cables.

Now I'd like to talk a bit about the Connecticut siting process which is probably state-of-the-art as well in the nation. The Siting Council was formed in 1971. It uses a very lengthy, 12-month process, full-blown adjudicatory process. Everyone's invited to participate that wants to. And the law that charged the Council with its role, at least up until 2004, required that the Council balance three very important things, system reliability, environmental impacts and cost to consumers.

Now, as the regulators behind me well know from their experience as regulators, the definition of what balance means really depends upon one's perspective. And just giving three examples, when it comes to many outside of southwest Connecticut, the cost to consumers is really what this is all about. When you think about ISO New England, you tend to think more about system reliability than anything else. And when you think about many of the local opponents, at least I tend to think about environmental impacts, however they may be defined, whether it's vernal pools, whether it's visual impacts, whether it's electric and magnetic fields, whether it's

viewscape. And I don't mean to imply that that is their only perspective on any of these, with any of these groups. But they all do have a different way of defining balance.

Now, over the years, what I've shown on this chart in the upper half is what we've proposed for transmission projects and in the lower half what laws have been passed that affect the Connecticut Siting Council.

And what you see on the upper half is that we've had 57 upgrades to the southwest Connecticut system from 1971 up to 2001, 57 separate projects. We applied for the Bethel to Norwalk line in 2001. The line was certified by the Siting Council in 2003. We applied for Middletown/Norwalk line in 2003. And we expect to receive certification in 2005.

At the bottom, I've shown the law creating the Siting Council was established in '71. During the Bethel to Norwalk proceedings, there was a legislative moratorium imposed that basically put the Connecticut Siting Council in a position where they had to hold up hearings until various working group reports were completed in 2003.

In 2003, a new law expanded the application requirements. And if I could for just a

moment? The application in the Middletown/Norwalk case is nine volumes. This is one volume. The full application was 2800 pages, a little more than 2800 pages. And the new laws have expanded the requirements.

And in 2004, there was a new law passed that mandates either undergrounding or, in the case of overhead 345-kV lines, buffer zones.

As to the project status, the Bethel to Norwalk project which is 21 miles of higher-voltage line and 12 miles of lower-voltage line has the Siting Council -- we have the Siting Council approval. And we are now going through a process of receiving all the additional approvals that are necessary, working with the towns and the communities, working with the Connecticut Department of Environmental Protection, the Army Corps of Engineers, working through the Siting Council to develop detailed design plans.

And there really is not one step along the way where we don't incur higher costs. We expect the Siting Council -- I'm very glad to hear Derek Phelps indicate that the Siting Council will be approving the remaining detail plans by year end so we can move on with construction.

You see in the bar at the top that we've actually been doing some of the substation work, even

during the court appeal period, because we knew or we believed that ultimately a line would get built between the two substations. So we felt that was safe. We will be building the lines over the next year or two and hope to complete them some time in 2006.

With respect to the Middletown/Norwalk project, which is 69 miles of 345-kilovolt lines, you can read the bullets there. We are very hopeful that the Siting Council will decide the case early in 2005, will find that right balance and then allow us to build. And we will build as quickly as possible if the line works and if we are very clear that when we build the line, we are --

Now, in the original application that we filed for Middletown/Norwalk, there were three alternatives proposed. We proposed the preferred route that was 69 miles, 45 miles of overhead, 24 miles of underground. And I really don't want to be shy about it. We heard the communities. We heard the legislators. They demanded underground, as much underground as we could build.

The studies that we had and the experience that we had told us that 24 miles was really pushing the envelope. But if we could make 24 miles work, we'd have

to displace no homeowners. And we wanted to try and make that happen. So we file an application that had 24 miles of underground in it.

But we also filed two other alternatives, one of them that had 60 miles of overhead, 13 miles of underground, and one of them that had 2 miles of underground.

I was asked to frame up some of the benefits and drawbacks of some of the technology options that exist for the panel. And when you look at the various costs, the reliability and some other concerns -- I put together this chart, which is a Consumer Reports kind of chart. The orangey circles mean good, the purpley circles mean poor.

And if you look at the overhead technology, what you see is clearly that would be the lowest cost option, have the best reliability, the best operability. But there are concerns about viewscape. There are concerns about EMF.

If you look at an all-underground option, it's pricier. There are definitely reliability concerns to the point where it won't work. There's also EMF with underground lines. I am surprised that a lot of people are surprised about that. But there are concerns about EMF there as well.

And one of the things that I think we all underestimate is how do you build underground lines in small roads, on State roads, on congested roads? Well, you do it by spending a lot of time and money, working late at night, paying premiums for overtime for contractors, disrupting traffic, disrupting businesses, disrupting homes. And that's one of the sort of hidden factors in underground that really I wonder whether people have thought about at all.

With respect to overhead and underground, I'm not quite sure what the cost will be. We've put estimates out there. But as I indicated earlier, in the Bethel to Norwalk proceeding, at every step along the way, every additional permit that we need to get layers on costs. And I can tell you that what we thought the cost would be in Bethel to Norwalk is going up significantly. The cost of undergrounding, in particular, is going up significantly.

And we are trying to find that sweet spot, how to find the most underground that will work.

And I've indicated here also some concerns we have with some of the static bar compensators. I think in isolated cases, we are finding -- we've actually investigated the option that is out there, we also have some concerns. But we are going to study it and we're

going to look hard to try and find a way.

In closing, I just want to say that it is our company's public service obligation -- and the Middletown/Norwalk project, we are co-applicants with United Illuminating. And I know they feel that it's their public service obligation as well. We have a public service obligation to keep the lights on. And we all intend to try to do that.

We really can't delay any longer. We are out of time. We want to find the right balance. We're committed to find the right balance. We are pushing and pushing and pushing to find a way to underground as much as possible. And if there's a way, we're going to find it. And if it will work and we're paid for it, we're going to build it.

I've summarized today the need for transmission, the siting process project status, the issues associated with the lines. I hope this is helpful to you. I thank you for being here today. And I'd be happy to entertain any questions if you have them.

CHAIRPERSON WOOD: I was struck, I think, by your -- I guess because we hear about this from a number of folks across the country in the utility enterprise. But you did mention twice "if we're paid for it." What's the issue there? I thought we'd -- I

thought between the feds and the states this was one part of the country where we had the cost recovery issue kind of dealt with. But what's your -- what are you pointing at there?

MR. BOGUSLAWSKI: Well, Chairman Wood, we are proposing to build a fairly large project. And as we've discovered building the Bethel to Norwalk line, at every turn along the way someone wants to change the project for some reason in the details. And I am convinced as we go to build the underground sections of the line we are going to find that the upset that's caused with traffic congestion is going to slow the pace, raise the cost -- and I'm just giving you one example. And as a result, the costs are going to go north of the project estimate.

And I think as utilities help -- wanting to try and solve the problems, we just want some assurance that that is a reimbursable cost.

REPRESENTATIVE DelGOBBO: Thank you. That's a question I would like some reassurance on myself. I'm sure many members here representing the Connecticut viewpoint would love to hear that, Mr. Chairman.

I wanted to get a better sense of two points you made. One is you characterized as sort of

this additional incremental cost for the existing project your, you know -- that you believe this is going to be a lot more expensive or a fair clip more expensive. Could you define a little better what that means in terms of dollars?

And the other is maybe just for clarification. You spoke earlier in your presentation about a 100 to 200-million-dollar additional cost that Connecticut rate payers, consumers, our economy bears because of the inadequate system we have in place and because we haven't moved forward.

Could you validate that a little bit more, what that represents? But, more importantly, how much of that is going to get mitigated if this system is -- the new system is put in place?

MR. BOGUSLAWSKI: Well, first of all, with respect to the cost penalties we pay, I think what I'm very concerned about is more the growth of the penalty charges than the base amount. We will never drive penalty charges to zero. It's just a fact of life that when you move power on transmission lines, there are -- there is energy that is lost. There is heat that is lost. And you have to produce more power to make up for that.

But the 345-kV lines will help reduce

that. I think once we build the transmission system, we enable the placement of generation in southwest Connecticut. And that helps mitigate any growth in those penalty charges. So, Representative DelGobbo, what I'm -- what I was speaking to really is the concern about those charges going from 100 to 200 million dollars up to maybe three times that amount. And that's what I think we can help mitigate, by building out the transmission system and enabling generation.

As to the cost increase in the transmission projects, the increases I've seen are on the Bethel to Norwalk project. The estimates that we had many, many months ago are out of date and we are presently updating them. I know, for example, that there's millions of dollars in changes required -- for example, one of them, the Army Corps of Engineers, in providing us a permit to work in Norwalk substation along the river, required additional retaining walls and civil work that added five million dollars to the project cost. That's just one example.

When I say the costs are going up substantially, I mean not by 10 percent, not by 20 percent. They're going up much more than that. I am more confident in the Middletown/Norwalk cost estimates that we filed with the Siting Council than I am with the

Bethel to Norwalk project. I am more confident with the Glenbrook cable project estimates than I am with the Bethel to Norwalk project.

What I think is important, though, is to recognize that the undergrounding has some complications that I'm not sure any of us thought of from a cost perspective.

ATTORNEY GENERAL BLUMENTHAL: Mr. Boguslawski, first of all, as one who attended many of those hearings with you late into the night, I know that you did listen. And I thank you for that. And I'm wondering about the Bethel/Norwalk line. Are the increases in cost due to the undergrounding or to other changes, such as the one you just mentioned involving a substation in Norwalk? Are they directly attributable to undergrounding? And, if so, what is it that was not known just a couple of years ago that is now known to drive the cost up by maybe -- I think you just mentioned double or triple.

MR. BOGUSLAWSKI: Yes. And I don't want to give anyone the impression --

ATTORNEY GENERAL BLUMENTHAL: Triple.

MR. BOGUSLAWSKI: You're trying to battle me, I think, a bit. And, Attorney General Blumenthal, I do appreciate you being here. And I remember distinctly

in the Bethel to Norwalk proceeding and the Middletown/Norwalk proceeding, one of the public meetings we held, it was about 95 degrees in the gymnasium with no air conditioner. And as we were both up there answering questions from the crowd, I was also saying a prayer that we lasted through that particular day with serving that peak load.

The cost increase that we're seeing really comes at us from many directions. The single biggest increase is in the undergrounding. As we receive bids from contractors who will dig in the streets, place the trenches, place the vaults, remove the rock from the rock -- and I think that they're putting premiums on the need, the work hour requirements that we think we're going to have. I think they're putting premiums on the time of year they can work. I think they are putting premiums on the exchange rate with the dollar and the Euro, for example, because these cables are typically manufactured outside the United States. There are several things.

And what we are doing right now is going through because we've just received the bids not very long ago and we're trying to peel them all back to take a look at them to figure out what we an do to keep the costs lower than they appear to be heading.

ATTORNEY GENERAL BLUMENTHAL: I just had a

chance to look at the Executive Summary of the KEMA study that Mr. Phelps distributed earlier. And on an initial reading, it seems to provide a significant new perspective on many of the technical issues that may be involved in the undergrounding issues. Would you agree that it's worthy of serious consideration?

MR. BOGUSLAWSKI: I agree that everything is worthy of serious consideration. I, frankly, hope KEMA is right. You know, KEMA is a well-respected firm. The firms that we are using and that ISO New England is using are also very well-respected. And they seem to be coming out with different answers. And so what I think is very important is that we converge on what is the right answer.

Now, I don't want to be reading -- I haven't seen the full KEMA report. And I know KEMA was talking about one aspect of reliability, this thing called system harmonics. Yet, if you read down further in their Executive Summary -- and it's only an Executive Summary -- they seem to be signaling that we haven't done transient network analysis, which is sort of the next level. And what I'm hoping is that they're onto an idea that solves one issue that also helps solve the other. But I don't know that until we actually sit down with them and talk to them.

ATTORNEY GENERAL BLUMENTHAL: And you plan to do that.

MR. BOGUSLAWSKI: I know we're going to do that. I don't know the ground rules of the Siting Council proceeding. So it may have to be in that forum.

ATTORNEY GENERAL BLUMENTHAL: Do you have any idea when the final report of the Reliability and Operating Committee will be done?

MR. BOGUSLAWSKI: I cannot give you a specific answer. I can simply say that we share everyone's frustration with the length of time that these studies take. They are iterative, computer runs that are minimally inches thick with printout that require analysis. And we've been -- and sometimes when you change some of the variables, you can influence the outcome.

What we're struggling with is the experts that we've all used come together, look at the analysis that's been done, even on the 24 miles of underground, and we don't seem to be able to pinpoint why the results are coming out as poor as they are. If we could sense that, if we could sense the underlying reasons, we could change something on the system a bit, make a new run and find that solution.

We are all struggling with the puzzled

nature of the consultants not being able to come and find the answer. So we are shooting to have something done in December. But it truly is a guess because every week that goes by, we try and crank out a new round of runs, a new round of analysis. We have the consultants working, throwing as many resources as they can afford at the problem. And it's been very, very frustrating to all of us.

ATTORNEY GENERAL BLUMENTHAL: And I understand that you share the frustration that has been expressed very vehemently. But, also, I don't take your remarks about delay as blaming communities that have expressed concerns or regulators that have expressed their concerns, but a frustration that is generally shared. I assume that to be the case.

MR. BOGUSLAWSKI: I think the frustration is shared by everyone. I'm not sure that there is any one cause for the delay. Clearly, the need to find and the desire to find the most amount of undergrounding possible is really what we're all trying to do.

ATTORNEY GENERAL BLUMENTHAL: Thank you.

COMMISSIONER BROWNELL: David, just a couple of questions. Thank you. It strikes me, from the number of issues you've raised, that there's kind of no way that we're going to make those optimal dates that we

saw earlier, that it just seems very unlikely that, even if everything got resolved tomorrow, we would make those early dates that the ISO was projecting. Is that correct?

MR. BOGUSLAWSKI: I need to have a better understanding of what the ISO was projecting. The ISO was projecting '06 for Bethel to Norwalk and '08 for Middletown/Norwalk. And I think that the Bethel to Norwalk dates are not in hand, but they are certainly something that we are shooting for and feel we can accomplish, unless there are some unknown, unpredictable twists coming our way.

The Middletown/Norwalk '08 in-service date, we are simply not far enough through the siting process yet to know what we have to build. And I have struggled with answering the in-service date question until I know what it is that has to be built.

COMMISSIONER BROWNELL: Okay. Well, I appreciate your honesty. I just want us all to be realistic. So let me make sure that I understand and that we all understand fully the drivers of cost because we've seen this in other regions in the country. The drivers of cost that you've mentioned is the uncertainty of the technology itself, that undergrounding itself is more expensive and there's some degree of uncertainty as

to kind of how much you can actually do. Second cost driver is delay. Third cost driver, no particular order, is change orders, as change orders in the construction of a building or your house run up costs. Fourth is labor -- I'm going to call it the housing factor of the labor conditions under which people will have to work. So that the extent to which we can control the delays and we can get some resolution of what the technology is going to be and then make an actual determination of the cost and, frankly, ask the people if they want to pay the premium for the underground lines. Is that a fair assessment?

MR. BOGUSLAWSKI: Yes. That's a good summary.

COMMISSIONER BROWNELL: Okay. And change orders happen because -- I know surprises happen, unfortunately. But change orders are happening because people are changing their mind. You talked about the Army Corps of Engineers. Is there any way that we could find out what --

MR. BOGUSLAWSKI: The agreement up front is -- again, it depends on what we mean by up front. When we go through a Siting Council proceeding, the Siting Council will ultimately agree that a line needs to be built between a couple of substations and they will decide whether the line is overhead, underground, what

the voltage is, how many lines you're putting there, how high the structures can be and so forth.

What we then need to go through is a process of working with the communities and coming back with a very, very detailed design proposal. And as Derek Phelps indicated, really segment by segment to the Siting Council and their internal review.

And the kinds of concerns that come up are many. And they're driven by basically everyone who has an involvement in the project. For example, on the Bethel to Norwalk line, where do you put the transition station exactly from going underground to overhead? If we're moving that transition station by half a mile dramatically changes the cost because you may have to work around -- you may have to acquire property. You may have to increase the underground section by that half a mile. You may have to work on a very narrow street. So there are a lot of -- that's just one example. And I can cite many others. There are many along the way.

And I think the permitting process that you go through first is you go through sort of a macroscopic review and you get one level of a certificate. And then you go through the detailed design. And during detail design, for example, one of the things we found in the Bethel to Norwalk case is at

the -- in the final order, the Siting Council ordered us to put additional amounts underground. Well, that changed the design of one of the substations because when you come into the substation underground -- and it may be more expensive, gas insulated switch gear. That's one example.

And so at every step along the way, until you get to the point where you have all your permits, you really are trying as best you can to keep the change orders to a minimum but you're also trying to navigate through a process where you are cooperating with all the important needs that the constituents have along the way.

COMMISSIONER BROWNELL: So when communities may aesthetic choices, for example -- I appreciate the work that you and others have gone through. Are they advised as those aesthetic choices are being made of the cost of those choices? Or as change orders are introduced by Siting Council, does the community who pays the bill have an opportunity to reflect on the importance of those specific changes? Or is that left to the Siting Council to fund-- the local permitting agencies to fundamentally make that decision for the customer along the way?

MR. BOGUSLAWSKI: As best as possible, for every decision that has to be made by a regulator, we are

trying to identify the cost differences. Generally speaking, the decisions along the way are made by either environmental regulators or the Siting Council. I'll leave it at those two for now.

MR. PHELPS: Commissioner, with regard to change orders, I will add that to the extent that you may wish to know what kind of boundaries or parameters are around the issues or the process as they relate to fine tuning and those exact decisions about mitigation measures, design technologies and so on, I will point out that, as Mr. Boguslawski described, we are a quasi-judicial agency, sort of a fully adjudicating agency that maintains very formal procedures. And to that extent, there is a record. And the flexibility or the latitude that the Council has for making adjustments or rendering decisions about the D&M plans and the final construction design and methodology, they must be within the body of the record. To do otherwise requires reopening the record, which I will tell you, you know, the Council is loathe to do barring any real compelling reason.

COMMISSIONER BROWNELL: I understand. My only point is that I think it's really terrific to give customers choices and options. Sometimes we ask them to voice an opinion over something about which they have no idea that they're going to be paying the bill for. And I

just think in terms of laying out a fact pattern, which I think is what we're all about here, just make sure the people who pay the bill know exactly what they're paying the bill for.

MR. PHELPS: Yes, Ma'am. And one last thing. We always ensure that the utility companies work with the municipalities, the elected officials, the legislators, the mayors and first selectmen, go back around for one more consultation period where they actually meet with those local residents and that they are fully engaged in those processes. And to the extent the cost factors are part of those discussions, the communities are informed about that through that second effort before the matter is brought in to us for final action.

COMMISSIONER BROWNELL: Thank you.

COMMISSIONER DOWNES: David, would you suggest that it was a -- would you agree that it's a fair rendition to suggest that undergrounding per se is not necessarily always the most expensive alternative? If you look at a situation where you have a highly densely populated urban area and you were going to put through overhead lines, then you're going to have to condemn fairly good-sized rights-of-way to make this work. So you're going to wind up taking houses and businesses and

whatever else. Whereas, if you underground, presuming that you have a public road or some similar kind of facility nearby, the undergrounding might actually be less expensive when you take into account the whole construction cost than the overhead. Is that, in fact, a fair rendition?

MR. BOGUSLAWSKI: Yes, it is. And I want to just point out on this chart, for example, in our filing with the Siting Council we actually pointed that fact out. When we you look at our preferred route of 24 miles of underground, what you see is that we are not acquiring additional right-of-way. And Alternative B, which had more of the acres of the right-of-way purchased and acquiring homes, that actually can be more expensive than burying the lines those 24 miles. And that is why we -- that is one of the reasons why we, as a preferred route, said we want to try and make that 24 miles work; because not only -- not only is it what consumers want and legislators want on the points along the way and it's what we want for them, but it also helps keep the cost down.

COMMISSIONER DOWNES: Thank you, sir.

REPRESENTATIVE DelGOBBO: Mr. Chairman, a quick follow-up actually to Commissioner Brownell's comment. What strikes me is that, in fact,

unfortunately, there is not necessarily the connection to the consumer of the costs. There's sort of a disconnect. As the Siting Council considers both the initial application and any variation that goes forward, it's not necessarily connected what that means to dollars to the Connecticut rate payers, although we have an extraordinary Office of Consumer Counsel. That office is aware of it and is trying to always push that envelope. I don't know that there's a real connection to people. And even in the process that you're undergoing right now. I wanted to clarify that because I -- unfortunately, I don't know if that's really been a message that the public in Connecticut has understood, these incremental costs and what they may be looking at.

My question to you as the applicant is something that they couldn't answer today. But as we're -- throughout today, we're being presented a picture again of significant concerns of reliability, of what the potential impact is to Connecticut, to the region, throughout this day. You as the applicant today -- I'm a little concerned as I've been an observer on how you're and the other utilities and United Illuminating, pending application, how that's going forward. I'm a little concerned that we're heading to a train wreck and that, in fact, all these nice graphs are nice graphs but that

we might not even get there. How do you -- can you give us a sense of how you feel the application process is moving forward and what kind of certainty or comfort level we can have that the issues will get adjudicated in a timely way and we're going to proceed with this transmission project?

MR. BOGUSLAWSKI: We know that the application is to run this until April of '05. So we must come forward with a plan or a set of plans, set of options for the Council some time in December. I think January may be pushing it a bit too late. And we intend to do that.

But we plan to use the next month, month and a half, to try and find again that sweet spot of exactly how much undergrounding can we do to meet the -- to maximize the use of undergrounding on this project. And that's really what's taking the amount of time.

We could come forward with a proposal right now, as we have and you see on this page, to put virtually the whole thing overhead. But I think that's only a partial answer to the problem. I think the underground -- the maximum amount of undergrounding that we can do is really something we also have to define and find. And that has been the challenge so far.

MS. McKINLEY: Mr. Chairman, a number of

questions have centered on cost and cost allocation. And our next session is going to deal with that issue. And I'd just like to, before we begin this next session, explain the plan. Steve Whitley is going to give a presentation of the estimated cost and potential cost allocation. And the rest of the panel is going to give five-minute opening statements and then we will open it for general discussion. So our first -- our first panelist is Steve Whitley, Senior Vice President, Chief Operating Officer of ISO New England.

MR. WHITLEY: Chairman Downes, Chairman Wood, Commissioners, it's indeed an honor to be here today on behalf of ISO New England to talk about cost allocation. Very timely, following up on Dave's presentation. All of the presentations this morning have been very well done.

And I'm going to stay at a fairly high level to talk about the process. I think we have a very good process for cost allocation in New England. It's been developed over the last few years. And I think it will go a long way to helping us get the infrastructure put in New England that we need to have to keep the lights on.

By way of background, back in July '02, FERC ordered the development of the cost allocation

process to accompany commencement of the market design with locational prices of various zones in New England.

In its December 2002 interim order, FERC agreed that in order to aid Connecticut's transition to L&P, it would be reasonable to moderate the financial impact of L&P by building a defined set of upgrades in southwest Connecticut.

They also challenged ISO New England and NEPOOL to develop a cost allocation method going forward based on an open stakeholder process and based on agreed to principles that would guide cost allocation rules. And I was fortunate to be a part of that process supporting Gerald O'Connor from ISO New England and NEPOOL participants and regulators to go through that process.

And just to give you an idea of the kind of principles that we identified as founding principles, one of them was that transmission serves many benefits to the region and to the pool over the long life of the facility. You only have to look back at the last ten years to look at periods when you go through nuclear outages, drought situations, cold snaps. And you may think of bulk transmission lines as just sort of one region of the network primarily. But when you look at those various scenarios, you can see that power flows in

many directions on many occasions.

Certainly with the advent of 9500 megawatts of regeneration in New England over the last four years, we've seen significant change in the flow of power across our grid.

We also recognize that the New England grid is very tightly connected. These are small states. Electrically we're close together. And what happens in one of our areas affects the other areas.

So we did develop those principles and we developed a process that gained 80 percent support from the NEPOOL participants and in December 2003 FERC approved that filing effective January 2004.

There are four key points in this process. First is that the transmission system upgrades that are approved have to be approved through the regional plan process called RTEP, which then identifies the specific transmission upgrades that have regional benefit. And those benefits can be categorized as either reliability benefits or economic benefits.

And by way of fact, we now have a number of those projects approved in our RTEP as we've gone through four years of updating this process and improving the process and continuing our planning.

At this point, all of the projects are

reliability projects except for two, which are economic upgrades.

And ISO also approves the reliability of the design proposed by the transmission owner. That's a process to ensure that the upgrade can integrate electrically satisfactorily to the grid and not deteriorate the performance of the grid and enhance the operation of the grid and meet the project's objectives.

The third step is that ISO approves the TO's cost allocation application to determine what the project is regionalized to the entire pool and what is localized. And the NEPOOL committees, in fact, the Reliability Committee and the NEPOOL participants committee as a whole provide advisory input in this process.

Now, how does that work? Upgrades that don't have regional benefit are not eligible for regional cost supports or portions of an upgrade that doesn't have regional benefit aren't eligible for regional cost support. Therefore, localized costs are the responsibility of the entities causing the cost. If we have a project that requires A to B, a line from A to B and the sound engineering way to produce that project to meet project benefits is an overhead line and additional cost to the project by putting an underground, then that

incremental extra cost per this process would not be rolled into the regional cost allocation. It would be the responsibility of the local transmission owner, the local state that imposed that cost.

The ISO determines -- reviews the application and determines whether those costs should be regionalized or localized based on the reasonableness of the design and the construction method used. We're basically looking for the project that meets the project's objectives as a reasonable cost and meets all the engineering requirements.

But beyond that, the ISO considers good utility practice, the engineering design and construction practices in the area and in the region, alternative feasible and practical transmission upgrades and also, as much as capital, includes the relative cost of construction, operation, timing of implementation, efficiency and reliability of the transmission upgrades.

The ISO completes its cost review when the applicants make the proposal and then the transmission owner constructs the project, places the project in service. Then the NEPOOL and the TO file the revenue requirements with FERC annually for inclusion into regional network service for RNS rates.

And how does this work? Under a formula

rate, the cost for new transmission facilities are shared around the pool on a pro rata basis. Electricity demand in each area of the pool determines its proportionate share of the upgrade cost. However, if one region of a system reduces its electrical use through conservation relative to the rest of the pool, they would pay proportionately less.

So, in effect, we have a process that allows transmission upgrades to be built that are to the benefit of the entire pool and are paid for on a pro rata basis, but the incremental cost of any extra facilities that are added that aren't basically required for the project aren't paid for by the pool.

This breakdown gives you the regional consumption percentages among the six states based on today's energy requirements.

Questions?

COMMISSIONER DOWNES: Steve, so, in short, ISO needs to go through the process of determining the regionalized cost versus the localized cost. And if we begin with the assumption for just a moment that integral pieces of the pool transmission facility, the underlying grid, are a regional benefit, then the real decision that ISO is making is primarily one of whether or not the proposal, in fact, actually works and is electrically

sufficient and meets good utility practice and engineering design and the other things that you mentioned on Slide 4. Is that, in effect, the situation?

MR. WHITLEY: Yes. The first thing, the RTEP identifies the system need.

COMMISSIONER DOWNES: Right.

MR. WHITLEY: And then the proposal has to meet that need electrically.

COMMISSIONER DOWNES: Right.

MR. WHITLEY: To keep the lights on. And then once that step is made, the project is approved and the regional transmission expansion plan, then the cost allocation process kicks in. Once the project is determined that it can work, then we look at what is -- what are the components of this project and are all the components necessary? All of the components that are necessary end up through this process getting rolled into the regional rate.

COMMISSIONER DOWNES: Okay. And just to follow that along for a second. So to the extent that ISO concludes that the cost of a particular project should be spread across New England, all of New England -- so to that extent, they're including something called the regional network service rate.

MR. WHITLEY: Yes.

COMMISSIONER DOWNES: And that's basically broken down according to the chart that you showed us on Slide 7. Correct?

MR. WHITLEY: Basically on a proportion of load.

COMMISSIONER DOWNES: Now, the piece that is not added into the regional network service presumably then goes to the local network service?

MR. WHITLEY: That's correct.

COMMISSIONER DOWNES: Okay. So that would be paid for primarily in Connecticut's case by Connecticut consumers.

MR. WHITLEY: That's correct. And I think that's a point that isn't well understood in Connecticut, that we've been trying to get that message out. You can't prejudge the process, but there's certainly a high potential that there is going to be incremental costs based on what you've heard today.

COMMISSIONER DOWNES: Thank you, sir.

CHAIRPERSON WOOD: Steve, when in the process is that going to be made so that it can help in forming the debate that some of the other decision-makers were talking about in the last --

MR. WHITLEY: It would be when the applicant brings the proposal forward. In this case, we

have to have a proposal that we all agree can work. We need to work out those details. And then we're able to bring forward a cost estimate for what it's going to take to do that. And then we'll look at that cost estimate and the alternatives.

CHAIRPERSON WOOD: Thinking back to David Boguslawski's time line on the two big projects here, when is the kind of witching hour for the Bethel/Norwalk? That's the earlier one. Correct? That's the one that's more advanced in the process?

MR. WHITLEY: Yes. That's right.

CHAIRPERSON WOOD: He had a chart that looks like that. When in that phase do they bring that to the ISO New England for those determinations to be made?

MR. WHITLEY: I think they'll be able to bring that one forward fairly soon. However, the ISO is looking at these two projects as a system. And we have to make sure that both of these two projects work together and they can be operated electrically together. And so that's all dependent on the results of these transient studies that we're doing right now. But I think that project will be able to come forward sooner certainly than the other one.

CHAIRPERSON WOOD: And so then the

determination as to the split between regionalized costs and localized costs can be made, what, in the next six months for that project?

MR. WHITLEY: I think in the next six months.

CHAIRPERSON WOOD: And then as to the other large project, assuming, of course, that they work together and they integrate on the engineering side, on the costing side what would be the time table for that? Would it be -- what is it dependent upon? And, Dave, you can jump in here, too. You guys move forward. Then you bring it to the ISO at some stage. What's the triggering event for the utility to bring it to the ISO so that those cost issues can be dealt with?

MR. BOGUSLAWSKI: Well, I think we're in a process that has -- is really still in development. And only recently was the process established. And where we are with Bethel to Norwalk is, as I said, we're going through a detailed estimate right now based on the final permitting that we're going through. So I would expect to be before the ISO either end of this year or early next on the first of the two lines.

On the second of the two lines, certainly we want to have a good project estimate before we go into the ISO for that cost allocation decision. I think we

need to be through the siting process for sure so that we know what the exact route of the line is, if you will, the amount of overhead/underground.

At some point between that date, which let's just for talking purposes say April '05, and six months thereafter when we would have done a lot of the detailed engineering, we'd probably be before them. So some time in '05 would be my guess.

ATTORNEY GENERAL BLUMENTHAL: Mr. Chairman, may I follow up with a question?

I don't know whether you're suggesting, David, that cost allocation would wait until the Siting Council process is fully done. Is that what you're suggesting?

MR. BOGUSLAWSKI: Yes. At a minimum, receiving the initial certificate. Whether we go through all of the development and management plan filings or not is a decision that's not made yet.

ATTORNEY GENERAL BLUMENTHAL: Well, I would respectfully disagree. And if I may, Mr. Chairman, cite the recent decision of the FERC in the Narragansett Electricity Company case where it held the application or the petition for declaratory ruling by my colleague in Rhode Island as moot was premature at the time, but it did direct that the ISO has an obligation as soon as

possible, even before the Siting Council process is done, to determine cost allocation issues for exactly the reason that I think Commissioner Brownell suggested; namely, that the Siting Council and consumers and all of us deserve to know who is going to pay the bill for the changes or incremental costs that may result from changes in the design and so forth.

So I would suggest that ISO New England be involved in this process even earlier. And there has been as yet, Mr. Chairman, no indication from ISO as to what the cost allocation would be on Phase 2, which I do think they have an obligation to provide.

CHAIRPERSON WOOD: And, Mr. Attorney General, you're correct. Our order in the Lynse Case (phonetic) said exactly that, that the Siting Councils do need to have that type of guidance so that they can make those decisions. And having heard how the Siting Council works just a moment ago from Mr. Phelps, I think that that clearly is where I'm going with my line of questioning. And the sequencing here may not get all the relevant information out. I mean how much are we -- are we talking -- do we have a ball park estimate for the delta or the under-grounding net of the -- I think as Don pointed out, net of the acquisition cost for surface land overhead?

MR. BOGUSLAWSKI: The 24 miles of underground proposal that we filed had an estimated cost that was around the same as the overhead, all overhead, solution. They were within a matter of a couple of million dollars of one another.

Now, what we -- what we don't know yet is, as we go through all these analyses that we're doing right now -- as we go through the analysis that we must go through to determine whether it will work, we will find that the costs change because we have to add more components to make the undergrounding work.

So I think there are advantages of going in sooner, as the Attorney General suggests. And we will certainly reconsider that. I do feel we must have a clear, well-defined proposal and estimate before we take that process forward. And maybe there is a middle ground that we can try and achieve here.

MS. HEALY: I would like to just jump in. Mary Healy, Office of Consumer Counsel. And my remarks will follow up a little bit on, Chairman, your question. We think that, too, there is a need to be fully informed on the area of costs that the consumers will pay. We think that there's an obligation and a responsibility of the Siting Council as well; that that is something that was not changed by the underground statute. There

clearly is a preference for undergrounding. But it did not change the balancing responsibility that the Siting Council has to undertake amongst reliability, cost and the environmental aspects of a solution that is in front of them.

So our position has been that costs are a very essential part of this administrative proceeding at the Siting Council. And that to put that into a clearer context, when this process that Steve Whitley is talking about has determined regional versus localized costs and say it's all underground and there is a reasonable alternative that is far less costly, however, the underground project is going in, well, who is going to pay for those incremental costs? And where is that proceeding going to take place?

Well, that's going to take place at the state level in front of the DPUC. Chairman Downes and the Commissioners sitting here are sitting here to be informed and to be ready for that. But that proceeding will have to take place to determine what of the -- who of the Connecticut rate payers will pay for those localized costs that are not deemed in this process, this 12-C process, to be regionalized.

And to that end, we want to have as much information on the Siting Council record to help inform

these decision-makers on localized costs and who should pay for them. And it would help us all in that decision if the Siting Council makes findings to that effect. Is it all of Connecticut rate payers? Is it a certain portion of rate payers who are the only ones clearly benefiting down in that area from certain of the undergrounding effects? Or is it some other sub-set?

So that it is really an opportunity that we shouldn't miss. Right now the record is still going on in the proceeding to really get as much information out there on cost and also to have a decision from the Siting Council that will help inform the ISO process as well as the DPUC process.

MS. McKINLEY: Thank you. I think it would be helpful to actually move on with the statements. Mary, would you like to continue with your statement?

ATTORNEY GENERAL BLUMENTHAL: Can I -- Mr. Chairman, can I just ask a couple more questions of Steve?

CHAIRPERSON WOOD: Yes.

ATTORNEY GENERAL BLUMENTHAL: I don't mean to be conflicting about this. But you would agree, would you not, that Phase 1 and Phase 2 have an impact on the entire New England region?

MR. WHITLEY: Absolutely. And the ISO

supports those, both projects as regional upgrades. They have regional benefits.

ATTORNEY GENERAL BLUMENTHAL: And they have significant regional benefits. Do they not?

MR. WHITLEY: Absolutely.

ATTORNEY GENERAL BLUMENTHAL: Thank you.

COMMISSIONER DOWNES: And I'm very sorry, sir. I promise I'll do this very quickly.

Steve, I think it may be useful for some of our friends to understand some of the dynamic here. The costs involved in undergrounding, those certainly come from the fact that you have to dig a trench in the ground and put the cable in and put the cable in the vault and run it down the trench.

There's a whole second set of costs which has to do with the electrical effects of bundling wires together inside a vault. As a general proposition, when you run wires together on an overhead arrangement where they're separated on those large towers, as a general proposition, the electrical effect of them is to produce a voltage drop over distance. And so we compensate for that by putting capacitors on the system to keep the voltage up every so often.

But on an underground basis, you usually have the reverse. When you bundle those wires together,

what you get is an increase in voltage over distance. And so then you need some sort of a device to reduce that voltage.

So my point is that there's a second set of costs beyond just the digging of the trench and putting them in a vault and so forth. There's also all these various mechanical devices or electrical devices that are necessary to maintain the voltage at a proper level over distance. And the voltage has to stay flat within a very narrow range. Is that a generally accurate statement?

MR. WHITLEY: Yes. That's correct. There's actually several aspects of costs I think that we have to look at. There's the capital costs. There are the extra devices that are needed to make it work. Then there's also O&M costs. If you an area of the pool that doesn't have any underground and all of a sudden they're going to have 345-kV underground, that's a major change in the whole operation. They're going to have to have completely different kinds of crews, trained crews and so forth, equipment to manage the operation of that underground system and to maintain it. There are concerns about splashes on underground that have been well discussed at the Siting Council. But those are all pretty big issues and new issues that didn't have a cost

associated with them.

MS. SUEDEEN KELLY: Steve, when the process begins for determining what's regionalized and what's localized, how long will it take?

MR. WHITLEY: It normally takes a couple of months. It takes one month of a transmission owner bringing his alternatives to the participants and a lot of questions are generated. And then the utility goes back and answers the questions and brings those back, the answers back. Normally it takes about two months. This one is so large, though, it may take a little longer than that.

MS. SUEDEEN KELLY: And who would initiate the process? Would it be the utility or would it be ISO itself?

MR. WHITLEY: The utilities, UI and Northeast Utilities would bring forth their plans to the Reliability Committee of NEPOOL which is a part of the process. And then they would review -- that committee is made up of engineers from the other utilities. Generators, owners, regulators attend that meeting. A lot of questions would be asked. And ultimately a recommendation would be made and the ISO would ultimately decide.

MS. SUEDEEN KELLY: And, David, when do

you think you might -- do you have a ball park for when you might take it to the ISO?

MR. BOGUSLAWSKI: As I indicated earlier, I think on the Bethel/Norwalk project, as soon as we go through a detailed design phase it should be perhaps over the years, we will. I think the Middletown/Norwalk project, I'm sometimes hearing several of you suggest that we go sooner rather than later. And we need to go back and think harder about that and determine whether we can, in fact, do that, given the fact that we are pouring, trying to pour as many resources as we can at doing the technical analysis to find how much undergrounding we can do.

So, again, I think I -- one of the things I've gotten out of this conference already is a fairly clear signal from several people that we ought to get in front of the ISO sooner on cost allocation.

MS. SUEDEEN KELLY: Thank you.

MS. McKINLEY: Mary, would you like to make your comments now?

MS. HEALY: First, just good morning, everybody. Thank you for being here. I think this is a terrific opportunity where we get everybody in the room to share their thinking on how to solve this issue. And I want to thank our FERC Commissioners and our State

Commissioners and other assembled dignitaries here and people who are just generally interested or are involved in the complex cases that are going on.

Our office has been actively involved in resolving the issues on today's agenda. We are members of NEPOOL in the end user sector. We are very engaged there. We were a party to the Phase 1 transmission line case at the Siting Council. And we are very involved in Phase 2 on behalf of all Connecticut rate payers.

And as we know, these involve the lines that are going to be built in southwest Connecticut which we all understand. That's one thing we can agree on. There is a problem that has to be resolved down there. In Connecticut's new transmission line case, the question of how much should be placed underground is front and center in this proceeding and including by virtue of a new state law, Public Act 04-246, that we've been hearing bits and pieces about.

And this undergrounding of the line raises two important issues, reliability and cost. And just a few words on reliability. In the state docket, ISO New England has said that the amount of undergrounding is going to impact and degrade reliability. This would be some 24 miles within the 69 miles of the Phase 2 project.

In recent weeks, I saw when the utilities,

as you have heard, have been engaged in a concerted effort to resolve this issue on reliability with undergrounding by modeling many different line configurations. In effect, ISO is carrying out a dress rehearsal of its so-called 18.4 process where it will look at the Siting Council's certificate to see if it passes its criteria on reliability and other criteria.

This ROC Committee issued its most recent report last Friday. We were involved in a conference call. And the planners have ruled out some of the options to increase undergrounding. For instance, the use of -- the extensive use of stat coms is not an option any longer. It is not a reliable option.

And I just want to parenthetically add Connecticut rate payers and regional rate payers want reliability first and foremost. We don't want it irregardless of cost. So I'll say a few words on that in a minute. But reliability -- we want to buy a reliable product. We want it to work right the first time. It impacts all of the economic engines, Joe McGee's clients, the CBIA's businesses, we all need -- and our residential, we all need that reliability. That is what we're trying to figure out at this point.

And if it can be done by undergrounding it and we get that reliability, then fine. Then we go on to

the cost. And as I understand, it's going to take some weeks, maybe months for that ROC Committee to continue their line configurations, their modeling. And so I guess a little patience is in order. But we do have a great deal of urgency about the situation.

On to cost. Let's assume the reli-- the configuration has been decided; it passes the reliability muster. The applicants estimate that the Phase 2 line they initially proposed would cost 604 million dollars to build it. And that was overhead. And that's 2003 dollars, 604 million. Preliminary estimates suggest that extensive underground construction would at least double this figure. And ISO New England and NEPOOL, as Steve has told us, have in place this cost allocation procedure. It used to be called 50.5. But Steve told me it's now 12-C.

And there are several points about this process to keep in mind. First, if the Phase 2 line ends up featuring substantial underground construction, I believe this process is likely to reject New England-wide socialization of most of the incremental costs. Second, aiming the December 2007, quote, placed in line or placed in service deadline that FERC announced in its December 2003 order is not likely to change this result. And why do I say that? Because by its own terms, the FERC

announcement never reached so far as to guarantee socialization for all costs of either the Phase 1 or the Phase 2 projects.

And to clarify, this December 2007 deadline has caused some concern about the urgency of trying to get the decisions done because after that whatever is decided wouldn't be eligible for socialization. Well, the reasons we believe that December 2007 date is not a drop-dead date to achieve New England-wide socialization for otherwise eligible costs -- and here I would like to see the Commissioners from FERC nod if they agree, if FERC believes -- if FERC believes that a project in the works now but going into service somewhat after that deadline actually improves system reliability or market efficiency, as any well-designed transmission line would do, then it stands to reason that it would allow some level of socialized cost recovery for that project.

Third --

A VOICE: They're thinking it over, Mary.

MS. HEALY: Yeah. I'll give you a copy of my remarks later.

Third, the 12-C, formerly 5.5 procedure, we believe is well thought out and is basically sound. It would unwise for Connecticut to try to evade its

effects for our state in the event that the Phase 2 line does end up including substantial underground construction. And this is a long-term view, really.

This 12-C procedure is in place for all of New England and for the long run. In the future, for instance, it could enable Connecticut to avoid paying for locally focused costs generated by transmission upgrades in other states.

The Siting Council's role in reviewing these transmission line applications is to properly balance multiple considerations. At a minimum, these include, as I indicated before, system reliability, public health and, yes, cost.

A new law that Connecticut specially passed, the undergrounding statute, 04-246, does not change this mandate for balance that the Siting Council has. Clearly, that law expresses a preference for underground construction. However, that preference is not to be implemented regardless of other considerations.

The applicable laws framing utility rate regulation inherently treat cost and cost containment as a central, inescapable issue. This priority is expressed in different ways in various statutes -- you've seen them -- from just and reasonable rates to, quote, efficient management of the franchise to prudence. But it always

there. And it is front and center in this administrative proceeding at the Siting Council.

And to sum up, cost is rarely a secondary consideration in utility regulation and it is never an irrelevant one.

And if I may indulge, I have to say a brief word on EMF, which is on the agenda. The Siting Council has a mandate to address public health issues as well as reliability and cost issues in evaluating this transmission project. This is where EMF's come in.

In the current Phase 2 transmission line case, the expert testimony on EMF dangers is sharply conflicting. And people feel very strongly on both sides of the debate. OCC has not presented its own testimony on this in the current docket. We are not experts on this. It's not part of my mission or my office's mission. But I understand it's very important to many people and I don't undervalue that. But we will be closely evaluating that testimony of other parties in this docket as it proceeds.

And one final comment on that. EMF's have reached a somewhat surprising prominence in this Phase 2 docket. For instance, in Phase 1 our experience showed us that EMF's played a distinctly secondary role. OCC in both of the transmission line cases has sought to bring

the cost issue forward in its broadest context. Our concern, for instance, has not been to minimize the construction cost per mile of specific transmission options. Rather, we've advocated the development of an electricity infrastructure that embodies an overall least-cost solution that gets the job done. This means taking all costs and all benefits into account, not just construction costs for transmission and the benefits of a new line.

To decide on a sound basis whether this transmission project is right for Connecticut, one also should examine energy costs, such as L&P, also known as congestion costs, significant multi-million-dollar charges that we all pay as electric rate payers. The costs and benefits of conservation and demand side management continues to be undervalued in the state. I'm hearing more about things about 2008 -- where we're not going to see any new generation, as this gentleman from FERC said, is an opportunity to really get serious and more strategic about that third leg of the stool.

Air quality implications of the various projects also must enter into account. This used to be a well-known and well-understood regulatory exercise. It was called integrated resource planning, you may all remember. It's become much more difficult in Connecticut

since the electric industry was restructured. But we have to try. And I think that's what we're all about here today.

And I'll close by noting that Connecticut has in its new Connecticut Energy Advisory Board a powerful opportunity to approximate integrated resource planning in this new restructured era. I serve on that CEAB board with Chairman Don Downes and acting Commissioner Jane Stahl. The Governor has an appointee on the board, as do the House and the Senate. And it's fully engaged and moving vigorously ahead to get this vital job done of restoring integrated resource planning. It's going to carry out the energy plan that has been articulated for the state and with a sense of urgency.

And I thank you for your attention.

MS. McKINLEY: Thank you.

We really must move on. Our next presenter is Joseph Brennan, Senior Vice President, representing the Connecticut Business and Industry Association.

MR. BRENNAN: Good morning, Chairman Wood, Chairman Downes, other members of the panel and guests. Thank you very much for inviting us here this morning. Let me say at the outset I'm here representing the business community in Connecticut as a whole today. With

me to my immediate right is Rob Early. Rob is assistant counsel at CBIA and represents our members before the legislature, the DPUC and Siting Council on energy issues. And also, to Rob's right, is Joe McGee, the Vice President of Public Policy and Programs for SACIA, the business council of Fairfield County. So certainly from Joe's perspective and his members in Fairfield County, about a third of our 10,000 member companies are located in southwest Connecticut. We have a particular interest in this topic.

What I'd like to do is just make an opening statement based on overall economic impact of the issues we're discussing, put it in context a little bit about the specific Connecticut economy and then I'd be happy to answer any questions. All of us will be available to do that.

The business community is here today because of what's at stake for both our state's consumers and our economy. Reliable and affordable supplies of energy are fundamental to a healthy economy.

Currently, the transmission crisis facing our state literally threatens our ability to fuel economic growth. State consumers continue to pay higher costs today because we have not fixed our deficient transmission system. As we heard this morning, the

discussion of congestion costs. More importantly, our state remains vulnerable to the severe economic impacts that can result from brownouts and blackouts, as we found out in August of 2003.

I'm not going to go through in any detail, but we did do a survey a couple of years ago of businesses across Connecticut as to the impact that unanticipated loss of power would have on their businesses. And some people in the general public might just think a power loss as being out, you know, a day or two after a bad storm. But for these types of businesses, even seconds or minutes can have pretty serious impact on their productivity and on their bottom lines. Particularly with financial services businesses in Connecticut, some of our high-tech manufacturing, any interruption at all has serious implications. We can share that study with you if you're interested.

Significantly, Connecticut's electric demand has increased nearly 25 percent over the last 10 years. We're more dependent on electricity than any time in our history. This increase occurred despite the conservation efforts in Connecticut that have been models for the rest of the nation.

More importantly, the southwest Connecticut region represents the fastest growing demand

area in the entire state. In order to continue the important economic growth in the region, we need to ensure southwest Connecticut's access to reliable power. The business community sees no way to ignore the need for dramatic improvements into our current infrastructure.

Our overall energy policy has three main priorities. Number one, upgrades to our electric and natural gas transmission systems and the siting of adequate generation capacity. Two, conservation and load management efforts, as well as the development and deployment of alternative energy technologies. And, three, the creation of vibrant competitive marketplaces for both electricity and natural gas.

Such a multifaceted approach will likely remedy the problems not only in southwest Connecticut but the entire state and, we believe, in the New England region as a whole. It can also help the Connecticut consumers continue to lead the nation in efficient use of energy and have a reasonable choice of energy resources.

We understand that most parties acknowledge a need to upgrade our infrastructure. Our concern is that one or two years from now we're still sitting here everybody acknowledging that need but not having anything been done. Our message today is that the acknowledged need must be coupled with a heightened sense

of urgency to get the needed upgrades built.

Connecticut fashions itself as a technology state due to the high education levels of our employees, our prominence in research and development, our pharmaceutical, bio-science, insurance and financial services industries, software development, high valuated manufacturing and other industries.

We will not be able to sustain this type of economy with an antiquated energy infrastructure. Certainly from a competitiveness standpoint, I don't think any of you need to be told that we're in an intensely competitive environment, particularly in Connecticut, the New England region, the U.S. as a whole.

Cost impacts are something that are much more problematic for our members than they were 15, 20 years ago. So we have to look at every incremental cost in operating a business in Connecticut, whether it's increased cost of producing your product or delivering your service.

But as we've seen congestion costs pile up over the last several years -- and, again, this is not anything to do with pointing any fingers at either regulators, legislators, the applicants, community groups, environmentalists, anybody else. All we're trying to say today is that the delay really is causing

serious problems. The more we delay, the more those congestion costs are going to increase. The more we delay, the more the construction costs will ultimately be when we finally build something. The costs are really having an impact on Connecticut's economy. And our fear is that impact is only going to grow over time.

So basically we're just asking all the parties gathered here today, and certainly with FERC's guidance and influence, to try to move this process along as quickly as possible, to expedite it in any way that's feasible in order that we can begin construction on very, very critical projects.

We know the very serious cost allocation and other pricing issues involved. We have been at the table and continue to be at the table to discuss those with you. But the overall message, again, is the sense of urgency that really needs to be underscored in order that we can move these projects forward.

Thank you. Again, we'll be happy to answer any questions.

MS. McKINLEY: Thank you, Joe.

And now we're going to hear from Joseph McGee, Vice President of Public Policy and Programs of SACIA, the business council of Fairfield County.

MR. JOSEPH McGEE: Thank you. And just

let me, for the sake of time, join with Joe and state that we've got a question, though, that was raised this morning I think very powerfully. The cost of this system and the process by which these decisions are made is somewhat confusing. The Norwalk to Bethel line, what's the cost of that project if it's 50/50 underground/overhead? What's the differential? We keep hearing -- these numbers keep floating on us. It's 10 to 20 million in the DPUC -- in the Siting Council account. It's far more than that in the utility account.

The other problem is you can't build Line 1 if you don't build Line 2. This is one project, but it's broken up in the process into two. As the customer, we pay the bill on this. We're trying to figure out what will this cost us. If it's simply 10 million more to do the Bethel line and bury it, 10 million financed over 20 years is a buck a month to the customer. I think people would say that's reasonable.

If it's 150 million, that's another equation. And the problem we're having as a business organization which is a critical issue -- what will this cost us? And I think a way you can be very helpful to this local situation is to put some parameters on when you define it, what's the date certain and no decision is made unless we know the cost of this process.

I don't know how anyone buys this pig in a poke. This is a game of Three Card Monty. Here's the pea. We move it over here, move it again. Business people need to know is it reliable? What will it cost? And when is it going to be done? And after this morning, sitting here for three hours, I don't have a clue on that.

Thank you. That is unacceptable.

MS. McKINLEY: Thank you, Joe, for those refreshing comments.

Our final comments will come from Tom Welch, Chairman of the Maine Public Utilities Commission.

MR. WELCH: And happily from Maine following those last comments.

I want to speak -- first I want to thank the FERC Commissioners, Chairman Wood and the others, and also, in particular, Don Downes, for allowing me into the state. And my Connecticut colleagues.

I'm speaking largely in support of the ISO process of separating base line costs for reliability projects which currently are spread throughout the region and incremental costs to accommodate local concerns, which I think are appropriately borne locally. But I will, just in response to the last speaker, indicate I think that the implications of where costs go and what

the magnitude of those costs is is absolutely critical when people are making their decisions about what routes to pick or how much local support they're going to throw one way or the other.

But let me step back just a moment. The emergence of markets as a way of allocating resources and bringing benefits to consumers has revealed, though not created, a number of inherent tensions in our collective efforts to ensure reliable and economically efficient electricity infrastructure.

The particular tension that's relevant here in part is between ensuring sufficient reliability to move power within and among regions on the one hand and, on the other hand, avoiding structural or systematic bias in favor of transmission at the expense of other approaches that might be capable of delivering the persistently adequate and reliable supply of electricity that our economy and consumers demand.

Markets should be as large as information systems, line losses and the practicalities of dispatch and coordination permit. When markets are larger, the overall efficiency of the system is improved to the benefit of the market as a whole. Larger markets permit the capture of the benefits of dispatch over a larger set of available resources, take advantage of load smoothing

available when areas with different climate and demographics act in concert, increase fuel diversity and security and reduce the opportunities for the exercise of market power.

For this reason it is likely that any transmission project by increasing the extent to which lower-cost power can be brought to higher-cost areas will to some degree enhance the overall welfare of the entire market. But it does not follow that every possible transmission line should be built or that all areas of the market should bear equally the entire cost of every major project.

We should not prejudge how to make infrastructure and capacity sufficiently robust for all approaches. New generation, distributed generation, conservation, both persistent and peak shaving, in addition to transmission should be evaluated and encouraged through market and regulatory mechanisms that do not produce artificial results; that is, results that do not reflect effective solutions at economically efficient prices.

In a closely analogous way, policy, including the systems of cost allocation, should reflect, to the extent possible and practical, the geographic scope of benefits. The reasons for assigning at least

some cost elements to the area that will benefit most are both economic and equitable.

On the economic side, if the costs imposed by local aesthetic and political concerns are socialized broadly for transmission but not for other solutions, such as generation, distributed generation and demand response, transmission may become the preferred solution even if it is not the most economically efficient.

With respect to equity, it seems difficult to justify taking money from areas that lag in economic growth and the accumulation of wealth which drive respectively the need for additional supply and the political force with less aesthetically intrusive solutions and distributing that money to areas whose very success suggests that they have ample money to pay.

Put another way, those of us in less prosperous and slower growing areas can understand why we should pay some portion of projects built to improve the overall economics and reliability of the system of which we are a part. But it is impossible to understand why we should be asked to carry the additional burden of satisfying the aesthetic sensibilities of those whose very prosperity has created the growth in electricity consumption and, thus, the need for the additional infrastructure in the first place.

Now, some may argue that because a line needed for reliability will not be built unless local concerns are met, the cost of meeting those concerns should be socialized to improve the changes of construction. Accepting such an argument is fraught with peril to our collective pocketbooks. Such a policy would effectively transfer to local siting boards the right to determine what costs are socialized and remove any incentive to achieve either economic efficiency or equity.

This concern is not merely hypothetical. In the deliberations of the Connecticut Siting Board itself of the proposed Phase 1 upgrade in southwest Connecticut, the Siting Board considered that Connecticut rate payers would have to pay only about 27 percent under a socialized regime. And, in part, because Connecticut rate payers would have to pay only about a quarter of the total cost of the project, the Siting Council was willing to approve a plan for using underground transmission lines to address local concerns even though, according to all the testimony we've heard, this plan substantially increased the cost of the project.

Now, in Maine, the legislature itself has considered a closely analogous issue and concluded correctly, in my view, that the additional costs imposed

by local community concerns should be borne by the local community. Where a community has designated an historical district, for example, the community can insist that the utility either place its structures out of view or underground. But where such a demand is made, the municipality, and not the rate payers in other areas of Maine, must bear the cost of doing so.

In conclusion, I fully recognize the need in parts of Connecticut for relief from the reliability concerns that have been rather eloquently articulated today. And I'm also prepared to defer to the ISO's finding that the best available alternative at the moment is the construction of new transmission that can bring additional power into the area.

I am even prepared, for the purposes of today's discussion, to recognize that there will be widespread benefits to such new transmission for the entire region and that the region as a whole can reasonably be asked to share in some of the costs. I do not believe there is any justification, however, for asking consumers of electricity outside of the local area to pay for costs beyond those minimally required to build a transmission line that satisfies the dictates of electric reliability.

The Commission should, thus, support the

ISO's policy that excludes from socialization costs for undergrounding facilities where an aerial alternative is cheaper.

In the longer term, we should continue to work towards a more fully integrated system of economic incentives so that, unlike today, decisions among transmission generation, distributed generation and demand response can be made preferably by the market on their underlying economic and reliability attributes and not on systems of unjustified subsidies.

MS. McKINLEY: Thank you.

We are running a bit over. Are there any -- a few questions or one question?

Mr. Chairman?

CHAIRPERSON WOOD: There are probably a lot of issues that get better if you think about them over lunch.

MS. McKINLEY: Then we will reconvene at 1:00.

CHAIRPERSON WOOD: We'll see everybody at 1:00 sharp; we'll begin the presentation.

(RECESS)

CHAIRPERSON WOOD: Okay. Thank you for coming back promptly. And we have asked a renowned EMF expert, Dr. Robert Goldberg, who is Director for EMF

activities and Editor of the EMF Health Report in Philadelphia, to come to discuss some issues which I understand have come up quite a bit and, as we heard today earlier from Mr. Phelps and others, have come up in the context of transmission siting here in Connecticut. And rather than going on with the panel, the technology panel, we thought we'd break out this particular safety-related issue on its own.

And I think with no further preface than that, Dr. Goldberg, I'd like to just turn it over to you and let you have the floor.

DR. GOLDBERG: I would like to use most of my time just to answer your questions. But I thought it might be helpful to give you first a little bit of background on me, our company and the EMF problem as a health issue.

I have a doctorate in medical biophysics from the University of Toronto. I went through a happy early career in research and teaching and then about 19 years ago got involved with Information Ventures where, since then, I have been pretty much full-time tracking the world literature on electromagnetic field health effects from static DC fields on up into the power frequencies and up into the microwave and up to the terrahertz range.

We, as a company, have maintained a data base where we've collected the world's literature and we have it in a computerized form, now running about 35,000 articles and records representing individual publications and meeting abstracts. From that number, I think you see this is a fairly complicated, complex area. And as people have already mentioned -- and I think you've had some experts speaking before this group before -- it's a controversial area. It's an area where there are many unresolved issues and an area where there's a lot of disagreement in terms of what's going on.

In terms of what we do with the area, we, in addition to producing this data base, produce the EMF Health Report, which I think you mentioned I'm an editor of. This has been going on for 12 years now as a bi-monthly newsletter covering both the positive and negative aspects of EMF biological effects, not necessarily hazards. But there are many medical applications and basic research as well.

We've done reports for the state of Maryland for their environmental group in the PUC monitoring power line issues. We've done some work, reports for Electric Power Research Institute for their member utilities on EMF and cancer specifically. We've done work for Department of Transportation that was

concerned about electrical rail transport and the field from those and specifically magnetic levitation train designs which generate some pretty high magnetic fields.

And we were involved in the EMF Rapid Program which some of you may have heard of, a congressionally mandated program from 1994 to '99 run by Department of Energy and National Institute of Environmental Health Sciences to basically assess the risks of power line fields.

Just briefly, I think most of the concern with EMF centers around the epidemiologic studies which have their origin, at least in the west, in the United States and in the study of Wertheimer and Lieper in 1979 where they surveyed the homes, the residences of children who had died of leukemia in the Denver, greater Denver area, and noticed a correlation between presumptive magnetic field levels in the residence and risk of dying; in other words, a higher number of the children, the case children, than a comparable group of control children were exposed to magnetic fields which they measured by a surrogate measure called wire code which was based on computing distance from lines and looking at various transmission and distribution lines and assessing the amount of current they carried.

In the 20-year period since that study,

there have been perhaps 120 epidemiologic studies of various sizes and qualities, the most recent studies using much more sophisticated methodology in terms of assessing exposure and trying to get a handle on what might be going on.

The upshot of all this research is really a statistically significant risk association with childhood leukemia that has caused several groups reviewing this using International Agency for Research on Cancer criteria to class EMF as a possible human carcinogen. And this means simply that there is a statistically significant association representing perhaps a 60 percent to a doubling of risk of contracting leukemia for children living in close proximity to power lines. But at this point, it's very hard to assess what aspect of living next to power lines might be involved.

Also, the people who have investigated this have pointed out to some degree of comfort that this appears to occur only with very high levels of exposure. The estimate has been about .8 percent of children might be living in residences that are like this. And, fortunately, childhood leukemia, which is the disease that's been most closely associated, is itself fairly rare. Perhaps three per 100,000 cases, which means that it's, from a public health point of view, not been

considered to be a very pressing problem and, from a biological point of view or from a research point of view, means it's been very hard to pin down because you need large numbers of cases to see any effect.

So, that being said, there's a large amount of research in basic biological experiments, animal experiments, cell experiments. And I understand you've been regaled with much of this over the years in considering the siting. So I would be prepared to answer any questions you might have on this body of research.

CHAIRPERSON WOOD: When I was doing siting issues in Texas, we had a number of EMF issues. What was -- that came up in probably the mid to -- well, pretty much the mid-90's. I recall that there was kind of a seminal study or seminal effort that happened in the late 90's that came up in the hearing that I presided over down there that tended to, I think, reduce the concerns on that. Can you walk through what that literature was?

DR. GOLDBERG: Yeah. I think you're probably referring to that congressional program, the EMF Rapid Program, which went from '94 to '99. They did a final report in '99.

CHAIRPERSON WOOD: Okay.

DR. GOLDBERG: And I believe that's -- somebody told me you had seen that final report or it's

been submitted to this group. Basically, that was a 45-million-dollar research program that was basically aimed at trying to validate some of the laboratory research that was supporting a suggestion of cancer incidence.

That particular program didn't do any epidemiology research; that is, looking at human population. But they tried to repeat some of the major studies that had suggested electromagnetic field bio-effects at very low levels of intensity; that is, much lower than the prevailing standards that had been set up based on well-recognized biological effects.

And in one sense, I guess it laid some things to rest and they were unable to replicate many different lines of experiments. But they made a decision right at the outset to use a very controlled exposure. And the Department of Energy financed the engineering of exposure systems which were used by the majority of the investigators that gave a very pure, very well controlled sinusoidal 60-hertz signal without any of the spikes and transients that normally occur in electric -- in normal electric power.

So this body of negative results, which is I think quite reliable, was called into some doubt by people who weren't willing to accept it by saying they weren't really replicating the original experiments.

They were doing a different experiment using this very pure sort of exposure.

CHAIRPERSON WOOD: To switch gears a second, is there anything from your studies or from what you've researched on, Dr. Goldberg, that has a distinction between the undergrounding and the above-ground as far as any sort of -- any amounts or what would need to be done --

DR. GOLDBERG: Well, I think you may have some discussion on this after me. But I believe the main effect of undergrounding in terms of electromagnetic field levels is to reduce the field levels by phase cancellation. Basically, electric power is delivered usually in three phases which are 120 degrees out of phase and they tend to cancel each other out, which means that when you have two phases in opposition close together, very quickly as you move away from a line -- there's, of course, a magnetic field right at the wires. But you move away and the intensity drops off very quickly. As opposed to a single-phase line where it drops off much more slowly.

So the primary function of undergrounding in terms of magnetic field reduction is by insulting the lines and bringing them into close proximity, you're getting more phase cancellation and effectively reducing

the magnetic field at the source.

CHAIRPERSON WOOD: What would be, for example, for the overhead 345 line which are what we're talking about here? What would be the range that would be kind of beyond which the effects are negligible? That's kind of the -- what's the zone of concern, radius?

DR. GOLDBERG: Well, the standards in terms of exposure by organizations like IEEE and the ICNER, the international agency, are based on what we call acute effects, effects that can be easily measured and clearly demonstrated in a short-term. For example, in the power frequency range, you're worried about inducing currents in nerve and muscle that might trigger irregular heartbeats or other -- those sorts of problems. And then they establish a standard below, far enough below that level to sort of compensate for unknowns and uncertainties and differences in susceptibility.

So that brings you to a level of about one Gauss or a thousand milliGauss in terms of average exposure levels. The upsetting thing or the alarming thing about the epidemiologic studies is that you're dealing with fields that are much lower in terms of the average fields that you can measure for people living in proximity to power lines. And it varies in different studies. But there were two large poolings of these

epidemiologic studies that looked at the overall risk of in one case non-combined studies and another case of 15 combined studies. One established a level of effect at over three milliGauss, another at over four milliGauss.

But I think it's important to realize that these are really descriptive levels. In other words, it doesn't mean that above four milliGauss it's dangerous, below four milliGauss it's safe. It means that people living near power lines seem to be at slightly greater risk and we can characterize those conditions by this average field level.

But there are many people who feel that there's something other than the average magnetic field that may be causing the effect. For example, spikes of transients or even contact currents as a result of currents being induced in the household plumbing.

And it's all complicated by the fact that the animal studies that I referred to have not in any sort of unequivocal way pinned down a particular exposure where you can take a laboratory rat or mouse, expose them to a particular characteristic of an electromagnetic field and show that you're increasing reliability the incidence of cancer.

CHAIRPERSON WOOD: So I'm trying to -- based on your studies, how close is close? I mean how

close were these lines? And were they large, high-voltage or relatively distribution level? I mean what are we talking about here as far as voltage lines?

DR. GOLDBERG: Well, it depends on where the studies were done. The European studies were done with high-voltage lines down at maybe 45 kilovolts, 36 kilovolts. They are -- in part because of the electrical practices in Europe, there's a lot of undergrounding. And it was not easy to measure electromagnetic fields. Although some of the later studies were done with personal exposure where people actually walked around for a period of time wearing a meter that would record on a computer what they had been exposed to at any given time. And those levels were average.

In the U.S. studies, the wire code that I referred to really concerned both transmission lines and distribution lines and the smaller lines because it was, in fact, the initial look at Denver didn't show much correlation with the transmission lines and that was kind of a puzzle to the initial investigation.

So it's really -- I think investigators were looking at this and thinking in terms of magnetic field levels rather than distance, which, as you probably know, depend on the amount of current that's being carried in the line, as well as factors like the

distance, physical distance from the line.

COMMISSIONER DOWNES: Okay, Doctor. Let me see if I can bring this down to a level that I can understand. First off, going back to the point that my colleague raised a minute ago, so as a general proposition when you -- when you take transmission lines and bundle them together and you put them underground, the EMF result of that is apparently very, very low levels of EMF because the wires are bundled closely together and the phases cancel one another. Did I get that right?

DR. GOLDBERG: Yes. That's basically right.

COMMISSIONER DOWNES: Okay. By contrast, if you run lines overhead and you separate them by some distance, as you do on typical towers, then that separation as a general proposition does, in fact, create some level of EMF. Correct?

DR. GOLDBERG: Well, basically, I mean the only distinction, correction I would make is that what happens is the fields drop -- the way the fields drop off as you move away from --

COMMISSIONER DOWNES: I see.

DR. GOLDBERG: So when you have a separated line, the fields drop off more slowly, directly

proportional to the distance. When you start bundling them, they'll drop off with a square of the distance or a cube of the distance, depending on how they're bundled.

And so the fields are just as intense right at the line.

COMMISSIONER DOWNES: Right.

DR. GOLDBERG: But the way that declines as you move away from it becomes much sharper.

COMMISSIONER DOWNES: I see. Now, on a slightly different point, if I understood your exposition at the front end, I think what you were trying to say to us was that at the beginning of the organized effort to look into EMF and its health effects and so forth, the first study or studies -- you mentioned epidemiological studies in particular -- were relatively simple and straightforward. As later studies came on, came through the process, they became somewhat more sophisticated and they tried to look for different factors that might be causing the EMF effects. Is all of that reasonably close to accurate?

DR. GOLDBERG: Yes. The term of art is exposure metrics. You know, what exactly are you being exposed to that may be causing the biological effect?

COMMISSIONER DOWNES: Okay. Now, in -- you know, clearly, the reason that this is an issue in

Connecticut is because people are very uncertain about just what it is they're getting into if they -- if you know, Company X builds a transmission line through your particular town, the concern of the citizens is "Okay. You know, what is this really going to mean? Is this going to potentially create a health hazard for me or my children or my animals or whatever?"

Now, I realize that there is not a standard buffer zone kind of an arrangement set out in terms of numbers of feet. But lengths of wire are always bought in such a way that there is a substantial clearance on both sides, mostly for the ease of maintenance and inspection and so forth.

Are you suggesting that in your opinion it is likely that there is a substantial health risk to people who are living or going to school or whatever within the buffer zone or do you think that there is a health risk some distance out beyond those? Or do you think that there is no health risk at all if they live even underneath the line? In other words, can you give me a sense of where is too close and where is too far away? Do you see where I'm going?

DR. GOLDBERG: Yes, I do.

COMMISSIONER DOWNES: And I realize it depends on voltage. But we're --

DR. GOLDBERG: Yeah.

COMMISSIONER DOWNES: But here we're talking about a set of 345's basically.

DR. GOLDBERG: Yeah. It actually depends on the current rather than voltage. But --

COMMISSIONER DOWNES: Oh, I see. The amperage, in other words.

DR. GOLDBERG: Yeah. I mean that's a question which people in my position get asked all the time. It's a perfectly reasonable question. "Is this stuff dangerous?"

COMMISSIONER DOWNES: Oh, good. I thought I invented this my very own self. All right. I'm sorry. Please proceed. I couldn't help it.

DR. GOLDBERG: The difficulty -- and that's where the ambiguity comes in in terms of the research. That if we could give -- you know, at "X" level of milliGauss or at "X" distance from the line, everything is fine, we would know an awful lot more about EMF bio-effects than we do.

About all we can say at this point is that from the level of incidence that's turned up on the epidemiologic studies, this appears to be a rare effect. And my own particular opinion based on laboratory studies, as well as the human studies, is there's an

interaction going on that -- you know, to some extent everybody differs in terms of their susceptibility to cigarette smoke or any other toxin in the environment.

But there seems to be a very strong role for other factors in the EMF story. And there's probably genetic factors. There may be other chemical carcinogens that may be interacting. There's a lot unknown here.

But the bottom line is that these results are so uncertain, the results of the epidemiologic work is so puzzling because why don't we just pin down what's causing the effect. The usual way we would pin this down in, say, an animal study is get 100 rats and expose them to a very high dose of EMF and get, you know, a 20-percent incidence of tumors and then you know exactly what's going on.

When you do that experiment, you don't get that high incidence. And many people feel that's because you're ramping up the dose, you know, going up to 100 milliGauss or 500 milliGauss, is not really ramping up the exposure. Something else is going on. It's not directly related to the amount of intensity or average intensity.

COMMISSIONER DOWNES: Or in any event solely related to that.

DR. GOLDBERG: Right. Right. So when

people come to me and they say, "Should I buy this house that's near a power line?", you know, generally what I suggest to them is that they look at what the actual magnetic field levels are and then ask if these are much above what people would be experiencing from other sources. I mean you're getting magnetic fields from your household wiring, from any appliances you use. An electric shaver will expose you to 300 milliGauss. So you'll only be using it for, you know, a short period of time in the morning -- I think I see everybody's face --

COMMISSIONER DOWNES: I'm shifting over to double-edged razors very shortly.

DR. GOLDBERG: That's because you have a motor sitting right up against your face and you have a short distance to the exposure. But nobody has seriously found an association of disease risk with use of electric shavers.

It's an unknown because we're exposed to magnetic fields. Always you're comparing exposed with exposed. People who are living away from the power lines are being exposed when they go to work on their electric trains or working in the office. Any time you're -- if you have power, you're exposed.

Now, to answer your question, I think probably what you need to do is to look at the sort of

milliGauss readings you're getting outside the right-of-way and ask are these significantly elevated over what one would expect to encounter?

In other words, are you subjecting people who are living near this power line to undue --

COMMISSIONER DOWNES: I'm going to defer to my friend, Representative DelGobbo. And I'm going to -- you might want to watch out for him.

CHAIRPERSON WOOD: In any event, let me just grab that number. Five to ten milliGauss would be an acceptably -- would be a range that the incremental background milliGauss would --

DR. GOLDBERG: Well, I think that's a matter -- a very subjective sort of thing. Ten milliGauss is a level that people may be aware of because that's getting into the level that will cause jittering on computer displays, for example.

CHAIRPERSON WOOD: Okay.

DR. GOLDBERG: So -- I was just at -- last week, I was just at an international meeting in Greece and they -- an environmental minister suggested -- in Israel, suggested ten milliGauss as a standard to work for. And it caused unbelievable havoc. There were people from companies that had been involved in EMF mitigation. Mainly their work was involved in

electromagnetic interference, things like shielding electron microscopes and medical equipment from electrical interference. But they were seeing -- getting all sorts of calls from people in apartments where distribution lines or power lines would pass right by the apartment building and they'd get 30 milliGauss in the apartment and now nobody could -- nobody wanted to live in these apartments. Not that there's evidence that that's dangerous. But because this minister had sort of suggested that's a -- that's a number that you should watch out for, all of a sudden it became a standard.

And I think the reason these standard setting bodies have not gone beyond the thousand milliGauss level as yet is because they're not convinced that the evidence is convincing enough and consistent enough to justify lowering the standards below that level.

COMMISSIONER DOWNES: Let me just pursue that point just one little bit further here. And I'm sorry. I'll be right back to you. I promise.

I'm having trouble understanding milliGauss in terms of the context. And I take your point that in different places the background EMF, if I can call it that, always present EMF is somewhat different. But is there a -- is there a general average

number that reflects what the background would normally be? I mean is the background 5 or 50 or 500 or --

DR. GOLDBERG: Well, you have to distinguish the sources. And the Electric Power Research Institute did a survey of 1,000 homes roughly and came up with an average figure of one milliGauss from external sources, that is, power distribution. Now, obviously, you'd have to get -- to get that measure, what you have to do is turn off the power in the house and make sure you have no local sources and then measure what's coming from the power line.

But that in the U.S. was about an average. Interestingly, in Europe it's much lower because they use a different practice, including undergrounding, and going up to twice the voltage reduces the magnetic field as well.

But, you know, basically, the one -- one milliGauss is sort of a range. Should people get upset if they have two milliGauss in their house? Well, you know, then it becomes a matter of judgment. You know, people very often read this three and four milliGauss, you know, based on the epidemiologic studies and say they want to hold to that as a standard. But epidemiologists will tell you that's not what epidemiology is showing you. It's just showing a correlation. And we have yet

to figure out, you know, the whys and wherefores.

REPRESENTATIVE DelGOBBO: Thank you, Mr. Chairman.

I am somewhat excited about this, excited in the sense of anxious on your answers in some of these questions because it's been a significant concern. It's sort of entered the policy debate in Connecticut in a substantial way this year. And I understand we're not going to solve, you know, the scientific questions absolutely today in your responses. But I have to challenge you on a point you made. And that was it just seems as though you're representing that there has been no absolute agreement that there is adverse effects at certain precise levels. And you gave a bunch of different numbers.

And for the sake of discussion, I have to challenge you on that to say that it appears as though there is -- there are those in the scientific community that do challenge that and believe that some of the standards that have been set are still too high. So I'd ask you to sort of respond to the -- what's been characterized to me and what I've viewed in testimony before one of our bodies here in Connecticut was that, yes, there are those who make very substantial arguments that it's not X. It's X minus whatever. And I'll point

back to your statement that there was a level that was determined as sort of acute. You could see acute effects at a certain level, EMF level, and then there was a number brought substantially below that to sort of take into account -- I think you characterized it generally a general safety zone based upon the studies that have been done.

Is that number that you spoke to, is that legitimate? Is that scientific? Or is that just sort of -- how do you defend the nature of how numbers like that are determined? And I'll finish off the question this way. What has happened in Connecticut, as you might be aware, is that the Siting Council has had for some time a best practices process in terms of dealing with EMF in addition to all the other responsibilities they have in the siting of transmission lines. This year the legislature codified that, institutionalized that in terms of dealing with EMF. How do you -- could you suggest they should be taking in all these conflicting evidence on EMF?

DR. GOLDBERG: You're sort of getting -- moving from science to policy. And so let me sort of answer that the way a scientist would and you can then work through the policy issues.

The bodies -- the various bodies that have

set exposure standards claim that they are considering what are referred to as athermal effects or low-level effects because they are finding the evidence inconclusive.

They feel that they are -- and I don't serve on any of these standard-setting bodies. So I can -- it is they. They feel that they have adequately set up standards that protect the public. Nevertheless, there are these lines of research that suggest the possibility of effects that can be explained through the mechanisms that they took into account in setting the standards and setting a safety limit down below that.

And that's problematic because ideally you'd like to know exactly what's going on and have something firm which you can grasp and say, you know, "Here's a reason for lowering the standards. Here's an effect. We can reproduce it. And it has clear health implications."

Unfortunately, we don't have that yet. The -- let me give you one example. And I don't know, you know, who has spoken to you and exactly which experiments have been brought forth. But let me bring up one that came up at this conference that I was at last week.

There were a series of experiments done

with a line of human breast cancer cells which showed that their growth in culture -- these are isolated cells that are growing in a tissue culture environment in an incubator. They grew at a certain rate. And if you add in the pineal hormone melatonin or the drug Tamoxifin, you suppress their growth rate.

And one investigator showed that by applying an electromagnetic field, a 60 hertz field, magnetic field to the cells, you could basically wipe out that effect or reduce it substantially. The cells grew faster. They overcame the inhibition of this drug.

And the level that was effective -- two milliGauss had no effect on these cells in culture. Twelve milliGauss produced the effect. And you got no greater effect when you went up to 100 milliGauss. So here was a biological effect occurring at 12 milliGauss.

That study was replicated, that is, other groups completely independent of this first investigator, reproduced the experiment and it was done in three different laboratories, two of them in the U.S. and one in Japan.

Now, this is a biological effect. But when you look into it a little deeper, you find that only one particular cell line of this, these particular breast cancer cells, will work. There are other similar lines,

very much like the line -- they're actually broader lines of the same line that don't respond to pineal melatonin and they don't respond to Tamoxifin and, of course, they don't show any effect from EMF.

So you have a phenomenon and it's a phenomenon that can't be explained through electric currents or shocks or any of the sorts of things that we use to set the standards. But what does that mean in terms of health effects? I think it's overly simplistic and the investigators who did the work say it's simplistic to think that women with breast cancer are at greater risk because these cells respond in this way to a 12-MilliGauss level.

So there are bunches of little experiments like this that are producing conflicting results. In some cases, we see a thread of some explanation as to what's going on. But the research hasn't gone far enough where we can say, yeah, here's exactly what's happening and here's what's responsible for it.

COMMISSIONER DOWNES: So is one of the reasonable implications of this that if the legislature, for example, wanted to try and establish a standard, that they would be smarter trying to establish a standard based on actual measurements of EMF in the neighborhood of the line as opposed to simply adopting a statute that

says you've got to have a 300-foot buffer zone or 500 feet or pick your favorite number?

DR. GOLDBERG: Yeah. I think if your objective is to follow what research evidence there is about biological effects or health effects, you're really following the magnetic field level rather than a distance. It's a little harder to implement because you've got to have measurements for modeling that predicts what the magnetic field levels will be. But that would be closer at least to the research.

I should mention just briefly there are a couple of concepts that have been kicking around and policy issues. In the U.S. prudent avoidance was introduced as a concept by Granger Morgan and Carnegie Mellon. And the current term in the World Health Organization in Europe is precautionary principle. The idea is that you have some uncertainty and you basically take a reasonable measure in the face of that uncertainty to go well below what you think are levels that might be dangerous.

And, of course, that becomes a policy issue because there are costs and there are trade-offs in terms of different interest groups in making that statement. And, of course, a scientist would say, "Well, we want to see some payoff for your precautionary

approach and your costs and have some feeling that you're getting some benefit from it." So we would look to the evidence.

MR. McCLELLAND: I haven't been involved in the issue for 15 or 20 years. So this question may date me. But as I remember when this issue really surfaced in a big way at about that time period, the Europeans were in disagreement with the Americans, as I remember, Sweden, for instance, about what the long-term effects were for EMF. And that time, they moved or were moving to make policy decisions and revise construction standards to mitigate EMF fields, particularly from public utilities. Are you are of any of those policy decisions or construction standards and whether or not any studies, subsequent studies, have been performed to see if they've had any effect?

DR. GOLDBERG: As a matter of fact, at this conference, Maria Fefting, who is one of the authors of the large Swedish power line study, gave a kind of "Where are we 20 years later" talk on the epidemiology. And, in fact, in Sweden they basically backed away from taking that precautionary approach. And it was largely based on the sort of surveys that looked at exposed populations.

Basically, what they determined was there

were so few children exposed to the sort of levels that were coming up in these aggregate studies as risk factors that it didn't justify, you know, legislating some sort of additional measures.

On the other hand, there are countries and there are even municipalities -- we've seen this now with base stations for wireless cellular phones -- where they're establishing very low limits. The municipality is just doing it, saying, you know, "This is what we feel." And I mentioned the case in Israel where this 10-MilliGauss guideline -- it isn't a regulation -- was imposed. The danger of this, of course, is that it sort of sounds like it's establishing a safe level. I think it gives a false feeling of confidence for people following this and it may impose an unfair burden on people who have to meet this standard. It's not quite arbitrary, but it's getting fairly close to arbitrary.

COMMISSIONER DOWNES: I'd like to mention that cell phone towers is something else the Siting Council has jurisdiction to deal with those.

CHAIRPERSON WOOD: Let's try to move along. We're about a half-hour behind. And we do have four more panels, three more panels this afternoon. So is there any final thoughts here for Dr. -- I don't see any.

I want to thank you, sir, Dr. Goldberg, for being with us this afternoon. And I appreciate --

DR. GOLDBERG: I hope it was helpful.

CHAIRPERSON WOOD: It was. Thank you a lot.

Sarah?

MS. McKINLEY: Thank you. Mr. Chairman, we have a panel of speakers to address technology options. Each of the speakers will give five minutes of opening comments and then we will open it to a general discussion. Our first speaker is Dennis Duffy, Senior Vice President of Energy Management, Inc. And he is representing the Competitive Power Coalition.

MR. DUFFY: Thank you very much. And thank you, Commissioners. I'm very happy to be invited to the panel today to speak on behalf of the generation sector.

As some of you may know, our company, Energy Manager or EMI, has been in the energy business in New England for 25 years developing generation projects. We started with small distributed generation projects, then QF facilities, then eventually IPP facilities. As of about five years ago, we had developed and were operating five gas combined-cycle units in New England.

Roughly three and a half years ago, we

sold all of those and, since that time, have been focusing our energy efforts solely on the wind power project, the Cape wind project, America's first offshore wind project located roughly six miles off the coast of Cape Cod, which would be capable of generating roughly 420 megawatts.

That puts us in a somewhat unique position because, as far as I can tell, we are the only entity that is actively pursuing any major generation project anywhere in the New England power pool. And that is not a good thing.

One point I really wanted to stress that was made by one of the speakers this morning is that reliability can't look solely to one part of the equation. We spent a lot of time today talking about transmission. And it is essential. And I feel the pain of those trying to get the permitting done. It's the same game that's being played with delay in NIMBYism. But transmission alone is not sufficient. We need transmission. We need generation. And we need demand side responses.

Now, the first thing I would point to is Kevin Kirby's presentation from this morning which right on the front page has the chart showing New England's capacity situation, subtitle "Today's Surplus Capacity

Situation Will Be Short-Lived". And I'd like to make two critical points based upon this handout.

Number one, you will see that by the year 2006 this ISO forecast shows the region in the aggregate deficient in generation capacity. Two years away. It's late 2004. We're on notice that we are capacity-deficient in 2006. And that even -- that is without giving any allowance for transmission problems in the system, without giving any allowance for problems in fuel and pipeline distribution to keep the generation running and also without allowance of additional retirement which may be in the works. So everyone interested in the reliability of this grid really should stop -- and this is a very important moment -- to say "We're roughly a year and a quarter away from a situation where we acknowledge we're deficient" and nothing for generation is being developed anywhere in New England of any scale other than a wind power project.

Now, I think what we have to do is stop and take a look and ask ourselves why is it. Why is that the case? And the reason is that there is no long-term credit in this market. There's no long-term power contracting and there's no long-term credit. And it should be no surprise as a result no one is interested in developing generation assets with the long-term

commitments and financial institution commitments that have to be done.

And sometimes to realize how we got here it helps to go back and look at the start. One of the things that I did in preparing for today was to look back at Professor Hogan from the Kennedy School of Government's famous wholesale primer on electric market structure from 1998. This is what he warned us at the outset. "Typically, we expect a new generator to look for a customer who wants to price hedge and for the generators to defer investing in new plant until sufficient long-term contracts with customers can be arranged to cover a sufficient portion of the required investment."

So right from the start the fundamental thinking of this whole market redesign and restructuring always assumed and anticipated that there would have to be a long-term price signal, long-term contracting and long-term credit in order for the necessary generation to be built. And that's where the system has failed.

Happily, we've seen a major step in the right direction with ISO's recent filing of the Y-cap proposal with the demand curve. We're extremely happy with that. It absolutely sends the right signal. And we're also very happy with the FERC's June 2 order

endorsing the approach.

But one, at least one, major issue, a fundamental issue, remains to be resolved. And it's a matter of unclarity perhaps or a matter of interpretation that I wanted to raise both to state and federal regulators today.

The Devon power order of June 2 made the point that ISO New England requested guidance as to what party is responsible for the long-term capacity procurement that would be created through the Y-cap mechanism. FERC responded in that order, Section 75, that it is the load-serving entities that have the primary responsibility for long-term capacity procurement and obtaining sufficient supplies to ensure long-term reliability.

We're very happy with that answer. However, within New England, perhaps it's a matter of semantics or a difference in defined terms, there is far from agreement as to exactly who that means and who has the obligation. And it's one thing to send an accurate long-term signal through Y-cap, but if the party to whom you're sending it doesn't acknowledge that they're the recipient, it won't work.

Just to explain what the difference of opinion is, some people, including most generators in our

company, believe that in that context load-serving entities means the utilities, the electric utilities who have the long-term franchise obligation, the long-term presence in the market and the traditional responsibility to maintain reliability.

The other school of thought is that when a distribution utility has done a transfer of its load obligations to a wholesale marketer, that wholesale marketer is the one who assumes the long-term obligation for reliability purposes. We would suggest that that cannot work.

The type of assignments of load obligation that are happening in New England are by their nature short-term, typically one to three years, often as little as three months. The whole Y-cap proposal will not work if it generates a long-term signal, a long-term contracting obligation to wholesale marketers who by their nature are short-term players in this market, often with no assets in this market.

So we're very hopeful that the Y-cap is sending the right approach. But I think it's very essential that we get clarification and confirmation that the parties who are going to have the long-term obligations resulting from that structure are the utilities who have the long-term presence and the long-

term credit in this market.

I would just throw out one example on this which is very helpful. Remember the gas side of the industry in these very same districts is several years ahead of us down the restructuring path. Many of the state commissions still require their gas LDC's on a regular basis to refile long-term forecast and supply plans for regulatory review. It is a type of regulatory review that is entirely consistent with restructuring, with unbundling and with competition. They still want competitive procurement but they have done it under the context of regulatory review to assure that essential reliability component.

Right now we have a mismatch. On the electric side, it's not happening. No one's watching it. On the gas side, it is. We think it should be comparable oversight on both sides.

Finally, the other major hurdle that any new generation faces in New England is our regional tendency towards NIMBYism and delay on any type of project. Almost everything David spoke about this morning for transmission problems, transmission delays, is also applying on the generation side.

Basically, most of the easy projects have already been built. For the last 15 years, we've done

nothing but gas combined-cycle projects in New England. That was good. We could get them permitted. Everybody liked them. However, we've hit the wall on that. I think we all recognize that 40-percent saturation natural gas is enough. We've got to look at other things. And they are by their nature going to be more difficult to permit.

In our case, we've gone to the Massachusetts Energy Facility Siting Board, done a full evidentiary proceeding, 20 full days of testimony, a 50,000-page evidentiary record. On July 1, we had a tentative approval issued by commission staff. Since that time, for the first time in the history of the Mass Siting Board, the board has not convened within 14 days of a tentative decision to vote up or down on the decision. We are still waiting five months later for the board even to schedule a hearing to vote on the tentative decision.

And on the federal side, we've spent three and a half years doing a draft environmental impact statement with the Army Corps as the lead agency, 17 participating agencies. There's a 4,000-page draft report which we're told was completed in early September, still has not been released.

So basically what we need -- the message

we want to send is we need clarity and we need leadership from the regulatory community. And it's going to be painful sometimes because you've got to take the long-term view on reliability and on occasion it's going to take standing up to very powerful NIMBY forces.

MS. McKINLEY: Thank you.

Our next speaker is Jeff Donohue, President and CEO of TransEnergy, U.S.

MR. DONOHUE: Thank you. Thank you, Chairman Wood, Chair Downes and other distinguished participants, for the opportunity to speak today. My talk is going to be on the application of underground transmission technology and the recent TransEnergy experience using underground transmission in various parts of the world.

A little background. TransEnergy is one of the largest transmission providers in the world. We have assets in Canada, the U.S., Chile, Peru and Australia, about 3,600 people spread around the globe and thousands upon thousands of miles of overhead transmission lines of all voltages and many hundreds of miles of underground transmission lines, also.

Since 2000, we've put into service three high-voltage DC underground transmission projects comprising 255 miles using what is commonly referred to

as voltage source converter technology and XLPE cables.

I'll focus basically on three issues. Is this technology reliable? What's its availability, proven operable? Is it affordable? Finally, I'll draw some experience very quickly from our Murray link project in Australia, the world's longest underground transmission line.

Hopefully, this talk will initiate some questions and move along the process here in Connecticut. First, our experience with advanced transmission technologies and undergroundings, in fact, improves the overall grid reliability. We have found through operation of our grid in Quebec and in Chile and in operation of our facility in the U.S. and Australia that higher controllability over the grid actually helps prevent cascading events. This controllability can be provided by many, many devices. But, generally speaking, in fact, we see controllability as good, not bad.

We see that undergrounding transmission eliminates the major causes of transmission line outages, such as hurricanes, ice storms, which are near and dear to many of us, tree contacts, lightning and fires.

Also, now, we've viewed many studies that confirm that actually the reliability of underground transmission is far greater than the reliability of

overhead transmission lines. Just to reference a few, North Carolina Utilities Commission completed a study in November 2003 that found underground outage rates were 50 percent less than overhead. Maryland Public Service Commission in February 2000 found that underground systems in urban areas were much lower in frequency and duration of outages. The Australian government in '98 found that the high-voltage underground systems have about 80 percent less outages than overhead. And even today, the Florida PSC is initiating a task to look at whether Florida should be embarking on undergrounding much more of its own transmission system.

We do extensive evaluations on our grid in Quebec to determine what we should underground, what should stay overhead as we move forward. And we -- you will see that we will be undergrounding more in that forum and certainly in our different projects around the world. We continue to look at this on a case by case basis.

Next question. Is underground transmission proven? Is it fully operable? Can it be integrated with the grid? We've heard some comments this morning on this which are a little bit surprising to me. First, we don't have to look too far. But if we go to Europe, look at Europe, currently there are over 3,400

miles of high-voltage underground transmission, 110-kV and above. Just a couple of examples, Denmark -- I tried to find a country in Europe about the size of Connecticut and couldn't find one. But Denmark was close. Denmark's about four times geographically larger than Connecticut, about half the population density. 16 percent of all transmission 220-kV and above is underground. The UK, which is quite a lot larger than Connecticut, about 20 times physically larger than Connecticut, but about the same population density, six percent of its transmission 220-kV and above, almost -- it's almost 1,000 miles is underground.

In fact, to my surprise, and I didn't know this before this past week, in France they actually have a mandate not that much different than the mandate that was recently passed here in Connecticut where, in fact, 25 percent of the new transmission built in France must be underground. I didn't know that until a couple of weeks ago.

So we can see that other parts of the world, for a variety of reasons, some of which you've heard today and others which I think are specific to the region, have embraced the need to undergrounding and are advancing along that line.

We look at the technology today. We look

at the technology that we've applied, the voltage, the XLPE cable. We believe it is proven. We believe it is commercially available. In fact, the major manufacturers, Seamons, ABB, Pirelli, they're all willing to risk a portion of their Balance Sheet providing availability guarantees, manufacturer warrantees, liquidated damages if the equipment doesn't perform as specified.

So we don't think that this technology that's out there today is a science project. Indeed, we are convinced that it's a proven and certainly commercially available. But the manufacturers are willing to sign contracts with the appropriate terms and conditions.

And, also, look at other people using this technology right now. Major oil companies are beginning to use this technology to provide energy to oil platforms. Recently, Stadt Oil, the largest oil company in Norway, installed this technology and XLPE cable going to their oil platforms. It pumps somewhere around a billion dollars a year worth of oil to provide the energy needs for that oil platform.

And I must say it was one of the things that gave us comfort when we were looking back several years ago at some of our investments in this technology.

We do get comfort to know that there are other folks in related industries that have a need for extremely high reliability and have significant monetary damages if the facilities aren't working using this technology.

And, finally, our own experience from our projects in Australia that went into service in 2000, 2002 and from the cross-sound cable is that this technology is very mature and very, very reliable.

A question about its affordability. We've heard a lot said today. We have embraced a technology in Australia and the U.S. for a totally different reason than what you've heard today and we have a totally different challenge than what the folks here in Connecticut have. We embraced the technology because we needed to permit to get something built quickly. And what we looked at is the total life cycle cost of an investment to build emergent transmission lines, something very different than what's being done certainly here in southwest Connecticut. However, the technology is equally applicable.

And we embraced spending a little bit more for the technology because we felt we could get a permit permitted and built much quicker. And, in fact, in most cases that has been the reality of the situation. The same technology allows efficient use of existing right-

of-ways. They can be installed adjacent to roads, pipelines, railroads, gas lines, water lines, requires roughly a 10 to a 20-foot right-of-way.

And just a quick picture. This is the actual pieces of our cables from our 220-megawatt transmission line project in Australia. It's 110 miles long. It's just these two cables buried in the ground, about three feet that's required to build an underground transmission line.

We evaluated the need to install conduits, duct banks, et cetera, et cetera. And after thorough evaluation, we found that all those things were nice and interesting; they didn't actually improve the reliability, the availability. They certainly added to the cost of the project and, in the end, weren't required. And we're quite pleased with the direct burial method that we have used.

And, again, the peak thing is because we don't need much right-of-way, it's very, very easy to acquire.

The installation techniques that I've just said are very simple. It's digging a ditch, installing the cables, covering it up. It's like installing fiber optic cables. I know many places in this country have installed fiber optic cables along federal highway

systems. This is the same. It's a little bit stiffer than the fiber optic cable ducts, but it's not much more complicated to install.

We found that using the AC/DC technology we can avoid -- not that -- Dr. Goldberg, not that we -- we don't mind debating the EMF issues. We find that we can avoid the AC EMF issue altogether. DC, of course, uses static magnetic fields. It's like the earth's magnetic field. And, again, installing cables like this close to other, the currents cancel and we end up getting a static magnetic field that's actually much smaller than the natural variation in the earth's magnetic field. So we completely avoid the AC EMF issue debate.

Finally, we've found through actual operation that the O&M cost of our advanced underground HVDC systems is quite reasonable. And, in fact, I'll mention on the Maryland project we spent less than one and a half million dollars a year operating and maintaining that facility. In fact, if you compare it to most U.S. utilities' FERC 401 O&M costs, we're a small fraction of what many local utilities have on their FERC 401 cost for their overhead transmission line cost.

Of all the points first advanced, HVDC underground cost, very comparable to underground AC. And we're finding that the costs of HVDC underground are

declining where actually the cost of overhead AC is increasing.

A case study, Merlin, the world's longest underground transmission line. It's been in operation since October 2002. It's a 220-megawatt system. It uses voltage source converter technology and XLPE cable. It's just a simple little high-tech cable there. Average right-of-way width on that project is 13 feet. The minimum was 10 feet. We installed, as I said earlier, the cable along roads, gas pipelines, water irrigation lines, railroads. You name it, we faced it on Merlin.

Our converter station sites are very small, about three and a half acres each, at each side. The project was permitted in about 24 months, constructed in about 21 months. There was overlap between the permitting and the construction. It took us less than 40 months from the very beginning of the investment decision to the very end to get it energized. We met the schedule that we wanted.

Since October 2002, we have had one cable failure, unfortunately. Christmas of 2002, just before Christmas, we had a cable failure. We found it and repaired it in six days. A little bit longer than we would have liked. But we did give the guys a break. Again, this is a merchant line. The profiles are looking

over the -- revenue profiles, I should say, is what we worry about with merchant lines. Looking over the Christmas holidays were very low and we decided to actually take our time in repairing it.

292 cable joints in this cable. No failures to date. Availability, over 98 percent. The cost of this facility, 97 million dollars U.S. That's everything, the converter stations, 110 miles of cable and the interconnecting substation on one end, six breakers, 132-kV, and a 220-kV breaker to interconnect at the other end. As I said earlier, annual O&M cost of one and a half million dollars a year.

So, hopefully, folks will look at some of this technology, maybe evaluate some of the facts and see if it is applicable to the situation in southwest Connecticut. Certainly every situation is different. And we realize that. And we hope that just the example of what we've experienced can help the debate here in southwest Connecticut. I look forward to questions when we have time. I can see Sarah saying, "Go, go, go."

MS. McKINLEY: Thank you so much.

Now we're going to have Doug Johnson, the composite conductor program with 3M.

MR. JOHNSON: Thank you very much. I'd also like to thank Chairman Wood and Chair Downes for

inviting me here to speak on our composite conductor. I'm a product engineer with 3M Company located in Minnesota. And we have developed a new type of overhead line. So I'd like to switch the discussion a little bit to talking about overhead transmission lines.

And the new line has a composite core developed by 3M. I'll talk a little bit in detail about that and tell you what it's about. But that cable allows you to basically upgrade an existing transmission line, say a 115-kV transmission line, and double the capacity of that line without any visual changes in the line, without having to put up taller towers or bring in construction people to rebuild the line, and a much faster permitting time.

So we recently were working in Minnesota. I'll talk about our experiences there to put in a longer section of line to solve transmission concerns in Minnesota. It's really directed at a number of constraints as we talked about earlier this morning in a transmission system. So our conductor is directed at solving thermal constraints. Those are some of the contingency constraints. I believe there's a map of New England that Mr. Kirby showed earlier highlighting the number of thermal limits. Thermal limits are basically the maximum temperature you can run a line at without it

sagging too much and violating your clearances or shorting out.

A real advantage with the 3M material is the composite material that was developed at 3M. Basically, a little bit about overhead transmission lines. Reliability is really the issue with overhead lines. They have to meet a number of demanding engineering requirements. They have to carry high current loads, particularly high, very high current loads during contingencies when they'll operate at high temperatures. And they have to operate at those conditions without violating your clearances.

Furthermore, they have to be very reliable. They're designed for lifetimes of 40 years or more. They have to be very strong because they have to withstand heavy ice and wind loading, like those Northeasters that come down through Connecticut here. So what is really required is a very high-performance material.

And we have a composite core which replaces the steel core in a conventional overhead line. That's the center of the cable. And that core is as strong as steel. So it's basically as strong as steel, but it has the weight of aluminum and it doesn't expand much as the conductor heats up. That allows you to

basically run up to two or more times the current through it on an existing line without it sagging and violating your clearances.

So we've been -- 3M is a materials company as well. We've had over 30 years of experience in working with the ceramic fibers that are the core of this conductor. We're very concerned and focused with reliability through a partnership with the Department of Energy. We are -- over the past three years, we've been engaged in extensive laboratory and field testing of this conductor. We're testing it in various areas of the United States, exposing it to extreme conditions. We've done a first test in Minnesota in 2001. It's in a line in a grid outside a power plant. And that's been operating reliably since then. We have a line with Western Power in Fargo, North Dakota, a 230-kV line installed in 2002 which has been operating reliably. It's exposed to high ice loads, similar to Connecticut here. It's exposed to very cold conditions. It was minus 44 degrees, I think, Celsius last winter there. So --

We have lines in Phoenix outside a power plant and in Washington with Bonneville Power where we're basically running the output of one generating unit through that line to really test it under the maximum

conditions. And we have a line at Oak Ridge, Tennessee where we're engaged in testing and basically thermal cycling, compressing many years worth of data into a short period of time, all aimed at demonstrating reliability.

So, as I said, it's aimed at increasing the capacity of existing lines with these thermal limits on the line. And one particular line that came up last spring, the engineer at Minnesota Utility called me up and they had a line, an existing line, built in about 1950's, early 60's that needed to be upgraded. It needed to be upgraded because they were adding a peaking unit on the line and they needed to generate or transmit about twice the power to that line. And the line is -- the problem is it's located in -- along the Minnesota River Valley. It's in a scenic area. There are wetlands along there. There are regional parks. There are trails. Basically, the plant was built in the 50's and the suburbs kind of grew up around the line. So the line actually goes through neighborhood back yards. And Excel could not upgrade that line with the conventional conductor technology. They would have had to replace a number of -- a large quantity of the towers with taller towers. And that involved a lot of construction. And, hence, it was looking for a very long and lengthy --

looking at a very long and lengthy permitting process.

So I designed a composite conductor. It's actually the exact size as this conductor that would get them their 80-percent impacity increase. And we are currently planning on installing additional thermal upgrades on the lower kV networks to support the overall grid.

And I guess in conclusion then, the conductor, it's a high -- the performance comes out of the high performance core in the conductor. We thoroughly tested it for reliability. We have it in seven locations now in the United States. We're beginning to introduce it commercially this year. The first commercial installation is at Excel. And I think -- I've worked with a number of utilities in other states throughout the area and they seem to have very similar problems. There's quite a few of these older 115-kV, 230-kV lines that are in need of upgrading. The generators are basically attaching onto these lines and putting more current through them than they were currently designed for. And I think we have a very adequate solution for that particular problem. It's one more tool in the utilities tool box for us to provide to them.

MS. McKINLEY: Thank you so much, Doug.

Now we have John Howe, Vice President with American Super-Conductor.

MR. HOWE: Well, thank you very much. I'm glad to have the opportunity to give a brief report on the status of high-temperature super-conductor or HTS cable. So in the next few minutes, I'll discuss the principal benefits, report on its development status and expected availability.

Basically, HTS cable is a new type of underground power cable that will offer a combination of very high capacity, low siting and environmental impacts, very low construction impacts compared to conventional solutions. And what enables this new type of cable is a wire, so-called high-temperature super-conductor wire that has basically an almost-perfect resistance-free carrier of very high currents. We're making wire now that carries about 100 to 150 times more current than a copper wire of the same dimension.

This wire is based on ceramics-based, high-temperature, super-conducting compounds that were first synthesized in the late 1980's. So it's about a 15-year development process to take it from the compounds to the wire and now the applications.

We're working at applying this wire in not just cables but also motors, generators, a synchronist

condenser, grid stabilization technology that we've just demonstrated for the first time on the TVA grid in the past couple of months. High-power magnets and other power and industrial applications, think magnet trains and so forth.

We're regarded as a world leader. But there are several global HTS wire manufacturers in the United States, in Europe and in Asia. We're now producing several hundred miles per year of this wire. We have a two-year-old plant that's located at the Devons Commerce Park which is in north central Massachusetts, the old -- Army's old Fort Devons.

Now, the benefits of the cable from the standpoint of performance, system economics and siting, I think these are the benefits -- these benefits are most relevant for utilities that are faced with a combination of having to deliver a lot more power into or through very high-cost urbanized areas where there's a collision course. It's not just southwest Connecticut, but many parts of the country. The power needs are growing. Yet, land owner and community opposition to the siting of necessary infrastructure is most acute in these areas.

And I think I was actually gratified to hear the level of understanding today. If we don't solve this problem, it will literally become a constraint on

economic growth because of the rate at which we are electrifying our energy consumption in this country. We're becoming more energy efficient, but we are becoming much more reliant on high-quality electricity to meet those needs. So we really do have to solve this problem.

Now, the most salient benefit of super-conductor cable is, as I mentioned, its very high capacity. These cables will carry about three to five times more current than standard copper-based cables of the same dimensions. You could in theory go to ten times or more. But from a planner's perspective, we think three to five times is the logical increment.

What this means is that utilities could use very high-capacity HTS cables to deliver either a lot more power or comparable amounts of power without having to go to very high voltage. For example, it would be possible to carry up to, say, six to 900 megawatts of capacity in a cable in a 115-kV voltage class, the existing high voltage, as opposed to EHV class. And that is a power level -- six to 900 megawatts is a power level that is much more typically associated with 345-kilovolt transmission which generally requires much wider rights-of-way and a lot more land and expense.

Now, there is another important and less well understood performance characteristic of HTS cable

which is based on the high-current carrying capacity of the wire. And that is its very low impedance. Now, impedance is an electrical characteristic of a conductor that basically determines the division of power flow in an AC network. In other words, how much power will flow along any one given pathway compared to other pathways that run in parallel?

Now, the low impedance of super-conductor cable is a natural consequence of a shielded coaxial design. You think of a coaxial cable TV cable. There's an inner conductor and then an outer shield. And this design actually completely suppresses electromagnetic fields. So it provides a technology solution, just as Jeff mentioned, literally takes the issue off the table, regardless of the science surrounding EMF.

But what this shielding design also results in is an impedance rating that's about six times lower than conventional copper underground cables and about twenty times lower than overhead aluminum lines of the same voltage.

Now, what this means from a user standpoint and I think is important is that when you insert a very low impedance super-conductor cable into a grid, it will tend to pull the power into the heart of a congested area, whereas you might have to use two or more

conventional higher impedance circuits to push the same amount of power into the low pocket.

Now, some planners look at this and they say, well, isn't that a risk that you're going to have all this power flowing on the low-impedance pathway? But what you can do is you can, with very conventional technology, series reactors or phase shifters, you can actually inject impedance. You can dial up and dial down the level of impedance on a line. The net effect is you end up with an AC element, alternating current grid element, that functions very much like a fully controllable DC transmission line, such as Jeff described a moment ago. However, it can be integrated directly into the AC grid and does not require the converter stations.

Now, I mentioned to Sarah I'll have a white paper that we can post on the -- in connection with the hearing here that will give more technical information about the cable and some of its other advantages, including addressing congestion or extending the life of existing elements, solving problems with shorter circuit runs and tapping into lower cost sources of generation.

It's going to be a more expensive cable. But it will yield in many instances less expensive total

installed system solutions. But, rather than dwell on those in detail, I thought I'd take a final minute just to report on the stage of development because this is not yet commercially available. However, it is in advanced development. And we believe on the basis of a couple more successful demonstrations could be available by the end of the decade. Not -- and I want to emphasize this -- in time to meet the major immediate and pressing needs facing southwest Connecticut right now.

But let's recognize the problems in southwest Connecticut today won't be the last problems facing either the state of Connecticut or the New England region. So I think it becomes a matter of regional and national importance to have more demonstrations, work out the system integration issues, bring down the cost of this new solution. There are three HTS cable solutions currently under way. Our company is leading one close by, actually, on Long Island that will be a half-mile, 138-kilovolt cable rated at about 600 megawatts that will fit into about a 12 to 14-inch pipe that can be directionally drilled actually underneath the existing infrastructure to avoid any conflict with existing utilities. And that cable is slated to be installed by the end of the next year and operated in the peak season of 2006.

Our company is not involved in the Albany, New York demonstration. But I'd like to note that NYSERDA, the New York State Energy Research and Development Agency, is a co-sponsor of that effort. And I'd like to suggest that the demonstration of a short-length cable either here in Connecticut or someplace in New England under the sponsorship of one or more of the New England states could go a long way toward building familiarity with this technology, working out some of the system integration issues and establishing a reliability record for its use by the grid, in the grid.

The wire capacity exists. The cable designs are now fairly well developed. But what we need are additional steps to accelerate the acceptance of this new technology which we believe could help to resolve some of these very difficult, intractable siting issues that have hampered grid development and resulted -- and, in turn, this will result in important reliability and economic benefits for consumers.

Thanks.

MS. McKINLEY: Thanks, John.

And finally, our next speaker, Steve Doyon from -- Vice President of Virtual Peaking Capacity Development of Converge, and he's going to talk about demand response.

MR. DOYON: Thanks, Sarah.

Distinguished Commissioners and guests, ladies and gentlemen. As Sarah mentioned, my name is Steve Doyon and I'm Vice president of Development for Converge. Converge is a provider of hardware and software to the utility industry designed to provide reductions in peak load demand from residential and small commercial and industrial customers. In addition, Converge has pioneered the use of megawatt power purchase agreements. And we call it virtual peaking capacity or VPC, which provide peak load reduction capacity through a turnkey, completely outsourced load control program under a pay-for-performance contract structure.

With over five and a half million Converge load control devices installed nationwide, representing over five and a half gigawatts of capacity and 225 megawatts of capacity structured under its VPC contracts, Converge is a clear leader in the load control industry.

Our first VPC contract with Utah Power has achieved almost 40 megawatts of installed capacity within 15 months.

In response to the ISO New England's request for proposals to provide low response solutions for near-term reliability concerns in southwest Connecticut issued last year, Converge proposed a load

control program specifically targeted to the residential and small commercial and industrial customers within the southwest Connecticut area.

And Converge, along with other demand response providers, was awarded a four-year contract beginning in April of last year to provide up to 48 megawatts of load reduction capacity specifically in that southwest Connecticut area. Subsequent to the initial award, Converge also executed a second 12-megawatt reliability contract.

Since our contract award, Converge has initiated its marketing and recruitment campaign under the brand name Cool Century. And some of you may have noticed our billboards along I-95 in southwest Connecticut or received information by mail about our program.

Utilizing our load control switch technology, we are able to remotely cycle the compressors on residential and small commercial and industrial air conditioners during reliability events. By aggregating these loads from thousands of such installations, we can provide significant load reduction which can be utilized as a tool for system reliability.

Our program is a voluntary one. Customers are recruited through a direct mail campaign. And in

addition to responding to the environmental and reliability benefits associated with our program, they also receive a cash incentive for their participation. In exchange, they allow us to control their air conditioners during limited periods of the year with minimal discomfort.

We believe demand response and, in particular, load control should always be considered as part of a balanced portfolio approach to the many problems associated with electric system reliability. Load control has certain advantages over supply side alternatives. It can be specifically targeted in areas where supply side alternatives are difficult or impossible to site. It's the only resource alternative which provides positive environmental benefits by avoiding the use of peak generation sources which, even for renewables, have a negative environmental impact.

And, in fact, we encourage the Connecticut Department of Public Utility Control to consider the use of load control as part of meeting any renewable portfolio standard goals. To that end, load control can be economically competitive when compared to the supply side alternatives.

But demand response by itself cannot solve all the system reliability problems facing southwest

Connecticut. However, as part of an integrated portfolio approach, it is a resource that should be used in conjunction with other transmission and distribution and supply side alternatives available to address these important problems.

We are excited about the opportunity to help southwest Connecticut with its reliability issues. Our programs are on their way to success. However, they can be even more successful with your help. One of the hurdles we face is a perception or really a misperception of legitimacy. Few of our customers are familiar with ISO New England, the sponsor of our project.

Most of our customers, however, know their utility service providers very well. In our case, the two major utility providers in our project area are Connecticut Light & Power and United Illuminating. While the success of our program provides benefits to all stakeholders, including Connecticut Light & Power and UI, we have not yet achieved coordination with these two important utilities with regard to community outreach and customer contact.

And the feedback we've received is that CL&P and UI are unclear as to the type of coordination that the Connecticut Department of Utility Control would approve. Given that our program is paid for by all

Connecticut rate payers, we strongly encourage the Connecticut DPUC to assist us in reaching out to these utilities by providing them direction and safe harbor with respect to their support of our Cool Century marketing and recruitment campaign.

For example, the Connecticut DPUC could request that the utilities in our program area allow our marketing materials to be included in newsletters or as a bill stuffer.

Typically, when we develop other programs across the U.S., we're typically working with one incumbent utility. And for those programs, we're seeing a response rate that's about triple what we're seeing here. And it's primarily due to the utility involvement.

In conclusion, thank you for inviting us here today to inform you about the success and challenges of our load control program. The reliability issues facing southwest Connecticut are critical. And while we cannot solve all of southwest Connecticut's reliability problems, we can be part of an overall portfolio of technology and infrastructure solutions to address these issues.

MS. McKINLEY: Thanks so much, Steve.

Do we have any questions or comments from our panel?

MR. GETZ: Mr. Chairman?

CHAIRPERSON WOOD: Please proceed, sir.

MR. GETZ: Thank you. I'd like to ask Mr. Duffy a question because he's the first one who has brought up today that looming issue of the location of Y-cap proceedings that are going on. And I don't want to wander into some issues that we probably shouldn't be discussing. But the -- well, it was no surprise, of course, that you're very happy with the latest directions that the Y-cap proposal is taking and the effort to make sure the right things are built in the right place at the right time. It's probably no surprise also to you that there's a lot of regulators in New England who are concerned about the most recent directions in the proceeding.

But you also expressed a concern about NIMBYism. And I'm wondering, are you drawing some kind of linkage between Y-cap and NIMBYism that somehow generous Y-cap rates will contribute to breaking logjams in particular areas?

MR. DUFFY: No. Not at all, no. Unrelated topic.

MR. GETZ: Thank you.

COMMISSIONER DOWNES: Other questions?

CHAIRPERSON WOOD: I think one of the

things I'm struck by from you all is that there are, in fact, a number of different ways to address this undergrounding problem. And maybe to the point that it's not a problem. It's just another option, which I think is what the State is interested in. And I'm still haunted by the concerns of trying something new. And, you know, this isn't some cul-de-sac on the electrical grid. This is a big state with a lot of load on the end of these long cords here.

And I'm a little -- I'm informed I think by what you all said, but I'm still grappling for what at the end of the day is the actual next step so that we collectively can assist certainly the Siting Council I guess in its next red letter day in meeting a time table that works with the time lines that we heard of here.

And, you know, I guess -- I don't know particularly who to ask. Maybe since you're the applicant, David -- you know, how do we take the best technology solution here, devise, you know, an option that is consistent with the State Statute, which I was told verily that it's not an absolute mandate for undergrounding. It's just undergrounding doesn't decrease reliability, which is clearly the goal here. What's the way to keep an aggressive schedule, cost it out so that the issues raised by Mary and others get teed

up and then the Council has a good full record? What would be the next best step to integrate some of the things we've heard about today? And how aggressive can we be on the time table?

MR. BOGUSLAWSKI: Mr. Chairman, I would invite Steve Whitley and Roger Zaklukiewicz, who formed the Reliability and Operating Committee, to comment on that either now or on the next panel.

CHAIRPERSON WOOD: That's next. So why don't we hold that until the -- you all know that we're interested in hearing -- we're looking for the action item from today because clearly there are some problems out here that need to be pulled together and we can follow them down the field.

I was very impressed with the level of diverse technology both here and your window on the rest of the world. It is, I think, chastening to hear that America's not first and best. But that's okay. We're smart enough to learn from who is. And if we can grab that and use it in this grid up here, that's a big all to our credit.

So I don't have any particular questions other than to thank you all for the insight you put on what's out there in the lines and also, more importantly, out there in the field working.

Nora?

COMMISSIONER BROWNELL: Yeah. I just wanted to add to that. This is an industry, for obvious reasons, that tends to be risk-averse. But, sadly, some of that risk aversity extends to new technologies. And truly in restructured markets, we would expect to see lots more innovation. Yesterday, Chairman Michael Powell at the FCC, Pat and I toured a BPL deployment in Manassas which offers all kinds of opportunities, not only for communication but for smart grid -- I'm sorry -- broadband over power lines.

So I guess, listening to the options available, I would ask my fellow Commissioners to really start to ask the tough questions about why we are not seeing more applications of new technologies which really bring greater efficiencies. They're new, but they're not untried. And we really ought to be pushing the envelope a little bit more.

MS. SUEDEEN KELLY: And maybe some of the panelists have suggestions along those lines. If you do right now, I would appreciate it.

John?

MR. HOWE: I actually -- this is something I've given a lot of thought to in -- over the last several years. Transmission technology development and

deployment is truly an instance of the tragedy of the commons. I mean this is a system -- it's an integrated system that benefits us all. But because there had not been a clear framework of property rights, there has not been a clear incentive for individual entities to go out and develop and deploy the technologies because they could not, in turn, capture the benefits.

Now, there have been efforts, as we all know, to launch a merchant transmission center in this country. And there have been difficulties. But, you know, when we look at telecommunications, there is a framework of facilities-based competition, you know, where the cable TV folks and the telecom folks have gone at each other and the satellite folks and we have different networks. That has been -- that has generated competition and technology development, technology deployment. We have not had that framework in electricity.

But that argues -- my conclusion is because there is this tragedy of the commons, there is an urgent need for government to be involved and take a leadership role in developing and deploying these technologies. That means the Department of Energy in terms of having the budget and resources to do these types of technology demonstrations.

I also think it's noteworthy that out of 17 states that have energy technology development efforts, including Connecticut, including my state of Massachusetts and other states around the country, I can only think of two, California and New York, that devote really any resources to transmission technology development. Most other states have not focused on this area. It seems to be an oversight. I think we've come to recognize there will be limitations to the contribution that distributed resources can make to solve system level reliability issues. We need to have much more attention on this area.

MR. DONOHUE: Some other things to add. The current energy application of this technology, of course, is all based on business projects. I didn't have to go before ISO. I didn't have to go before the eight Commissioners -- I will get second-guessed on hindsight. But going forward, the issue to be determined is how much money do we want to spend. Is there risk associated with the technology? How are we going to mitigate the risk low returns that we're going to receive. This is why we move forward. We don't have a continuous second-guessing going on every single step of the way as to whether it is a prudent investment. You can invest too much or you're not going to recover some of the money.

From the get go, do we can recover it all or do we recover more or do we recover less. So a lot, in the application of technology, is we had a clear, concise cap of knowing what our risk and rewards were. It's not obvious to me sitting here today that they have any idea on how they're going to recover -- they have an idea of how they are going to recover their investment, but I'm not sure if there's any certainty (indiscernible) in that process that has a defined beginning and a defined end so that somebody dependent on can go on with the business of (indiscernible)

MR. BOGUSLAWSKI: If I could just -- go ahead.

MR. DUFFY: Just let me say -- I would say our experience in our projects, strictly our ten projects as well. So we have made the internal decision that all of our 115-kV transmission line five miles under water, seven miles underground will all be unaccounted for.

MR. BOGUSLAWSKI: If I could just add one thing? When you -- there is a place for these technologies as they develop. And when you -- for example, when you have a single problem on the system with thermally overloading your lines, you may be able to apply some of the technology being discussed, for example, the 3M solution.

When you look at southwest Connecticut, we have thermal overloads. We have voltage problems. We have instability problems. And it goes beyond that. And I'll stop there. But when you put them all together, what we are looking at for incremental technology -- we can isolate a couple of lines where there's thermal overloads where you put up sag measuring devices to make sure you can push more power through that. And we've done some of that.

But the point is as these technologies evolve, we have every intention, as we have in the past, to use them. But you must them in isolated ways until you figure out a way to integrate them more fully in the kind of robust solution that southwest Connecticut needs.

MR. JOHNSON: We're at our technology -- we're just at the stage where we're just commercializing it now. And the utility industry, it seems to be -- we have extensive field tests of the line, over three years of experience, extensive laboratory testing that we've done, gone through. There still needs to be some mechanism to really encourage the utilities that are the early adopters to put in not necessarily for a major line but to try it in a small section as we talked about where there's a problem to be solved, like in Minnesota. And whatever can be done through rates or whatever to

encourage that early adoption and then once the technology has spread, then disseminated outwards and the costs are driven down, I think we'll see a widespread usage of it.

MS. McKINLEY: Roger Zak has a comment.

MR. ZAKLUKIEWICZ: Commissioner Brownell, just so we're all -- have the facts in front of us. Clearly, Northeast Utilities has installed two D-bar devices, three D-bar devices, I'm reminded by John Howe, on our system. We also have one of seven static bar compensators in the United States was recently placed in service in the Stamford area. This is by far one of the largest high-technology devices. And we went forward with that project recognizing it has risk associated with it to ensure the lights stayed on. We are also contemplating on both projects, the Bethel to Norwalk project, the B/N project, and the M/N project, the use of -- extensive use of costly polyethylene 345-kV underground cable in lengths that are not equaled any place in the United States.

So we are pushing the envelope in many areas in a manner which we still feel comfortable we are going to end up with a reliable system, but, at the same time, we are not holding back and saying, "Well, it hasn't been done in 83 other cases. So we're not going

to do it now." So I just want to make certain we're all clear here that we are pushing the envelope in many areas.

COMMISSIONER BROWNELL: I'm thrilled to hear that. We hope that you'll share your experience with your colleagues. You probably had the leadership of a good commission to thank for that. My point was not to be critical. My point was that we do need more innovation. We haven't seen a lot of it. I'm not completely convinced that the economic signals encourage innovation. I think we're still working on old monopoly models in terms of economic signals. And so what I'm suggesting is -- my colleagues and I have discussed this and we're discussing with our state colleagues; is what can we do to change the equation not only on the risk management profile but on the economic incentives to be leaders rather than followers.

So I commend you and I hope that you will continue.

MS. McKINLEY: Shall we move forward?

CHAIRPERSON WOOD: Yes, Ma'am.

MS. McKINLEY: I think it's time to talk about reliability issues, which is a major focus of our topic today. And Steve Whitley, on behalf of ISO New England, is going to talk about their portion of the ROC

study.

MR. WHITLEY: Okay. Steve Whitley here. I'm going to begin the discussion. Roger Zak is going to join in and support the discussion to provide a status of where we are. Just to follow up on the previous discussion, I do want to mention that when the ISO first got involved with the planning process about four years ago, we organized a trip for the planning engineers in New England to the Effrey high-voltage lab up in Lenox, Massachusetts so that everybody was aware of what's up there today and what's coming up in the next five years. And I believe the planning engineers in New England are really on top of what's coming down the line and they look at those things. And I do think it's very important.

Getting back to southwest Connecticut, to put it back into perspective, we're talking about a 3500-megawatt load center that's served at 115-kV as an integrated bulk power system. And someone mentioned earlier it's almost like serving it with distribution.

And when I was at TVA, Memphis was about 3500 megawatts. We served it with three 500-kV lines, the power -- a large power plant in the center of town and three 500-kV substations surrounding the town. And the operators still watched it like a hawk.

So this is a large load pocket. And reliability problems here can affect our entire region. It can affect Boston. It can affect New York City, certainly.

Dave mentioned earlier a lot of the low-hanging fruit has been done over the years to patch this system up, prop it up. A lot of capacitors have been put in to maintain voltage with these heavy import limits. And that's pretty much got the system right up to its absolute limit at 115-kV.

The ISO's had to operate these old, inefficient units out of Merritt in order to maintain the flow within safe operating limits on lines. And we actually have to use emergency operating procedures today.

So the bottom line -- and we are existing now with a very weak system in southwest Connecticut. And because it's such a weak system at 115-kV, you know, with the voltage constraints we talked about, weak thermal capacity, too much capacitance, high short-circuit levels, it's really pushed us to the edge to try to find an underground solution that generates a lot of other capacitance into that same weak system.

We have found that the impedance of the system or the stiffness of the system, coupled with

capacitance, really leads you into severe transient problems. Simply stated, underground bulk transmission cable is very different electrically from overhead transmission lines and varied electric characteristics of the facilities. They're not simply interchangeable. And too much underground in a weak system can cause serious operability and reliability concerns.

We have been looking at a number of alternatives to try to find a solution that does put the maximum amount of underground cable in this network and still meet the reliability criteria that we need to meet to keep the lights on.

Just to give you a status on where we are today, we have been looking at the applicant's proposal with 24 miles of underground, Phase 2, and about 10 miles on Phase 1 that was proposed for Phase 1 as a system with the use of seven stat coms. We've now determined that that proposal is not workable because of the problems with trying to control seven large stat coms in one small area of our grid. It would be extremely complicated to try to do that and meet all the contingency and operating scenarios that we have to meet.

Our consultants have interviewed all of the existing stat com owners around the country, all seven of them, and found that they have all had serious

installation problems, many of them with outages over a year when they first went in service, cost and availability problems, problems with control. And, in fact, in some instances we have found that when they're needed to protect you for voltage collapse, they're not there because they require a 100-percent available off-site power supply. So we are not seeing that solution with the extensive use of stat coms as a solution.

Recently, ABB just this week has proposed an HVDC solution that they claim will meet the project criteria that we have identified. We're still analyzing that proposal to determine exactly how it works, what all it consists of and does it really meet all of our criteria. But we do have some up-front technical concerns.

First, it's not a simple HVDC proposal to send power from A to B. It's a multi-terminal HVDC proposal that would require the operators to try to operate a multi-terminal HVDC system integrated in the middle of an AC system and essentially try to turn the dials to make it respond like a free-flowing AC system would do in the multiple scenarios that we have to deal with in the tightly integrated southwest Connecticut system.

So we're continuing to look at that. We

have our consultants looking at it to try to understand it better, to evaluate it. We'll have a lot of questions for ABB. But we do have some concerns.

The current proposal that is before the Siting Council now, which is called Case 5, we have done some screening studies to determine at what level we reach harmonic resonance and saw that that case was pretty much on the borderline. So we wanted to dig deeper and ask our consultants to peel the onion and look at the results of actual transient voltage analysis.

And with this level of study, you're able to find out do you have a little problem that can be fixed or do you have a big problem. And we got those results in draft form just a couple of weeks ago. We still don't have the final case report back from GE. But the results are very troubling to us.

We're seeing transient voltages greater than 600-kV at multiple points on the system in southwest Connecticut and for sustained durations. So if those spikes had been small with short durations, there might have been some pretty quick solutions to try to mitigate those problems. But that's not what we have seen.

We're looking at literally hundreds of curves and plots to try to figure out what's causing those spikes. That based on our previous screening

studies, we believe it's related to having such a weak system in southwest Connecticut and having too much capacitance, which is the introduction of all the underground cable plus the existing capacitance that's there on the network.

We have to understand what's driving the problem and are there any viable ways to mitigate those problems. But at the same time, we're running cases to look at an AC solution with less underground to see if we can get a stake in the ground and find a solution that will work.

We'll continue to review the ABB proposal for HVDC. And we'll consider the implementation of any of the ideas that were presented today that we haven't already considered.

So that's where we are. I think if those case results would have come back, you know, a lot more in a reasonable range than what we saw, we could be a lot more optimistic about when we're going to have a solution. But that's where we are today.

Roger?

MR. ZAKLUKIEWICZ: Thank you, Steve.

Due to the lateness of the program, I am going to skip over the recognition of all the dignitaries present. However, I do want to -- that was almost as

good as "We can think better over lunch."

However, I do want to thank you for allowing me to participate in this very important technical conference.

As Dave Boguslawski said, we all see the southwest Connecticut problem from our own perspective. My perspective is that of someone who is going to be responsible for what gets built and, most importantly, that the project is very reliable, that it performs as designed and provides a long-term solution.

My concern is that of providing a transmission system that will work when it is needed and one that can be operated in real world conditions by utility employees.

We've all recognized that extensive use of underground cables in the long distance, extra high-voltage transmission lines would not provide the same degree of reliability that an overhead transmission line would. However, because of the extreme public interest in having new transmission lines be underground, we tried to come up with a proposal that would incorporate as much underground cable as we could while still preserving an acceptable degree of reliability.

On the Middletown to Norwalk project, the 24 miles between East Devon and Norwalk was the logical

portion of the line in which to concentrate the underground construction. This was in part because the existing right-of-way was not wide enough to accommodate new overhead line construction and so would have to be widened, whereas the rights-of-way north of East Devon were wide enough for the new overhead lines.

But there was one additional important reliability consideration for proposing underground construction between East Devon and Norwalk and not north of East Devon. The single largest reliability concern at the time was the long outage times required to find and repair faults in the underground extra high-voltage cable system.

The system south of East Devon could handle such an outage much better because the power starts to get distributed onto other lines at East Devon and there is less flow on the 345-kV circuits and more alternate paths for power to flow if one of the underground lines is lost.

The legislators then pushed us to do even more undergrounding, as much as technology allows. The studies needed to determine how much would be technologically feasible and where it could be constructed are very complex and time consuming and only a few experts in the world are capable of doing them

correctly. We retained several of them.

What we learned from these experts is what we had already proposed could be beyond the limits of what is technologically feasible. However, we are leaving no stone unturned. But neither will we propose to build something if we are not sure that it will work when it is needed and that it can be predictably operated.

I just heard this morning for the first time that the Council's consultant, KEMA, has said that 24 miles and more of underground transmission is feasible and will be reliable. I am sincerely looking forward to reading that report. And I would be delighted to be convinced that it may be possible to reliably operate that much cable in southwest Connecticut.

What strikes me about the KEMA Executive Summary is that KEMA says they have completed harmonic scans and apparently have not initiated any transient network analyses. We should note that the ROC consultants are doing TNA's -- that's transient network analyses. And it is these TNA results that are showing the widespread voltage problems we are trying to understand and mitigate.

It is not only the magnitude of the voltages that are a concern but the sustainability or the

duration of the voltage envelopes.

Perhaps the best way to use whatever little time remains is for Steve and I to address any questions that the rest of you have on the dais and give us -- give you our perspective on those issues. However, I want to make it perfectly clear that NU and UI are committed to finding a solution to southwest Connecticut that will incorporate as much underground construction as is consistent with the reliable and operable electric transmission system.

Thank you.

CHAIRPERSON WOOD: Let me just ask a quick question. And to your last point, so by when? Do you have a date? Can you give a date for that?

MR. ZAKLUKIEWICZ: A date to complete the studies?

CHAIRPERSON WOOD: Right.

MR. ZAKLUKIEWICZ: I believe Mr. Whitley and Mr. Boguslawski responded to that earlier. We were saying we were hoping we would be able to get a solution, find a solution, such that we could present to the Council some time in December. Recognizing, Mr. Chairman, that these studies -- to do full studies take three to four weeks. And we are pressing the consultants, that is General Electric and others, who are

performing these studies to complete them, work 7/24's if they have to, to get us the results so we can analyze the findings.

MS. McKINLEY: I believe we have a question by Representative Nardello.

REPRESENTATIVE NARDELLO: Did you have a follow-up?

CHAIRPERSON WOOD: Go ahead, Ma'am. Thank you.

REPRESENTATIVE NARDELLO: This question is for Mr. Whitley. And it's on process. As we -- this proposal -- as this proposal came forth in October of last year -- okay? We knew there was going to be 24 miles of undergrounding. And then we hear from ISO in June of this past year that you really had a lot of problems with the project. So my question to you is in terms of process did you see this application initially in October and why did it take six months for you to determine that there were going to be so many reliability issues? I think that's been asked of me many times.

MR. WHITLEY: Okay. We at the ISO and the applicants first saw some transient analysis reports from General Electric somewhere around January. And when our engineers looked at those first results, they looked like they could be troublesome. But they looked like they

might be okay, too. So we testified to the Siting Council that we had some concerns. We may be too far. And the Siting Council said, "Okay. I want you to go investigate that further." And we did. We went out and we hired a consultant from the UK who had a lot of expertise in detailed substation design and the capabilities of substation equipment and this network analysis.

And they told us that these problems were the kind of magnitude that you may not be able to find a solution. So we immediately reported that back to the Siting Council, which was June. So it took the time from seeing those first results, having our engineers seeing that they were very unusual -- and now mind you, these studies are not your typical load flow stability studies that are done in system planning. These are studies that are done really when you get into the design stages of equipment trying to determine the transformer ratings and whether you need surge arresters and so forth.

But they were troublesome. And so we got outside heads to investigate and we reported our findings to the Siting Council. And as we have dug further, the findings do appear to be very serious.

REPRESENTATIVE NARDELLO: And my follow-up question to NU would be you made the proposal. Did you

have some sense that there was going to be difficulty? I mean, again, this I think took a lot of people by surprise because when you came forward with the proposal, the towns involved -- part of that is in my district -- assumed that it was a viable proposal. And then suddenly we're hearing many, many reliability concerns. And I think that this has to be addressed. So what was your sense when you put this in initially in October?

MR. BOGUSLAWSKI: Roger, could I --

Representative Nardello, let me respond this way. If we erred, we erred on the side that you all wanted us to. The normal way that you do transmission planning is you run load flow studies to tell whether the lines will work thermally or overload, to tell whether you can keep the voltage up or not and then at a later time, after you know you have a project that generally will go from Point A to Point B, then you get in, as Steve said, you get into the very detailed equipment design ratings. And that is where a problem like the one that ISO has just talked about, what Steve just talked about -- that is where you typically would find the problem.

In our application to the Council, we committed to try to make the 24 miles work. We did not say 24 miles would work. We said we would try to make it

work. We also put in an all-over-- essentially an all-overhead proposal and one other one with fewer underground miles.

I am glad that ISO came forward as quickly as they did. Otherwise, we could have run the risk of getting to the very end and then, when we went back and tried to design the equipment, found that we could not get the equipment to the ratings that were necessary. So I think ISO really deserves a big pat on the back for coming in as quickly as they did.

CHAIRPERSON WOOD: Kevin? Representative DelGobbo?

REPRESENTATIVE DelGOBBO: Thank you. Thank you, Mr. Chairman. I -- and notwithstanding the previous question, my recollection is -- and I appreciate, Steve and Roger, your statement again here today on reliability issues involved in this particular application. I mean my recollection is there's not how many hundreds of ways can you two gentleman have come before us in Connecticut and discussed the concerns in every way possible of how to achieve the results of upgrading this transmission line. And I've heard that in every single iteration from both you gentlemen.

My question is to both of you. I'd ask you both to comment on this. I'm concerned -- and

Roger's comment is a serious one. Roger, when he said, you know, even what we have before us could be beyond the limits of technological feasibility. I take that seriously, not just as a, you know, an idle concern. What if we spent all these millions of dollars and what if we have deforested a whole section of America in studies and what if we have all this anguish in this process and the system is not, in fact, reliable? Is where I'm concerned. One of the things that I want to see come out of today is a connection between ISO and the applicants that we're going down the same track, that what the Siting Council finally puts forward is one that, in fact, ISO can put its stamp of approval as being reliable.

I'm sorry. As an individual and as -- I don't think we can live through a situation where that's not, in fact, the case. And I can't make that point strong enough. I'd ask you both to comment on the following. Is -- given the current state of the statutory framework that the Siting Council lives with under the presumption of undergrounding and your concerns that you've discussed of the technological issues facing that, where do you gentlemen feel we are and what the likelihood of how that's going to impact the application before the Siting Council today? I need to get your

sense of confidence on how that's going to happen and how the cost issue that was discussed earlier is going to relate to that.

I'll start with Steve.

MR. WHITLEY: Well, from the results we've seen in this draft report from GE, it's very concerning to me that we're going to be able to make these 24 miles work. But we're going to turn over every stone and try to make sure the way in. We're also trying to look at other studies with less underground to find something that will work.

I mean what's ironic about this whole thing, throwing the cost into it as well, you're trying to look at something that's just on the edge of maybe it will work and it might cost an extra 600 million dollars to put yourself on that edge. That's a crazy place to be. We ought to be trying to find a solution that will work and solve the problem and give the ability that Roger talks about to operate the system reliably.

But we -- I want to mention that we have a directive from Commissioner Katz of the Siting Council that says "Don't bring a proposal back that you won't stand behind." And so that's a very clear directive that I interpreted that way. And we're still committed to try to turn over every stone on this current proposal. And

we're doing that to try to better understand it and see if we can solve it. But we're also looking at alternatives with less than 24 miles.

Roger?

REPRESENTATIVE DelGOBBO: Roger?

MR. ZAKLUKIEWICZ: One of the questions within your broader questions was what happens with the high over-voltages and their sustainability. The best case scenario would be we would fail potentially from substation equipment and possibly some customer equipment as a result of these extremely high voltages. Costly, could result in localized outages. But it's also fair to say that the sustained high voltages could end up resulting in a widespread outage throughout all of southwest Connecticut and potentially extend into the other main transmission facilities serving the rest of Connecticut, which would end up blacking out portions of Connecticut and hopefully the productive relay systems would end up separating Connecticut from the rest of New England such that it would not be widespread as we experienced on August 14 in 2003.

I am in full agreement with Steve Whitley. We are not going to bring forth a proposal which is not going to be reliable and which will not work. We will endeavor to figure out the maximum amount of underground

cable that can be installed with the reliability and operability that meets our standards for operation then of the bulk power system within New England.

MR. BOGUSLAWSKI: Representative DelGobbo, could I make a comment as well please?

REPRESENTATIVE DelGOBBO: Please.

MR. BOGUSLAWSKI: Let me tell you what I'm concerned about. I'm concerned that a lot of well-intentioned people, legislators, tried to give direction in a very well-intended way and have put the planning for infrastructure into a state of chaos. And we're going to work our darnedest to meet the intent of the legislation. But I am very concerned that we -- it is going to take us a long time. We're going to be running study after study after study. The clock is going to run out on the siting process. And we will have the law of unintended consequences.

I am also concerned that, with the kind of discussion at the Siting Council that is taking place -- and I understand why. It's basically this law that's driving it. People are talking about, you know, taking wide swaths of land to build overhead transmission line and displacing homeowners and spending a lot of money to create these buffer zones where the science, the EMF science, doesn't support that.

So I am concerned that we may well find that we've created -- although we were well-intentioned coming in, I am very concerned that we have created in the state of Connecticut a law with unintended consequences.

REPRESENTATIVE DelGOBBO: I -- just to -- I appreciate the comments of all three of you gentlemen. I almost get the sense that the FERC session here today is somehow to get all of us as we all could understand this here today. But it's "All right, kids. We've got to play nice and figure out and get this done." So I appreciate FERC's intent, if that's -- if I understood it correctly.

MR. ZAKLUKIEWICZ: Representative DelGobbo, I think there's one other point we need to keep at the top of our list. The summer of 2003 was cooler than normal. Some characterized the summer of 2004 as not even having a summer. And we have lost sight of the experiences we went through in 2002 attempting to keep the lights on. And as I go through the various doors in the past two summers, I'm just reminded that at Home Depot they were selling air conditioning units, General Electric, $74.00 apiece and they couldn't ring them up fast enough. That additional load is on the system. Most new homes being built in the state are now 3,000,

4,000, 5,000 square foot, fully air conditioned. The load is there. The load is increasing. And we have to keep in mind that it is possible in 2005 and 2006 we are going to be where we don't want to be and that is going through rolling blackouts to keep the system from falling apart.

So we have this urgency that as Americans we tend to forget things quickly and we seem to have forgotten the urgency of the situation.

MS. McKINLEY: Gordon Van Welie has a comment.

MR. VAN WELIE: Yeah. I wanted to actually support some of the comments that were just made by Dave and by Roger. And this morning I said that we've got to relieve some of the constraints for the engineers that are trying to find a problem. We've got a macro problem and a microscopic problem here in Connecticut. At a macro level, we heard that you've got a serious reliability problem and that Connecticut consumers are bearing a great deal of additional cost because we don't have a reliable infrastructure. That's the macro problem that we're trying to solve.

And it strikes me that part of how we got ourselves into the situation is that we tried to solve for the political constraints before we tried to solve

for the engineering constraints. And I think where the engineers could be helped is if the policy makers gave them the freedom to go off and find an engineering solution that would be -- that would work and would be reliable and then thereafter they start applying some of these other considerations. And I think that way we'll get a solution that will work.

CHAIRPERSON WOOD: So mid-December we get a solution that will work. At that point, it goes through the wringer of -- on the costing side at least. How fast could -- could that be done simultaneously?

MR. VAN WELIE: Yes.

CHAIRPERSON WOOD: That you would say "Here is the base cost. Here's what the increment would be" so that the locally borne cost versus the regionally borne costs are out there for the Council to look at. So then you do engineering first. I think that's absolutely correct. Do what works reliably first. That's off the table. Then we go as to is that choice one that the Council approves. And I guess the hard question will be if the answer is no, then do you have options then that are maybe less expensive that still solve the reliability problem.

MR. VAN WELIE: Well, I think at a macro -- at a macro level once again -- and I'm hoping and

confident that we'll find some transmission solution here that will work. But it may not have as much undergrounding as we would like. So I think you've got to give the engineers the freedom to go back and look at a whole range of cases, starting at one of the alternatives which NU put on the table way back in October which had two miles of undergrounding, and give them the freedom to look at all of the solutions, find something that works and then thereafter come back and say, "Okay. We know this one works. Maybe if we add a couple more miles of undergrounding, does it still remain reliable? Is it still a stable solution?"

In the very worst case, if a transmission solution doesn't work at all, we're going to have to go looking for other solutions, distributed generation solutions. I don't know what the options are. Maybe we have to go back to the 115-kV network and see what we can do there. None of those are really preferred solutions because they're all -- they all smell like the band-aiding you've been doing for the last 20 to 30 years.

So I think we have to find a way of making this transmission solution work. But my plea really is where I think the Connecticut policy makers as well as the federal policy makers can help us is give us the freedom to find a solution that from an engineering

perspective works and then let's apply these other constraints.

CHAIRPERSON WOOD: I guess this is probably a good time to ask. Is that objectionable to anybody in this room?

MS. HEALY: Mr. Chairman, I would respectfully comment -- and Gordon's comments are well taken -- that you do as the engineers have that permission from the policy makers. As far as my reading of the undergrounding statute was, there was a preference for undergrounding and the term was "if technically feasible." And that, to me, gives you the freedom that you're looking for to do those extensive modelings that you're doing. And if it comes out and it's not technically feasible, then the presumption of undergrounding is rebutted. And then you have to look at other solutions and you're into the overhead configurations or some undergrounding and overhead.

And I think -- I think that that is in the statute and that is what this process is trying to be about at this point. And, you know, rallying us around it is a good thing. But the way I look at it and our office looks at it, it's a rebuttable presumption. If it's not technically feasible, then the undergrounding, you know, has been rebutted and --

MR. VAN WELIE: Perhaps I can just -- it's more than just the written word of what's written down in terms of the criteria. I've got a small dog at home and we have one of these underground electric fences. And we've trained it so that when he gets within five meters of that fence, he yelps and runs in the other direction. So the dog doesn't know about the law. But I tell you the engineers that are trying to design a solution here, they know when they get within five feet of the line the buzzer starts going off around their neck. And I think what you've got to give them the opportunity to do is to solve the problem without feeling that they're going to get shocked.

MS. HEALY: Right. And to that point, one last comment. If undergrounding is not going to guarantee reliability, I wouldn't want one rate payer paying for that, the cost of that line. And I'd say that quite publicly to them all. And I would hope that they would want me to say that as their advocate. And I think everybody sitting in this room would have to agree with that. We don't want to build something that does not work.

COMMISSIONER DOWNES: May I? May I jump in?

MS. HEALY: Please do.

COMMISSIONER DOWNES: Well, you may not like this at the other end. We'll see. In an ongoing effort to try and think up some new ways of approaching this and at the same time be the proverbial skunk at the garden party here, let me throw out another idea.

One of the things I'm concerned about is that, as a number of the panelists pointed out, this process of testing the various configurations is a long and complex one and involves a fair amount of time. And at the end of the day, my interest and I believe the interest of most of us is to try and move this process down the road fairly expeditiously.

We've heard from a number of people on this panel that they believe that there are a variety of other possible solutions that could be applied. And while I recognize that there are lots of opinions out there that are supported by different kinds of things, at the end of the day it seems to me that perhaps we want to set up an arrangement here so that there is some reasonable opportunity here to finish testing out the current theories.

And, Roger, you were mentioning a little while ago -- and I believe, David, you were mentioning a little while ago that some of the data on these has come back kind of alarmingly poor and that ultimately this

arrangement could turn out to be highly problematic.

Is there some valuable in setting a backstop on this and saying "Fine. Let's go on to -- I don't know -- mid-December or something, for example", which is what you were suggesting a little bit earlier. And one of two things is going to be true. Either, you know, either the experts will come back and say, "Yeah, it's going to work" or they will come back and say, "No. We still don't have something that's going to work here."

Well, if they come back and say it's going to work, well, then fine. We can all declare victory and go home. To the extent that they come back and they say, "Well, we don't know if it's going to work or not" or "It definitely won't work", then maybe what we ought to do is consider putting out some sort of a solicitation and asking a variety of folks, including some of these nice people and maybe some other people out there who have some different ideas to come forward and say, "Look. You know. We have a way of doing some of this. And here's our way of doing it." And by the way, I mean if I were doing this, I'd consider putting out this bid and having these guys come in and demonstrate through the studies and through whatever verification it is that ISO and NU and CL&P think is appropriate that their concepts actually work. As opposed to the company, you know,

trying iteration after iteration after iteration and ultimately maybe not getting anyplace.

Look. I want to stress I -- I have nothing against NU or UI or ISO. I think everybody has been making a maximum effort to move down the road. But I remain concerned that, you know, under the circumstances we're in at the moment, if GE comes back in the middle of December and says "You know what? We've run 16,000 possible variations and there is not one of them that we think is really do-able", then where are we?

And, frankly, some sort of a time line like that it seems to me would provide some incentive for these guys to move forward. It would also say to some of the folks that have other kinds of alternatives, "Look. There's a chance that this thing they're studying in Connecticut may not work. Let's get our act together. Let's see if we can put together a proposal that we think will work and get ready to go and offer to them."

So, in any event, that's the theory. I mean I'd be interested if anybody had a reaction.

COMMISSIONER BROWNELL: I think it's a great idea, actually. Competitive markets are best served by competitive bidding. And I think that allowing the opportunity for policy makers to really what a market-driven solution might bring would be an

interesting exercise. Clearly, we have companies who, although they haven't built transmission in 30 or 35 years, I guess, have experience and that's a good thing. But we see lots of new providers in the marketplace, new technology providers, independent transmission companies which have been enormously successful elsewhere in the world. I think it would be a pretty healthy exercise.

So, Don, as usual, a brilliant suggestion.

COMMISSIONER DOWNES: I only wish you could vote on my Commission.

COMMISSIONER BROWNELL: I'd be willing to try.

COMMISSIONER DOWNES: David?

MR. BOGUSLAWSKI: One of the things that I think we have done along the way is welcomed any and all comers that have ideas to come talk to us. But at the end of the day, I think you want to put through the technical analysis wringer, if you will, those proposals.

Now, Gordon's idea of trying to bound the analysis early on I think makes a lot of sense because if we can't find a way to do 24 miles of underground, we have to find something that works. So his idea is let's go to the lowest amount of underground possible and see if that works. If that doesn't work, we have a very different set of problems than any of us thought going

into this issue or this problem, this solution-finding approach.

I think the right way to do it is probably to bound the problem. And we intend to come back in December with an analysis that tries to bound the problem and tries to do enough runs so that we know where that sweet spot is which some will argue is what the law calls for.

Let me also suggest to you, sir, if I may, that what the putting out for RFP will do, guaranteed, guaranteed, is add 24 months to 36 months to the time line because they have to -- they would have to -- whoever does respond to the RFP would ultimately need to go through the same siting process, would ultimately need to run the same level of sophisticated analysis, thermal, voltage, stability, transient network analysis, harmonics, looking at the harmonics and those kinds of things. And it would be a shame for the state of Connecticut to lose the many months we've already invested in this in looking for a solution.

MR. VAN WELIE: Could I just add something to that discussion as well? Because I was thinking about the solution -- the suggestion that you just made. And I think in part I read it as an attempt to put some pressure on the process so that we get to a decision and

we can then move forward. And so, in general, I think that's a positive thing.

But to just pick up on what Dave just said, from what we can see of the system and what we've learned about the system over the last several years, the only alternative you've got to really strengthen the infrastructure is getting a lot of load off the current system. That means huge amounts of demand response or huge amounts of distributed generation. And I think before you go down that path and spend a lot of effort and time investigating that, you should probably take a look at what that will cost you; because I think it's going to be substantially more expensive in terms of putting that amount of distributed generation into southwest Connecticut and will have pretty severe impact in terms of causing people to effectively restrict their consumption and whatever ramifications that might have. So I think it's a good idea to perhaps think about it a little bit more. But you probably need to do a quick pen and paper check as to the feasibility of that particular option.

CHAIRPERSON WOOD: Gordon, where did you hear that there's something else that is kicking around here other than how to get these transmission lines built?

MR. VAN WELIE: Well, you know, what I heard there was the implication that if we can't find a solution, a transmission-based solution, by December, essentially what Don was proposing to take the problem away from NU and UI and hand it over to the market to find a solution. Now, my logic is the following. Unless we're going to find two alternate wires companies in Connecticut, we're the ones you've got. So really what you're asking the marketplace to respond -- what is the marketplace? The marketplace would be large-scale generation, small-scale distributed generation and demand response.

CHAIRPERSON WOOD: I think what I heard Don say, though, in terms of transmission is what we heard about here on the table. All these other points are valid. But I think what I heard him say was if this transmission solution can't work, then maybe some of these other ones can.

MR. VAN WELIE: Like emergent transmission?

CHAIRPERSON WOOD: Yeah.

MR. VAN WELIE: Well --

CHAIRPERSON WOOD: Or even --

COMMISSIONER DOWNES: What would be wrong with asking Northeast to consider putting out an RFP and

seek some of these technical solutions as well? I mean I understand that there are companies that would like to just build the facilities themselves and own it. Fine. I understand that. But it seems to me that they also may be purchasable and you may be able to put out an NU/UI consortium, be able to put out an RFP and say, "Look. We're looking for somebody to come in and provide that --

MR. VAN WELIE: A transmission-based solution --

COMMISSIONER DOWNES: -- technical -- exactly. Transmission-based solution.

MR. WHITLEY: Mr. Chairman --

COMMISSIONER DOWNES: I'm sorry. Bear with me just a minute.

MR. WHITLEY: Yes.

COMMISSIONER DOWNES: Because, Gordon, you know, the other thing that I can do is, you know, some time after the first of the year the Connecticut Energy Advisory Board will come on line. And they have the power to issue RFP's for all kinds of things, demand response and transmission and generation and pretty much -- so, frankly, I'm not inclined to -- you know, I'm not inclined to wade into this necessarily at this point and say to Connecticut I don't have confidence that NU and UI and the ISO are, indeed, making a responsible effort to

find a solution. So I'm reluctant to pass with that.

And in part you're right, Gordon. You know, part of my idea was kind of a backstop to put a little pressure on the process and make it move forward. But the other side of the thing was that --

MR. VAN WELIE: Well, could I offer you an alternative proposal?

COMMISSIONER DOWNES: Sure.

MR. VAN WELIE: Because I think visibility on this process will help keep the pressure on it. So my proposal would be to reconvene a conference like this in the new year to see where we -- to see what progress we've made. And at that point, if -- we'll know more. Hopefully, we've gone through these studies. And as Dave said, you've bounded the problem at that point. We'll know more about the range of possible solutions. And I think that's where you could actually ask that question again.

COMMISSIONER BROWNELL: Maybe we could have some of the many consultants that have been referenced here today, GE, KEMA, others, maybe we can just get the people who are doing these studies here so that we could talk to them about options and what those -- it would be helpful to have those studies beforehand. And when you say January, we talked about December and

then we talked about January. We've been talking for two years now.

MR. VAN WELIE: Well, you can do it in December. Yeah. I was just thinking --

COMMISSIONER BROWNELL: On Christmas Eve if we have to.

MR. VAN WELIE: Right.

COMMISSIONER BROWNELL: I mean let's be disciplined. It gets people's attention --

A VOICE: Do we get to vote on the Christmas Eve thing?

COMMISSIONER BROWNELL: Well, just pick a date and stick to it is my point. And make it in --

CHAIRPERSON WOOD: We will commit to do that between December 15 and January 15. We'll be back. And I think the hope here is that we -- the hope, the expectation is that we have a solution or two or three that clearly pass the reliability hurdle first, that conform to the state statutory requirements as much as possible, which it looks like, from looking at the words of the statute, envision that reliability is the trump card, and that it's actionable at that point by the Siting Council and by the ISO cost allocation -- or the cost allocation should be done before then. Is that do-able, Steve? That at least a ball park recommendation --

MR. WHITLEY: I think we can do the ball park. It's a matter of do they have -- does it have as much involvement on what the proposal is. But I think we should know on the order of magnitude of what the cost --

CHAIRPERSON WOOD: That's what -- I mean you're not going to know figures now with a project in '08 what exactly it is.

MR. VAN WELIE: Could I make a suggestion in terms of the cost allocation? What we've been talking about today is Phase 2. And what still has to be determined is the cost allocation on Phase 1. So I think as a goal, we ought to at least have had a good look at the cost allocation of Phase 1 because what belonged there in terms of that allocation process is probably directly transferrable, at least in terms of the principles that are developed, to Phase 2. So I think that will inform us in January as well.

COMMISSIONER DOWNES: Do you think we would have those estimates in January?

MR. VAN WELIE: Well, I'm -- I guess I'm asking the question and looking for a response from Dave and Steve because we know a lot more about Phase 1 than we do about Phase 2 at this point.

MR. BOGUSLAWSKI: Well, I think what we -- we would have gone through another very detailed estimate

on the Bethel to Norwalk line. And I think what we know in Middletown/Norwalk -- so I do agree with you, Gordon. I also know on Bethel to Norwalk -- on Middletown to Norwalk, rather, that the price structure is as for overhead lines. So if an overhead line was going to cost you, you know, three and a half million a mile, undergrounding is going to cost you somewhere in the 14 to 15 range for the multiple tables you're talking about. So we could ball park out costs I think along those lines as well.

COMMISSIONER BROWNELL: David, did I misunderstand something? I thought this morning you said undergrounding was the less expensive solution. I'm just confused. Maybe you're saying the same thing in a different way.

MR. BOGUSLAWSKI: Well, I think one of the things that happened this morning when I was asked questions about the cost of undergrounding is I was describing some tradeoffs that occur. And when you look at any project, you must build substations and there's a cost to that. You must acquire land and rights-of-way. You must also build overhead lines or underground lines.

When you look at the Middletown/Norwalk project, from Milford north to Middletown, we already have rights to the right-of-way. So we're looking at the

cost of building 345-kV lines overhead or underground. And our estimate of the overhead price tag for that section is about three million to three and a half million a mile. If we were to have to underground in that area, it would cost about 15 million a million, for a factor of about four to one. And we're talking, you know, a section that's about 45 miles long, 10 or so million a mile difference, you're talking four or 500 million dollars extra in cost to underground in that section. Those are very, very rough numbers.

When you look at the southern portion of the route, we don't have the right-of-way width. So we'd have to go out and buy homes and right-of-way width. When we first looked at this project for that 24 miles, it appeared to us as though the cost of under-- that the extra cost of putting the lines underground would be more expensive, but it would be offset by the savings of not buying the land. So we thought the cost of that 24 miles for overhead or underground was about the same either way.

We have subsequently learned in our technical studies that the problem -- that the technical studies don't solve. It doesn't work. We looked at putting a number of static bar compensators in at a cost of 250 to 300 million dollars. It just so happens that's

another 10 million a mile.

So I think my takeaway from this and what I want to be very clear about -- if I said anything at all that was confusing about the cost, underground is much more expensive than overhead. Much more expensive. Probably a factor of three to four or five, in that range.

COMMISSIONER BROWNELL: Okay. Thank you for clarifying that because I think a lot of people, including me, left this morning thinking that you had said just the opposite. Let's be very, very specific. I can't wait to see the outcome of a cost analysis. And ball park is lovely. But I think we need a narrow ball park, something a little more specific.

MR. PHELPS: Thank you, Mr. Chairman. I've been cautious in my participation today and careful to not remark too much during today's proceeding. I appreciate the fact that everyone here has respected my need in that area. Notwithstanding that reluctance to engage in a lot of the discussions and debate, for lack of a better term, I will remark that much of what's been discussed in the last hour as it relates to the technologies that are emerging among various companies, consultants, talented firms and companies that are talking about different ways of building transmission,

including our own firm, KEMA, that I remarked about this morning, you know, the Connecticut Siting Council, through its jurisdiction within the Connecticut Statutes, given the skill sets of the staff, the background and experience of the various members of the Siting Council themselves, not the least of which my chairman, I think it's important to point out here that our process and our wherewithal does, indeed, permit and empower the Siting Council to do much of what's been talked about here, juxtaposing one expert's thought processes about ways of building a mousetrap against the other. The formal process lends itself to testimony, cross examination and so on.

At the end of the day, once a route is brought in to the Siting Council, once we receive the ROC report and a route is pointed to by the applicants and what is said to us is "This is the route that we wish to build. This is our application. We wish to have this considered and acted upon", then we proceed with scheduling hearings. And, you know, the rubber will hit the road, so to speak.

But as we sit here today, we don't have the ROC report and, you know, we're not entirely certain when we'll get it, although we're hopeful that we'll get it by the end of the year.

The Siting Council is prepared to do the hard work and do its job here. We stand ready to do that and we look forward to doing that very soon.

MR. McCLELLAND: I feel like the guy on Jeopardy that's been hitting the buzzer but hasn't had a chance to speak, at least not on the microphone. A question. I have a question for you, Steve. The current situation, as I understand it, is you have a weak 115-kV system and you're looking at solutions. And this is an alternative between overhead and underground transmission. And I'm putting that in very simple terms in order to try to summarize it for the audience.

Now, GE's done a study and the study has come back and said, "Hey, we might have one, two, maybe three solutions." Solution 7 or Case 7 was the stat coms. And that's pretty well been crossed off. We're down to Case 5 versus the DC installation.

In the case of -- in the instance of Case 5, by taking out localized generation and we're also simulating transmission outages, on that basis you're running -- and I think the interim ROC report I think from last week states that it's very case-intensive and you're going through dozens, perhaps a hundred or so cases to try to sort out whether or not this is feasible.

The question I have is that what's the

public to do? I mean we have the Connecticut Siting Council that's come back with KEMA. This is a well-recognized expert that says this may be possible. On the other hand, we have GE, who is also a well-recognized expert in the field, saying it's probably not possible. And when one gets into a circumstance like this, especially as an engineer, we tend to test between zero and infinity. Zero is a known quantity that we can test to see if it works. Infinity is something that we're speculating about.

Zero would be the current system. Have you run a case study with GE's model on the current system to test for transient over-voltages, to check for the removal of localized generation? And have you simulated the same transmission outages? And if you have, has that circumstance shown that the current system isn't viable or feasible?

MR. WHITLEY: Well, we haven't run that case because we can't let the local generation go off line with the current system because we have to run it to maintain safe loading limits. But when we bring in the new transmission, especially during the spring and fall, we do see that we'll have numerous opportunities not to require that generation to be run out of Merritt. And, in fact, that's the time after we get the transmission in

that we hope to be repowering some of these cycles.

MR. McCLELLAND: Okay. Hold that thought for just a second, Steve. If we're taking the case or the contingency that we won't have localized generation available, is that two stringent of a requirement for -- to place upon the new transmission system? Second question as a follow-on -- and I want you to think about it while you're answering the first -- is that have you done a differential between the underground system and the new overhead system? Because let's face facts. This system is in bad shape. It's pushed to the edge now.

So how much better is the overhead transmission, the alternative, than the studied underground transmission? And have you run that analysis?

MR. WHITLEY: To answer your question, we are getting that detailed analysis done. We have done the harmonic resonance screening for that place and it looks promising. But we're looking at the more detailed voltage analysis case where it has to be where it comes back now. That's where Gordon said we're looking for a solution that will work.

MR. McCLELLAND: Okay. So to not undo all of the work that you've done and that the Connecticut Siting Council has done, would it be practical and would

it be helpful to go back and run the current system configuration under GE's TNA and run the current system configuration under KEMA's TNA, compare the two and see which of the two are accurate, more accurate? And I know it's not practical to subtract out localized generation. So you may just run it under the current operating conditions, compare the two and see if we at least have a same base line by which to do comparisons further down the road.

My concern is that if we move off of the work that you've done -- you've done a lot of work. If we move off of that and we lose the focus on what's already been done, we may wander in the wilderness for many more months. And the project isn't getting built. And I think everyone's in agreement, at least I've heard that most folks are in agreement to do something as far as transmission. What we're talking about is trying to quantify the difference between the overhead and the underground transmission. And we also, I recognize and realize, we don't want to end up in the same bad situation that you're in now, 600 million or a billion dollars later.

So is it a practical alternative? Is it something that would be helpful to have before the next technical conference?

MR. WHITLEY: I think we are going to have that. Yes. We've already asked for that case to be run.

MR. McCLELLAND: So you're going to do the base case of the existing conditions. And how about the Connecticut Siting Council then?

MR. WHITLEY: We've already done the base case for harmonics resonance screening. I don't think it would be practical to do another case with transient voltage analysis because we can benchmark the harmonic resonance.

MR. McCLELLAND: Okay. And for the benefit of the folks in the audience, transient voltage analysis or transient voltage problem is a temporary over-voltage or high-voltage condition usually caused by switching events.

MR. WHITLEY: That's correct.

MR. McCLELLAND: And that will last several cycles, which is fractions of a second long. Now, when that event occurs, it can precipitate equipment failure. And I think in your particular case, you're mostly concerned about which pieces of equipment?

MR. WHITLEY: Transformers and circuit breakers --

MR. McCLELLAND: Lightning arresters.

MR. WHITLEY: Lightning arresters.

MR. McCLELLAND: Okay.

MR. WHITLEY: And we see voltage spikes up to about 1.9 per unit.

MR. McCLELLAND: And I realize that's high. But there's also a BIO rating for some equipment that can suffer several cycles of almost double over-voltage. And I don't want to get too technical because we glaze everyone's eyes at the end of the conference.

But I guess it would be helpful, at least from an outsider's perspective, if KEMA and GE would take the base case, the one that you live under now because obviously you're not arcing over lightning arresters and you're not causing transformer failures, take the base case, see if the base case proves itself and then use that base case to establish sort of the assumptions and the model and the guideline then to do the projections for the overhead versus underground system. That seems as if that would build on the work that you've done, not reverse your efforts, and probably could be done, I would assume, fairly quickly.

MR. WHITLEY: I wouldn't assume fairly quickly. But we'll take a look at that.

MR. McCLELLAND: If you think it's a proper thing.

CHAIRPERSON WOOD: We do have a couple

more speakers and we're already at 4:00. So why don't we hop into that, Sarah?

MS. McKINLEY: Yes. Our first speaker is Anthony Vallilo, President and Chief Operating Officer of United Illuminating Company.

MR. VALLILO: Thank you. I want to add my thanks to everyone who participated in today's technical conference about Connecticut's critical electric system infrastructure needs. There is an obvious consensus that the needs in southwest Connecticut are both real and immediate. Many issues were highlighted today that point to the various engineering, financial, regulatory and political complexities that we collectively face. But as Representative Backer said this morning, we need to focus on what's real.

And I'm very encouraged by what I've heard today, especially in the last 20 minutes or so, because I think we're gravitating towards focusing on what's real and what really needs to be done here to get to a quick solution to this problem.

We cannot lose sight of the fact that the citizens, businesses and institutions in southwest Connecticut, along with the rest of Connecticut and all of New England, are entitled to reliable, value-based electric service. In turn, the lack of a reliable and

competitively priced electricity will have a debilitating impact on economic vitality and the quality of life. And although issues such as environmental impacts, health, costs are very important policy issues, the most important issue is to have a system that meets the power needs of our citizens.

It is the obligation of the utilities and ISO New England to see to it that the electric system is built and operated in a manner that meets long-established reliability criteria. If the lights go out, the customer calls the local utility. If the lights are out for a considerable time, they call me or they call Lee. So we have a vested interest. And if they're out for a very long time, they call Commissioner Downes. And I don't think he's here right now. But -- so we know that the immediate impact of the customer's wrath when service is not up to their standards.

But we need to -- we need the support and the collaboration of state and federal regulators working under appropriate policy direction and political oversight to accomplish the stated mission. History has shown that we, the utilities and now ISO New England, have been highly successful in meeting customer demand for reliable electric power while working within the stated public policy objectives. We have shown that

infrastructure projects can be accomplished in a way that is a fair balance of the many difficult issues.

This is not by accident. It is the result of competent and dedicated people doing a lot of hard work. And we can continue to do that.

Regarding the Middletown to Norwalk 345-kV transmission project, which UI is a co-applicant with CL&P, from the outset UI has advocated two fundamental requirements. And these have been stated already. But I'll repeat them. First, that the final as-built project must work. That is, it must solve the serious reliability problems in southwest Connecticut for the long-term.

The reality is that ISO New England will make the final decision as to which design is acceptable. We all have to realize that. We could all talk about policy. We could all talk about Siting Council process. We can all talk about what we would like. But we have vested the authority -- the federal government has vested the authority in ISO New England to make the final determination. And we must respect that. And they are working very hard to do that in a way that meets the policy needs of Connecticut and meets the needs of the electric industry, electric system in New England.

Our second criteria is that we receive

full cost recovery for our investment, especially those incremental localized costs that could result by doing a design that is not the traditional, normal approach.

There was some talk this morning about how that works. My understanding of how that works basically is that at some point ISO New England will determine that a particular solution that is a traditional, let's say complete overhead solution will cost, let's say for the purposes of the discussion, 600 million dollars, which is about what the 345 project will cost. If the actual cost of what is finally approved adds additional cost for equipment or further undergrounding and let's say that cost is now 800 million dollars, 200 million dollars is going to be allocated to local customers in Connecticut and 600 million dollars will be regionalized throughout New England.

Both of those costs, though, are under the authority of ISO and FERC to approve. And once they are approved, then the utilities, we believe, have the right to collect those costs from the Connecticut consumers.

There is not a complete connection of the dots yet to do that. But that is still an outstanding issue for discussion at a later day.

The importance of being certain a project works cannot be understated. Collectively, we do not

have the time or luxury to continue to push the experimental envelope or to build a solution that is sub-optimal or one that potentially worsens the already deficient electric system in southwest Connecticut. Such outcomes simply cannot be allowed to occur. Everyone loses if that's the outcome.

Electricity is a complex phenomenon that can be very destructive if allowed to operate outside very specific tolerances. Selection of the right solution will fundamentally be the result of the abrogation of strict engineering principles and, in southwest Connecticut, principles applied to an existing system that has unique deficiencies. Policy makers must have the courage to temper public policy needs and defer to these engineering principles. And I'm more confident today that the final determination of the right solution will be the result of a legitimate and comprehensive process that fully considers these strict engineering principles.

I do want to quickly comment on a comment that the Attorney General made this morning about the mismanagement of the utilities and ISO New England in the application process. That may be the perception. But I think as you hear the complexities of what's involved here, how we're struggling to meet the needs of all

constituents and the fact that during the application the laws were actually changed in Connecticut which required more stringent analysis on our part, that's what's caused the extension of this process. It has nothing to do with mismanagement. It's our desire and willingness to be extremely responsive to the needs of everyone here in Connecticut and in New England.

So we need to arrive at an expeditious decision. We need to arrive at expeditious decisions so that we can continue to reliably meet the needs of Connecticut's electric consumers and minimize the financial penalty that they will continue to pay until the southwest Connecticut electric system is brought up to modern standards.

Thank you.

MS. McKINLEY: Thank you so much.

And our last speaker is Mr. Lee Olivier, President and Chief Operating Officer of Connecticut Light and Power.

MR. OLIVIER: Good afternoon. It's a pleasure to be here. And first of all, I'd like to say thank you to Chairman Wood, along with the other Commissioners from FERC, and the staff for coming here today to really help bring greater focus and attention and hopefully to build greater understanding on this

issue that is very critical to our state.

I also want to thank the rest of the dais here today, particularly the leadership of Chairman Downes of the DPUC, along with the other Commissioners and the leadership of the Energy Technology Committee, Terry Backer and Kevin DelGobbo.

As President of CL&P, I'm the guy really responsible for keeping the lights on for our 1.2 million customers across Connecticut. And that's a responsibility that I, along with the other dedicated women and men that work in our company, take very seriously.

We've heard today that the current transmission system is really maxed out. And it is. The significant growth in load, particularly in southwest Connecticut, along with the aging transmission system, really presents a critical challenge that must be addressed. And, frankly, other than the Red Sox score last night, it's the thing that keeps me awake at night. And virtually everyone here acknowledges that this is a critical situation that warrants prompt and decisive action.

While at the same time, we can't seem to agree on how that should be done. Now, at CL&P, we've done all we can do to this existing, aging transmission

system to bring it up to date. But even those improvements aren't sufficient to meet the current and future demands. The lines need to be upgraded and they need to be replaced. And that needs to be done very, very soon.

We've come forward with what we believe is a balanced plan to increase transfer capability into southwest Connecticut, but also enhances reliability and minimizes energy cost.

Now, I would just say the Consumer Counsel, Mary Healy, I think said it very succinctly. This is all about reliability first and then dealing with the cost. And in regards to solutions, there are many solutions that are out there presently right now. It's just a matter of how much of this do we want to underground. Building a 345-kV line in itself gets done all around this country. So this is a problem that has many, many solutions.

However, I believe that the clock here is ticking. And without timely approval to proceed, I believe our prospects are bleak. We heard the issue of the weather and the very mild weather we've had in the summertime in 2003 and probably one of the coolest summers we've had in 2004. Clearly, that is not going to continue going forward.

The consequences of additional delays in addressing the inadequacy of Connecticut's transmission system will further endanger our ability to keep the lights on. And believe me, that is not an exaggeration in any way, shape or form.

In closing, it's imperative that we let the Siting Council quickly finish its work to identify a Middletown to Norwalk solution that protects the integrity and ensures reliability of Connecticut's electrical infrastructure while appropriately balancing the competing interests of the various parties involved in the siting process. We really believe in that. We believe it should be transparent. We believe there should be involvement of all of the stakeholders.

And, of course, we ideally say we really need to maintain the reasonable rates for all of the consumers and customers not only across Connecticut but across the region. I believe this forum has helped move this agenda forward. There is much to do in between now and the end of the end and January. But CL&P and NU is committed to work with ISO New England and United Illuminating to come with a solution that is workable, that will give a high level of reliability and will be the best technical solution and balance all of the interests of the stakeholders here in Connecticut.

Thank you.

MS. McKINLEY: Thank you.

And I believe that concludes our session today.

COMMISSIONER DOWNES: I want to thank everybody for appearing today. We hopefully have managed to eliminate a number of these issues for the benefit of not only the participants but also the public. I'd like to remind you all that CTN will be rebroadcasting this. To the extent some of you may have missed pieces of this, your favorite local cable access channel will no doubt be running the tape. You might want to grab a cold drink. It will probably run for six or seven hours at a shot. So those of you who feel particularly tough and resilient are welcome to watch the whole thing from front to back.

Again, on behalf of Connecticut's commissioners -- and I'm sorry our friends from FERC had to make plane flights. Thank you all for coming. And we are adjourned.

(Whereupon, the hearing was adjourned at 4:15 P.M.)