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BEFORE THE

CALIFORNIA ENERGY COMMISSION

In the Matter of:	)	Docket No. 15-IEPR-12
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2015 Integrated Energy Policy	)	
Report Update *(2015) IEPR)*	)	

Joint Lead Commissioner Workshop on
Nuclear Power Plant Issues

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
ART ROSENFELD HEARING ROOM
SACRAMENTO, CALIFORNIA

MONDAY, APRIL 27, 2015
1:03 P.M.

Reported by:
Peter Petty

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Commissioners Present

Andrew McAllister, Lead Commissioner, IEPR Committee
Robert Weisenmiller, Chair CEC
Karen Douglas

Staff Present

Heather Raitt
Martha Brook
Danielle Osborn Mills
Shawn Pittard, Public Advisor's Office

Also Present (* Via Phone)

Guest Speakers

Jonathan Bishop, State Water Resources Control Board
Bruce Watson, USNRC

Panelists Present

Stu Nishenko, PG&E
Norm Abrahamson, PG&E
Chris Wills, California Geological Survey
Jeff Billington, CAISO
Valerie Winn, PG&E
Rochelle Becker, Alliance for Nuclear Responsibility
L. Jearl Strickland, PG&E
Manuel Camargo, SCE
David Lochbaum, Union of Concerned Scientists
*David Victor, San Onofre Community Engagement Panel
Peter Lam, Diablo Canyon Independent Safety Committee

Public Comment

Donna Gilmore, San Onofre Safety
Bruce Gibson, Second District County Supervisor for the
County of San Luis Obispo
Larry Chaset, Keyes, Fox and Wiedman
Gene Nelson, Californians for Green Nuclear Power
William Gloege, Santa Maria, California
Joseph Ivora, Retired PG&E Employee
Ben Davis, Jr., California Nuclear Initiative
Nancy Nolan
Sandra Bauer, Citizens' Oversight
Alexander Cannara, Menlo Park, California

APPEARANCES (Continued)

Public Comment (Continued)

David Weisman, Alliance for Nuclear Responsibility
Jean Merrigan
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*Ray Lutz, Citizens' Oversight
*Richard Margo, Ramona, California
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P R O C E E D I N G S

APRIL 27, 2015 1:03 P.M.

MS. RAITT: Welcome today's IEPR Joint Lead Commission IEPR Workshop on Nuclear Power Plant Issues. I'm Heather Raitt, Manager for the IEPR.

I'll begin by going over a few housekeeping items. Restrooms are in the atrium. A snack room is on the second floor at the top of the atrium under the white awning. If there's an emergency and we need to evacuate the building, please follow the staff to Roosevelt Park which is across the street and diagonal to the building.

Today's workshop is being broadcast through our WebEx conferencing system. And parties should be aware that you're being recorded. We'll post the audio recording on the Energy Commission's website in a couple of days, and the written transcript in about a month. Also, please be aware that one or more parties will be video recording today's workshop.

We have a very full agenda. And I'd like to remind the speakers to please limit your presentations to the time allotted. This will

help make sure we can get through all the material and that all the speakers have the time they need. Raquel will give a sign when have two minutes and when time is up.

We encourage workshop participants to make comments today but ask that folks be brief as we have the full agenda. We're asking parties to limit their comments to three minutes so that the maximum number of an opportunity to speak. We will take comments first from those in the room, followed by people participating on WebEx, and finally from those who are phone-in only.

For those in the room who would like to make comments, please feel out a blue card and give it to Shawn Pittard who is the back of the room. When it's your turn to speak please come to the center podium and speak into the microphone. It's also helpful to give the court reporter your business card.

For WebEx participants, you can use the chat function to tell our WebEx coordinator that you'd like to make a comment during the public comment and he'll relay your comment or open your line at the appropriate time.

For phone-in participants, we'll open

your lines after hearing from in-person an WebEx participants.

If the room becomes full we also have additional seating at the Charles Imbrecht Room which is directly across the atrium.

If you haven't already, please sign in at the entrance to the hearing room. Materials for this meeting are available on the website, and hardcopies are at the table at the entrance to the hearing room.

Written comments on today's workshop are due May 11th. The workshop notice provides instructions for submitting comments.

And with that, I'll turn it over to Commissioner McAllister for opening remarks.

LEAD COMMISSIONER MCALLISTER: Thanks, Heather.

Thank you all for coming. We've got a full -- mostly full house, and overflow, if necessary, across the way.

My name is Andrew McAllister. I'm the Lead Commissioner on this year's IEPR. And pleased to be sharing the dais with Chair Weisenmiller today.

Obviously, this is a very important topic

for the state. There are two facilities in various stages of their lifetimes in the state. And we're certainly very much aware of their role in supplying power, historically and presently, as well as all of the other various issues that we'll -- some of which we'll delve into today that inspire many opinions and lots of passions.

You know, fundamentally we need to start where we are and try to look for pragmatic -- have a pragmatic discussion about where we're moving forward, how we're going to move forward, and would ask folks to think about in that -- in those terms.

There are many overlapping jurisdictions in this area. And frankly, most of them don't -- don't lie here at the Energy Commission, but we do do the forecasting, we do the supply planning, and we are obviously concerned about all the various issues that are part of our energy systems.

So with that, I want to encourage everyone to put their best ideas on the table but do it succinctly and with an eye towards solutions, pragmatic dialogue. And with that I will, without further ado, I'll pass it over to

the Chair so we can get -- get moving. Thanks for everybody's attention.

CHAIR WEISENMILLER: Yeah. Again, thanks, everyone, for being here. This is certainly an important topic. You know, as Commissioner McAllister indicated, we have actually at least four sites where have high-level waste, obviously Humboldt, Rancho Seco, Diablo Canyon and San Onofre, some various levels of being put into permanent casks in those sites.

At this point we're dealing with what Alvin Weinberg, who is actually a major nuclear proponent, always characterizes as -- a power source as a Faustian bargain that you get greenhouse gas-free power, and that end you're left with high-level waste. And so none of the reactors were sited with an expectation that they would be high-level waste sites, which they are now.

So anyway, we just want to look at the situation. We have one reactor that's operating in California, Diablo Canyon. And certainly that is, when it's operating well, a source of greenhouse gas-free electricity. But again, I think today we'll hear some of the other

issues -- some of the issues associated with it.

So with that, let's go to Danielle to set the stage.

MS. RAITT: Excuse me, Commissioner, can I just make one brief announcement?

In the audience today we do have an adviser for the -- the Chief of Staff for Commissioner Florio. And so we cannot discuss anything that part of an open proceeding at the CPUC today.

And also I just want to note that there is a change to the agenda. We have Manuel Camargo speaking in place of Jim Madigan for Southern California Edison. Thank you.

Okay, go ahead, Danielle.

MS. GILMORE: Could somebody repeat that again, what you just said we couldn't talk about?

MS. WINN: Actually, this is Valerie Winn from PG&E.

And if I could offer up, the CPUC -- PG&E is under an ex parte ban with commissioner advisers and commissioners until later this year. But there was notice of the CEC workshop that was circulated to the opening -- open proceedings

list at the CPUC, so that my understanding is that ex parte communication does not apply to this workshop.

CHAIR WEISENMILLER: Well, that's fine. But the question is what is the PUC staffer's understanding of those rules?

MS. KHOSROWJAH: My understanding is that you --

CHAIR WEISENMILLER: Please come to the microphone.

MS. KHOSROWJAH: My understanding is that you can talk about --

COURT REPORTER: State your name please?

MS. KHOSROWJAH: My name is Sepideh Kohosrowjah, S-E-P-I-D-E-H. And the last name is K-H-O-S-R-O-W-J-A-H. And I work at the California Public Utilities Commission.

And my understanding is that, yes, you can talk about it, but we need to file and ex parte. You need to file. That's all. Okay.

CHAIR WEISENMILLER: And I -- Sepideh, I assume that means anyone else who talks about issues that are pending at the PUC should also file --

MS. KHOSROWJAH: Yes.

CHAIR WEISENMILLER: -- an ex parte?

MS. KHOSROWJAH: So it doesn't mean they cannot talk about it. They just have to file an ex parte notice. And they know who they are and they know what they're going to talk about. I have no idea. We have -- we have had an all-party notice for the LTPP proceedings. So that's what we did because of PG&E ban.

CHAIR WEISENMILLER: Okay.

MS. KHOSROWJAH: Okay. Thank you.

MS. GILMORE: Thank you.

MS. RAITT: Okay.

MS. OSBORN MILLS: Hi everyone. I'm Danielle Osborn Mills. I want to thank Chair Weisenmiller and Commissioner McAllister for welcoming me back. For those of you who don't know me, I am the former Senior Nuclear Policy Adviser to the Energy Commission. And I was invited to come back as a volunteer today to sort of lay -- lay out the land and let you know where things have been for the Energy Commission, and also to review some of the 2013 Integrated Energy Policy Report recommendations that pertain to nuclear power plants.

The Chair covered this well already, so I

won't go into too much detail. But as many of you know there are four nuclear -- there have been four operating nuclear power plants in California over the years. Today's presentation will focus mostly on Diablo Canyon which is on the upper left corner, and San Onofre which is on the upper right corner.

Our -- in the 2013 IEPR the Energy Commission made 15 recommendations overall. I won't go into detail about every single recommendation in this presentation. But a list of those recommendations has been added to the dockets. So you can find those online if you'd like more information on any of those. The recommendations fall generally into five topics, which is basically the format of my presentation today.

So I'll jump right into to seismic uncertainty. This is mostly related to Diablo Canyon given San Onofre's closure in 2013. But in 2008 the Energy Commission released the AB 1632 report which essentially recommended biannual reports on seismic vulnerability, as well as other topics. The 2013 IEPR recommendation was for PG&E to make these

findings and conclusions available to the CEC, the Public Utilities Commission, and NRC during reviews of the license renewal application. And to our knowledge PG&E has done so, and I will go into greater detail about these studies later in the workshop today.

But in September of 2014 PG&E released the Central Coastal California Seismic Imaging Project. This was the topic of three public meetings with an Independent Peer Review Panel which is an appointed -- appointed panel of state experts who have been appointed to review these studies, as well as three public reports that are on the CPUC website for nuclear power plants. I believe that PG&E just responded to these reports in the public meetings late last week, so I'm sure that they'll provide an update on that, as will Chris Wills who's the Chair of the Independent Peer Review Panel.

I know one concern going into March was that in March PG&E was due to submit a reassessment of potential seismic and flooding hazards at Diablo Canyon to the NRC and did so on March 12th of this year. Some of the inputs and assumptions that were included in the Central

Coastal California Seismic Imaging Projects were the topic of concerns among the IEPR. And so how those are incorporated into -- into the March 25th submittal to the NRC is something that's currently being discussed. And I believe the NRC is reviewing as well.

We've also made recommendations that PG&E keep the Energy Commission appraised of how the Seismic Hazard Analysis relates to the licensing basis of the plant. This is something that's being discussed in multiple venues, as well as the challenge of the Atomic Safety and Licensing Board. And I'm sure that the experts from PG&E and the chair of the Independent Peer Review Panel will discuss this graph on the bottom of the screen later today, at least I'm hoping that they will because I don't have time or the eloquence to go into it right now.

And then in addition, one additional recommendation that the Energy Commission made was the Edison should also complete the SONGS seismic studies and provide the results of these studies to the Energy Commission and the CPUC. I think the status of that is somewhat in question. To my knowledge Edison has completed these

studies and seen the results, but I don't think that they've been provided to the Energy Commission or the CPUC. So that may be a topic of ongoing discussion.

Moving into safe -- Safe Operations and Emergency Planning. In 2013 the Energy Commission recommendation -- recommended that PG&E provide evacuation time estimates for potential seismic events or other events at Diablo Canyon as part of the IEPR reporting process. So that is something else that they may want to consider in providing data to the Energy Commission.

And on a somewhat related note, an event earlier this year was that the NRC determined that an unauthorized change to Diablo Canyon's emergency plan was of low to moderate safety significance and issued a White Finding to PG&E for that. It was essentially a change that Staff made to the Emergency Plan that basically struck the requirement for PG&E to notify ocean-going vessels within a ten-mile radius of some sort of emergency. So I believe that -- that PG&E may discuss that or it may be the topic of additional data to the CEC. But it's something that the

Energy Commission has been tracking as well.

National Fire Protection Programs is another topic of the 2013 IEPR recommendations. In June of 2013 PG&E expressed their intent to transition to the Fire Protection Program based on 2004 standards, which is one of the recommendations that the Energy Commission made in 2013. However, in 2012 -- oops, sorry, I need to go back. However, in 2012 I believe that the NRC filed an Event Notification Report finding three fire protection deficiencies at Diablo Canyon. So that may have been the reason for this transition to a Fire Protection Program. So an update on that would -- would probably be helpful to the Energy Commission in this process.

And then in terms of the more economic side of Emergency Planning, this recommendation has to do with the Price-Anderson Liability Act which is essentially a program that ensures the availability of a large pool of funds to compensate members of the public from a large radiological release or a significant radiological release. Currently these funds are about $13.6 billion according to the Nuclear Energy Institute. So the Energy Commission in

2013 recommended that PG&E provide a study on whether $13.6 billion or whatever the actual amount of funds in the Price-Anderson Act funds would be sufficient to cover any liabilities resulting from this release and if not, to identify and quantify any additional sources of funding that may be necessary.

And then moving on to decommissioning, these two images are from San Onofre. The first image on the left is the current independent spent fuel storage installation. And the drawing on the right is the proposed Holtec storage or the -- I'm sorry, the selected Holtec storage system that will be used for decommissioning of Units 2 and 3.

In 2013 the Energy Commission recommended that Edison submit a decommissioning plan and proceed swiftly with decommissioning. And indeed, in June of 2013 Edison first announced that it would permanently retire SONGS at San Onofre. And then in June and July of 2013, quickly removed the fuel from the reactors which is now in the spent fuel pools.

In September of 2014 Edison did submit the Post-Shutdown Decommissioning Activities

Report to the NRC, as well as a detailed cost estimate for decommissioning and an irradiated fuel management plan, so they've met that recommendation. One, though, decommissioning is still very much underway, and we'll have an update on that today.

One additional update on the decommissioning and Emergency Planning is that in March of this year the NRC voted to approve certain exemptions from the Emergency Planning requirements at San Onofre. This is a significant -- this was a significant decision to the Energy Commission because, one, voting -- one, the Commissioners voting record did indicate some concern with these exemptions as they relate to both the seismic activity of the region, as well as, you know, whether potentially a phased exemption process may be more appropriate giving the level of risk -- given the level of risk with the fuel being stored in spent fuel pools. And that ties into a number of the Energy Commission's recommendations on spent fuel management.

Essentially, what you see here is, on the left, an image of Diablo Canyon's spent fuel

pool, and on the right an image of the independent spent fuel storage installation. Common practice is for utilities to move the spent fuel into the pools immediately for cooling. The cooling water is recirculated to keep it cool, as well as to shield the radioactivity from, you know, the building and staff working in the area. The fuel can cool for about five years and then should be, according to the Energy Commission's recommendations, expedited into dry storage. This has been a recommendation that the Energy made in 2013 to both Southern California Edison and PG&E for SONGS and Diablo Canyon. There are a variety of reason for this, which I believe we'll also discuss in greater detail today.

A series of evaluations were also suggested or recommended in the 2013 IEPR. These include that PG&E evaluate the structural integrity and concrete reinforcing steel of the spent fuel pools, evaluate the potential long-term impacts and costs of storing high burnup fuels, either in the pools or in dry storage, inventory the spent fuel pools and determine the maximum number of bundles that could be moved to

dry storage given the number of constraints including, you know, thermal limits of dry casks and the availability of staff to actually make that transition. And all of this, of course, is with the recommendation that the utilities stay within NRC regulations too. We're not proposing anything different from what the NRC requires.

More generally the Energy Commission committed in 2013 to continuing to engage in a Federal Nuclear Waste Management Program and tracking those activities, as well as engaging at the federal level. The Energy Commission represents California in the Yucca Mountain licensing proceeding and is interested in protecting Californian's groundwater interests and any potential impacts from transport of nuclear waste to Yucca Mountain, and is supporting federal efforts to develop either an interim or a final repository for the disposal of nuclear waste with, hopefully, a consent-based approach from the states too.

There will be ongoing discussions around continued storage of nuclear waste at operating and decommissioned power plants given the lack of a federal program right now. And I think that

the Energy Commission's goals are to -- to minimize the current risk at the plants and to maximize the safety as long as the fuel is being stored at all four of these reactor sites, and also to plan in the longer term for the thoughtful transport and the interim storage or final solutions for nuclear waste.

There's also a large degree of uncertainty around Diablo Canyon's future which we'll be discussing today, that's with regard to seismic uncertainty, the once-through cooling policy at the State Water Resources Control Board. And as a result we'll be doing some -- or the Energy Commission will be doing some contingency planning on that as well. And just to draw kind of a broad scope around the Energy Commission's work on nuclear issues, I believe they're committed to continued coordination with the state and federal agencies, as well as the public and the utilities on plant safety transport and storage of nuclear waste.

Here's just a rundown of what the next steps are for the IEPR process. I want to thank the IEPR team who's been putting together this workshop and has done a great job and who will

be, I'm sure, pulling together a lot of comments as well. And I look forward to a very thoughtful and robust discussion today.

MS. RAITT: Thank you, Danielle. We'll move on to the panel on Diablo Canyon seismic update. And we'll hear from Stu Nishenko and Norm Abrahamson from Pacific Gas and Electric.

MR. NISHENKO: Okay. Good afternoon, Commissioner McAllister, Chairman Weisenmiller. Thank you for the opportunity to provide you with an update on the Central Coastal California Seismic Imaging Project.

I guess I'll just signal for next slide?

MS. RAITT: That's fine.

MR. NISHENKO: Okay. So next slide please.

PG&E's Long-Term Seismic Program is designed to continually assess the seismic safety at Diablo Canyon. The advanced seismic research that we have recently conducted as part of the AB 1632 process has provided a more detailed picture of the region's complex geology. The studies published in September 2014 provided an unprecedented look into the earth around Diablo Canyon and helped to further define the levels of

seismic activity that earthquake faults in the area are capable of producing.

Next slide.

What we found in this report and summarized in our September submittal is that the plant is designed to withstand the ground motions and shaking from earthquakes and the major components at the facility can continue to perform their safety functions during and after a major seismic event.

Next slide.

Just a brief background on the -- the AB 1632 process. In 2006 Assembly Bill 1632 required that the Energy Commission carry out a compilation assessment of existing seismic studies to determine the potential vulnerability to a major disruption due to either aging or a major seismic event of a large base-load generation facility of 1,700 megawatts or greater, so specifically Diablo Canyon and SONGS.

Next slide.

In 2008 the California Energy Commission issued the assessment of California's nuclear power plants, the AB 1632 report, and recommended that, first, PG&E update their seismic hazard

assessment, and then directed us to use 3D geophysical seismic reflection mapping and other techniques to supplement previous and ongoing research programs in the area.

Next slide.

In response to these recommendations the California Public Utility Commission then directed PG&E to complete these 3D seismic studies and convened and Independent Peer Review Panel to review, evaluate and report on PG&E's study plans and results. And the membership of that Independent Peer Review Panel is shown at the bottom of the slide, consisting of six state agencies and the County of San Luis Obispo.

Next slide.

The coordination between PG&E, the Public Utility Commission and the Independent Peer Review Panel has resulted in 18 public and information meetings between 2010 and today where the IP has issued nine reports, in addition to the evaluation poster that you see on this slide. So we have been very responsive to the IPRP and worked very closely with them in terms of designing the -- specifying the work that we're going to do, designing the experiments that we're

going to conduct, and then looking at the results of those studies.

The next slide actually goes into this in a little more detail. This is what we all a tornado diagram. And this is a comparison of some of the hazards significant parameters that we identified working with the IPRP to understand what geologic or geophysical parameters had significance to the hazard at the plant, and what studies could we do that would carry some likelihood of success that we would be able to collect information and then reduce the uncertainty in these parameters. So the parameters cover things such as how fast these faults are moving or slip rates, the geometry of the faults, the dip of the Hosgri at Los Osos, and questions about whether faults can link up and rupture together in large earthquakes that heretofore recognized.

So one case of that is the linkage of the Hosgri and the San Simeon Faults near Point Estero which previously had been thought not to be able to link up. And also the -- the linkage of the newly defined Shoreline Fault Zone right off of Diablo Canyon and the

Hosgri Fault could rupture, jump from the Shoreline onto the Hosgri or vice versa and basically bring that earthquake closer to the plant vicinity.

And finally, parameters regarding to what is the actual extent of the Shoreline Fault Zone. This is something that was first discovered in 2008. And so we spent a lot of time to just better understand the geometry and the extent of that fault as part of understanding the -- the hazards of the -- the plant.

The two color bars that you see in the (inaudible) diagram, the gold and the blue, the gold bars refer to the uncertainties as we understood them in 2011 when we issued the first Shoreline Fault Zone report in response to Nuclear Regulatory Commission inquiries. The blue is our current estimate of how much we've been able to reduce the uncertainty in some of those parameters as a result of the work we've done. And we'll be discussing more about that during this afternoon's session.

Next slide.

One of the things that allows us to, I think, have a lot of success in addressing these

issues is that there have been tremendous improvements in geophysical data acquisition over the last 20 years since the original LTSP was conducted in the late 1980s. Improvements in geophysical instrumentation, data processing, bigger faster computers and software, the advent of differential GPS navigation so you know your location on the surface of the earth to about the width of a dime or a quarter.

The use of geographic information -- information systems that collect all this information has allowed us to be able to start producing 3D seismic imaging of the earth's crust, analogous to going to the doctor's office and the difference between getting an x-ray and a CT scan. So an x-ray just gives you a static view, a cross-sectional view, whereas a CT scan allows you to look at it in many different orientations and positions so you can fully understand what you're looking at and the volume. So basically what we've seen in the last 20 years is a revolution in special resolution that we've been able to use to help inform our studies in the area in and around Diablo Canyon.

Next slide.

The California -- the Central Coastal California Seismic Imaging Project was a very aggressive program. So in the course of about four years we conducted a number of investigations both onshore and offshore, the area around Diablo Canyon on the continental shelf and the Irish Hills. In the picture you see here it shows the general study area. I wish I had a pointer but we'll just -- Diablo Canyon itself is located near where that number one is, just to the north of the number one.

Ah, thank you, Norm. Let's see if we can get some range. Perfect.

Okay, so Diablo Canyon is located right here, Estero Bay, San Luis Obispo Bay. The town of San Luis Obispo is right here. The major controlling fault for Diablo Canyon is the Hosgri. The trace of the Hosgri Fault runs right along the edge of the continental shelf there. The Shoreline Fault, as discovered in 2008, is located here as it juts up against the coastline. And what we want to do is see how far south it goes into San Luis Obispo Bay as part of these studies.

So what we did initially was look at the

area on the continental shelf with echo sounding and potential field mapping, and then gradually expanded our field of investigation in 2010 using low energy seismic surveys of the Shoreline Fault Zone here where the Shoreline butts against the Hosgri Fault and down here in the south to see a southern continuation, as well as initiating investigations of the structures, the geologic structures within the Irish Hills behind the power plant.

Next slide.

This was continued in 2012 with more focused investigations looking at the area of the Hosgri Fault in Estero Bay and points south and get specific information about what the slip rate of the Hosgri Fault was in the offshore environment, as well as studies here in San Luis Obispo Bay to improve our understanding of the slip rate of the Shoreline Fault Zone, as well as map its southern continuation. Additional studies onshore, located here in the number three, continued to determine the structure of the Irish Hills, as well as conduct very detailed geophysical surveys of the area right around the Diablo Canyon footprint.

Next slide.

This is just a cartoon of some of the way the marine geophysical surveys were conducted using a ship, like you see in the bottom, with what we call a P-Cable streamer that has 14 individual streamers about 50 meters long trailing behind a large vessel with the sound source located here and a cross-section of just how sound produced by that source is then bounced or reverberates off the sea floor and is recorded to give us a detailed 3-dimensional images.

Just so you know, Dr. Abrahamson has conceded his time to allow me to finish this presentation.

In addition to deeper penetration imaging of the sea floor we also used what we call multi-beam echo sounding to produce high resolution imagery of the sea floor itself.

And the next slide provides a comparison of our ability to map the sea floor circa 1990 versus 2010. So the image here on the left is a contour map of the sea floor just offshore Diablo Canyon here based on available sounding data that was available in the 1980s. What you see here on the right now is that multi-

beam image, digital elevation model, which has a resolution of -- horizontal resolution of between one to two meters. And what you clearly see is a sharp linear feature here between the two red arrows which we associated with the surface trace of the Shoreline Fault Zone immediately offshore of the plant. So it's something that we could not have necessarily appreciated 20 or 30 years ago when we first started doing that work with the available technology.

Next slide.

This is a cartoon view of just what you can do with 3D surveys. So this is a cube of data that we collected in San Luis Obispo Bay. And the first thing you can do is strip off the seawater layer -- next slide -- to expose the sea floor. And then based on what you're interested in studying you can identify a particular horizon in this cube. Here we'll look at the contact between basement, older rocks, and younger unconsolidated tertiary sediments in this area here -- next slide -- identify that layer, and then to strip off the overlying sediments or rock units -- next slide -- to reveal the surface topography of that layer.

So the -- so this -- and then for this particular view, then you can look at it, take cross sections in different angles, both vertically and horizontally, what we call time sections, to aid in the identification of faulting and other geomorphic features.

The next slide shows the actual horizontal time slice of the bedrock surface in the area of San Luis Obispo Bay. And you can see the Shoreline Fault Zone as identified here, just a very narrow, almost pencil-thin feature that cuts through the survey area, as well as other faults here, the Oceano and Los Berros Fault up here in the north. One of the key things that we're able to do with this kind of imagery is look at ancestral channels that have been cut across the continental shelf in previous low sea level stands and see how much those channels have been offset by fault motion in the intervening time.

Next slide.

This is an example of another feature, a paleo shoreline or shore face that we were able to shore face that we were able to image in the San Luis Obispo volume. And right here, I don't

expect you can see it too clearly, but there is an offset of about nine to ten meters of that old shoreline face that we used to help set the slip rate for the Shoreline Fault in the area. So again, this is, by the way, an image of a feature that's now about 50 meters below the current sea floor, to be able to successful remove the overburden and take a look at that digital process and techniques.

Next slide.

Another area we're able to have some success is looking at them, again, the Hosgri Fault Zone, the controlling fault in the area. And this is an image of three stream channels that originate from the Point Sal area that are progressively offset in a right lateral sense by the Hosgri Fault. So having an idea about what the age of the stream channel is and then the total amount of offset from the western end to the eastern end can give us valuable constraints on the slip rate of the Hosgri offshore. Currently we just have one measurement onshore at San Simeon. So now we've been able to expand the number of observation points or measurements in the marine environment.

Next slide.

In addition to a fairly aggressive marine program, we also instituted an aggressive onshore program that was designed to image crustal structure in the Irish Hills from the top to the bottom, so starting with surface geologic mapping and then using rather low energy weight-drop sources to get high resolution shallow imaging, i.e. the first one or two kilometers, and then supplement that with the equivalent of high-energy imaging on land called VibroSeis units was able to give us imaging down to perhaps six or eight kilometers beneath the Irish Hills. Again, this is a very challenging environment to work with in terms of both the topography and the rock types that we're trying to image. But we were using the latest oil company-based technology that was available to address these questions.

Now the next slide shows a map of the survey routes that were taken during this study. Diablo Canyon itself is right here. And again, for reference, San Luis Obispo in this area here. So all in all there's about 120 miles worth of survey routes that were done in and around the Irish Hills area. Again, regionally a very

rugged topography. Most of the access to the interior was through fire roads and other basically roads of opportunity because of the topography. But nevertheless, we used a wide variety of techniques and sources to try to image this to the best of our ability.

Next slide.

Just to kind of wrap this up and give you the punch line, going back to the tornado slide where there were a number of specific hazards, significant parameters, each identified, what I've tried to do here is identify some of the principal results that have some out of this study in yellow. So the Hosgris' slip rate basically originally, you know, ran from half -- half a millimeter a year up to six millimeters a year in the original LTSP. In 2011 we had presented evidence for a preferred rate of about two-and-a-quarter millimeters a year. The evidence that we have now at Point Sal and Estero Bay point to something less than two millimeters a year but certainly in a range of about one to three. So we've reduced that uncertainty by about a factor of two.

The Hosgri dip is something that we may

have been able to address with the proposed high-energy studies that were not permitted. However, given the available data we still believe that it is a steeply dipping fault; it dips to the northeast.

The slip rate of the Shoreline Fault in 2011 we estimated was about a quarter millimeter a year, give or take. With the new evidence that we've collected it seems to be slipping about an order of magnitude less than that earlier estimate, about .6 millimeters a year, and hence about two orders of magnitude less than the Hosgri Fault itself. So it's role in comparison to the Hosgri is now greatly diminished.

Could the Hosgri rupture south of San Simeon? The whole issue about step over near Point Estero creating larger magnitude earthquakes, while we ourselves were not able to find information to definitively prove or disprove that hypothesis, we investigated the consequences of a length rupture with a larger magnitude earthquake and determined that it was still bounded by our design basis.

Let's see. I can't see around the side.

So we can go to the next slide.

And the same issue was with a linked Hosgri-Shoreline Fault Zone rupture. Again, there's no definitive evidence that these faults have ever ruptured in the past, but given their proximity to each other allowed us to investigate the consequences and again determined that it is bounded by our design basis for the plant.

The -- the length of the Shoreline Fault as a result of these studies has now just about doubled from an original length of 23 kilometers in 2011 to 45 kilometers in 2013, primarily based on being able to trace it further through San Luis Obispo Bay.

Okay, one last thing that was in the previous slide, we just mentioned that the Los Osos Fault Zone was a parameter to the geometry to better understand that land fault zone. We have significantly improved our understanding the role the Los Osos Fault Zone plays in the Irish Hills. However, given the -- the quality of the imaging it's our determination that you need more than seismic data to evaluate the structure in many of these cases. So we've used a full suite of geological goephysical data available to us to help us come up with our evaluation of the

crustal structure in the Irish Hills.

Next slide.

In addition to this land and marine-based geophysical exploration, we also have an active ocean bottom seismometer project designed to record seismicity offshore Point Estero in the vicinity of the intersection of the Hosgri and Shoreline Fault Zones. And you can see in the right-hand panel is a picture of one of those ocean bottom seismometers. That concrete cap weighs about a ton and it's primarily put there to prevent damage from fishing and trolling in the area.

Next slide.

PG&E, of course, has a policy of transparency and openness for all the data that we have collected. And the next few slides will just talk about where you can find our seismic imaging report as presented in -- in September of 2014. The URL is on the bottom of this slide.

In addition, in the next slide we have made arrangements with the US Geological Survey and IRIS, the Independent Research Institute in Seismology, consortium to post all of the geophysical data that we have collected on their

websites for public access. The marine data is posted on the USGS National Archive of Marine Seismic Data, NAMSS, for the three survey areas that you see here, as well as the -- the earlier one that we talked about and at Point Bushon.

And the next slide just shows the web page for the IRIS database that -- where our land-based data has been collected and posted, again, for others to take a look at and draw their own conclusions from.

Next slide.

Okay. Thank you.

MS. RAITT: All right. The next speaker is Chris Wills.

MR. WILLS: Thank you And thank you, Commissioners.

COURT REPORTER: Turn the microphone on, sir.

MR. WILLS: Microphone on. There we go. Thank you.

Thank you, Commissioners. I'm here to report on many of the same things, too, just cover it from a slightly different perspective. I'm Chair of the Independent Peer Review Panel established by the Public Utilities Commission to

review the seismic studies done under AB 1632. I have -- the next slide is a very brief background of the Independent Peer Review Panel established by the PUC in response to the AB 1632 studies. And there's a couple of words in this -- in this long text of this slide saying that AB 1632 was designed to use -- the AB 1632 report recommended the 3D geophysical reflection mapping and other advanced techniques to study the fault zones at Diablo Canyon, and also to help resolve uncertainties surrounding the seismic hazard at Diablo Canyon. And those -- so those that we've taken those two key points as -- as the charge of the IPRP and looked over the PG&E studies with those in mind.

The bottom of this slide just mentions that this is a parallel process in many ways to what PG&E is doing with the NRC through -- through a SHAC Level 3 (phonetic) evaluation of all their seismic source characterizations and ground motion calculations. And IPRP has benefitted from a number of those workshops that we've been in on and been able to -- to ask PG&E about how their -- how their studies are being folded into those evaluations as well.

Next slide.

Just the -- to show you, we've been working on this for a while. In 2011 we issued our first reports. Just to point out, there's -- we did a few reports trying to just respond to PG&E's planned studies as they were getting going and we were getting going. That's the first three reports. A couple of studies where we are trying to get ahead of PG&E and look at the most important parameters in seismic hazard evaluation, slip rate on the Hosgri Fault, and a site (inaudible) and site amplification of seismic waves. And then the last three reports done in the last year, basically responding to the Central California Coast Seismic Imaging Process. And you can barely read at the bottom of this slide, and it's on your handout, the PUC web page where all of these reports are posted.

Next slide please.

Just to go through, this is the same tornado diagram that Stu showed a slightly fancier version of, but this is -- I think it's all the same numbers. This is the version that we asked about in one of our very first meetings in July of 2011 we asked PG&E, well, what are you

planning to investigate and how important is that? They came back with this list of seismic hazard parameters and the tornado diagram. And tornado diagrams basically show you the -- at the top they show you the change and hazard from the full range of uncertainty in a parameter, one meaning -- means you really can't change the hazard hardly at all using that parameter, so it's not really worth investigating. If you -- a factor of two is next, getting important. And so those things that I have circles around are things that have been addressed by the Central California Coastal Seismic Imaging Project.

And then the site condition and site amplification is something we've added to this tornado diagram. It turns out to be more important than any of the other seismic source characterization or targets that PG&E was originally thinking was part of the AB 1632 studies. But this is something that is very much amendable to the kind of advanced seismic imaging that is required by AB 1632.

So next slide please.

Just to go through some of these parameters, the slip rate on the Hosgri Fault has

been investigated at three different locations. One is the Cross Hosgri Slope investigated by Sam Johnson and colleagues at USGS. The second -- next slide -- is the Estero Bay study that -- that Stu alluded to where they have channels on either side of the fault. And then third -- next slide -- is a series of channels, and this is a cross section of those channels in one of the -- in the seismic imaging that PG&E has done. And in each of these cases they have found a feature on either side of the fault, measured it's offset, tried to get an age of that feature. And so it gives you the overall slip rate on the fault. And slip rate tends -- ends up being the key parameter. The one thing you want to know about any fault that's going into a seismic hazard analysis that basically gives you the amount of energy available that that fault can release in earthquakes. And so as Stu mentioned, their numbers have gone from about two-and-a-quarter millimeters a year down to somewhat below two millimeters a year for the Hosgri Fault.

Just to go to the next slide, there's been a number of studies. Back in the long-term seismic program there were a number of studies on

land in the San Simeon Fault which defined a number of things where the fault had to be slipping at less than six millimeters a year, but preferred value was in the -- in the one to four millimeters a year range. The Cross Hosgri Slope defines a slip rate of about -- of between two and three millimeters a year, but a range of down to one-and-a-half up to about four. All of the geodetic models that we -- we can infer from the movement of monuments throughout California and the amount of slip on all of the faults, it ends up being a range of one to four millimeters a year. And then the two studies that Stu mentioned at Estero Bay and at Point Sal are consistent with those values.

Factoring all of these things in, the Independent Peer Review Panel still prefers a slip rate somewhere in the -- somewhat above two millimeters a year, but that's not as big a deal as the old range of values that went all the way up to six millimeters a year.

Next slide please.

So on that tornado diagram the elimination of this -- this high point out here on the end of the tornado is largely because the

six millimeters a year range is no longer considered viable. The slip rate on the Hosgri, it's more like -- the upper end is about four. So we might not completely agree with the range that PG&E has put in, but we do agree that they've reduced the uncertainty of seismic hazard due to that parameter.

Next slide please.

Similar, on the -- on the Shoreline slip rate, and Stu went through this a little bit, there's -- there's a feature that's a few tens of thousands of years old that's offset by about ten -- ten meters, well below the sea floor. This is very nicely imaged. The dating is a little uncertain. But overall it does nicely define the slip rate on the Shoreline Fault to the lower range of what was possible before. So rather than being a quarter millimeter here it's probably under a tenth of a millimeter a year. And so that is a significant reduction in the uncertainty and the seismic hazard due to that one parameter.

Next slide please.

This turned out to be not a very -- a high impact parameter. But just to show, there's

a really detailed three-dimensional study of the north end of the Shoreline Fault, the Shoreline Fault's map off -- of Diablo Canyon, right about in here. And then there's -- there's a little gap, it's a few hundred meters, and then what's called the -- it's kind of evolved in nomenclature. But the northern extension of the Shoreline Fault extends all the way up along this line to a little subsiding basin right in here which is right next to it. Similar subsiding basin on the Hosgri Fault, so that's a gap of 100 meters or so at the -- at the ground surface. It essentially means those faults are connected. So the idea that these are discontinuous faults is no longer a viable model. And that's basically shown a direct connection between the Shoreline and the Hosgri Faults.

Next slide please.

Stu mentioned all of the on-land goephysical studies. And this to show one of the -- one our IPRP members refers to this as a road test. You can -- to many of our eyes you can see a fault wherever you want to in this.

And next slide.

We were not convinced that this

is the only -- this is the preferred model. This is not the only viable model that you can derive from the geophysical survey profiles through the Irish Hills. And we do not agree that the -- the relatively low-angle dip on the Los Osos Fault is precluded by the current models, which is what they show on their tornado diagram. This is the PG&E's model where they're saying that the low dip angle on the Los Osos Fault which leads to the relatively high hazard here is no longer allowable in the current data. We think that these -- the tectonic models that consultants for PG&E have come up with are, for the most part, reasonable models. But they don't preclude these low-angle dips on the Los Osos Fault.

Next slide please.

I'm going to go into a little bit of the other results of the -- of the 3D seismic surveys under the Irish Hills. And this is in terms of not the layering but the velocity of the material. And they've been able to resolve both the low velocity weathering zone up here at the ground surface, but then some very high velocity related to the intrusive diabase. This is almost a salt-like rock that has intruded into the

(inaudible) to the new surface millions of years ago. But it forms these very high -- high velocity bodies underneath -- underneath the plant and it leads to some unusual profiles in velocity underneath the plant.

If we go to the next slide we can see what the seismic imaging project. Actually, each one of these red dots is a source of seismic waves. Each of the blue is a receiver. So they're trying to get a complete velocity model underneath the plant site so they can fully understand the -- all of the seismic waves that are being recorded -- there are two seismographs at either end of the plant -- and then -- and then use that estimate of the seismic waves here and the full velocity at any point underneath the plant footprint to modify how the seismic waves are coming in from any earthquake in the -- in the surrounding region.

We think there's still some -- some uncertainty in the 3D velocity model that they're using for -- for this. Just to -- just to show that, this is how the velocity is being portrayed through this model from this point to this point across the plant site. And these are a whole

bunch of different profiles at points along that line.

If you go to the next slide, this is -- this is a simpler version of it where we simplified out just one -- one profile at this point. And then an old profile is measured with a different technique, way back in the ‘70s. And just to show that this set of blue crosses here doesn’t really coincide with this old data in the -- in the solid line. And so we don’t know why their 3D model doesn’t really coincide with the only form of (inaudible) we have available, but they don’t. And it may be that this old data isn’t very -- it isn’t very well constrained and doesn’t really represent what’s really there. But this -- this is something that we need to have PG&E explain to us why the -- the new model and the old data don’t -- don’t seem to coincide.

Next slide.

Also related to how the seismic waves get to the plant is the whole issue of the overall site conditions. And a lot of that is based on the throughway (phonetic) velocity in the area surrounding the plant. This is a graph from Norm Abrahamson who’s next to me. And the key thing

is that for these two earthquakes, for San Simeon and for Parkfield earthquakes, the recordings at the plant site in the -- in the frequency of interest for the -- for the facilities there, these are much lower than what you'd expect from the standard worldwide ground-motion prediction equations which would give you the zero line.

And so the residual should show that for these two earthquakes the ground motion has been significantly de-amplified at that plant. And so if this is a factor that is a site factor that is due to some properties of the rocks at the site, it would de-amplify every ground shaking from every earthquake at the plant. And that's what the current model from PG&E says.

Next slide please.

And just to show, this is -- we think is a fairly significant factor. If you use the ergodic assumption which is kind of the standard, no amplification or de-amplification with the full range of uncertainty in the -- in the ground motion, this is what you get for a number of scenario earthquakes. If you apply that site amplification factor you get much lower ground shaking for each of those earthquakes. So

it's -- so it's a significant factor. We need to understand whether this is a site term or there's something else going on.

Next slide please.

Just to point out, these are the two earthquakes at San Simeon in 2003, Parkfield in 2004. The question to us is: Is there something that's right here that's special about the velocity structure or the -- or the details of the geology beneath the plant that de-amplifies shaking from these two places and would also de-amplify shaking from the Hosgri Fault or the Shoreline Fault, or if there's something about the path the shaking has taken across all of these different faults and different layers of serpentine and crushed rock and various waves in the Franciscan that has modified these two, essentially in the same way. And so that's still a possibility, at least to us. And so we think that PG&E needs to completely convince us that this is a site factor, not a site plus a path factor, as we say.

Next slide please.

We went through many of these issues in our IPRP Report Number Six. And in the report we

talked about PG&E could do to help convince us that this was a site factor. One of the things that we talked about was a new model of the throughway velocity the site, which is what we showed earlier. And we still have some questions about the uncertainties in that 3D model. And there's also an analysis of other data which would help to rule out path effects in this -- in this -- in the side effect.

So we're still waiting for a complete evaluation of this and some further details from PG&E. And I think we are hoping to have some additional meetings. This was not something addressed in the Central Coastal California Seismic Imaging Program. It's been partly through the SHAC Ground-Motion Characterization Project. And so we are still waiting to -- to be able to go through what they did in that, and then some further evaluations.

So with that, wrap this all up. Next slide please.

This is a revised tornado diagram that Norm presented at our meeting in January. And so a number of things I've gone through where they've significantly reduced the uncertainty of

seismic hazard due to the studies in the Coastal Seismic Imaging Project. The Los Osos dip, notably, we don't agree that they have reduced the uncertainty to that factor. These two -- two site amplification factors we think are still very important. And then there's another -- a number of other things on this which could be -- could be the subject of further studies.

So I'll drop -- I'll end there. Thank you.

CHAIR WEISENMILLER: Thanks. I think -- I think I'd like to understand a couple things. One of them was initially there was going to be, I was going to say high-energy studies as part of this. What did we lose by not having those? I'd like to have both of you address that question.

MR. NISHENKO: Originally I think the intent as written was to conduct 3D seismic surveys, and there was no differentiation between high-energy or low-energy in the original recommendations. We went and decided to go down both paths to see what the feasibility was, and because each provides a different, if you will, level of imaging. The low-energy will give you a very high resolution in the shallow part of the

crust. The high-energy would give you perhaps lower resolution but deeper penetration that could answer questions about fault geometry, what is the dip of the Hosgri Fault, what do faults look like when they interact with seismogenic depths.

What I think we all discovered as a result of doing this work is that the questions of key importance to understanding seismic hazard really had to do with a better understanding of the recent history of fault activity, how much faults have slipped recently, what their current day rates of fault motion are. And those are questions that were more appropriately answered with the low-energy surveys than the high-energy surveys.

MR. WILLS: So just to I think almost reiterate what Stu has said, the two factors that you need to know about faults for seismic hazard analysis is how much energy is available to them to release as earthquakes, that's slip rate. That's something you get from the very near surface. And so the low-energy seismic is the right tool for that job. The other thing is how close the fault is to your -- to your facility.

And the distance to that fault is something you can get a little bit better refinement from knowing it's location through the whole seismogenic depth. And so you lost a little bit of precision in the location of the Hosgri Fault by not being able to do the high-energy.

I don't think that's a significant loss, actually, because you could -- you have a very high-resolution definition of the Hosgri Fault in the very near surface. And then you -- and projecting from that through the earthquake (inaudible) to define the rest of the fault plain. So defining that with high-energy seismic might have been a little bit more precise. But I think what we have probably is sufficient for --

CHAIR WEISENMILLER: Next question is certainly the intent at the time was to use state-of-the-art tools, you know, of -- and I guess I'd like to get some affirmation that indeed this is -- these are state-of-the-art studies from both of you.

MR. NISHENKO: In fact, they are. Earlier you may have remembered one of the slides I showed, I showed the -- the picture of the survey vessel with the P-Cable System. That is

brand new technology which has just become available within the last couple of years to do high-resolution 3D imaging. And the value of this is by having 14 streamers you can basically survey a larger area of the sea floor in less time. So it's a very cost productive way in order to do these kind of studies.

The on-land work that we did using what we call ZLand nodes or self-contained seismometer units that you could plant individually throughout the survey area is an advancement over old technologies where we used to use cables. You can imagine miles of cable being strewn across the Irish Hills and running around connecting and tracing down faults, it slows down those kind of surveys.

But these individual node units, as we call them, were very helpful in providing a wide geographic coverage in a very challenging terrain, as well as an incredible amount of improvement in just geophysical data processing, the software that people have developed over the years to process this 3D data, to bring out a lot of the factors and features that we -- we need to know in order to do our hazard assessment.

So we have been working very closely with groups in Houston, Texas, as well as elsewhere around the country to bring this expertise to bear on this problem.

CHAIR WEISENMILLER: Chris, what was your --

MR. WILLS: Well, I think again the -- particularly the 3D seismic and the low-energy 3D seismic is something that has not been used in defining the geometry of faults at the near surface and slip rates of faults at the near surface. And I think what -- what they've been doing is out on the cutting edge, and particularly the slip rate on the Shoreline Fault which I think the managed to find features that very -- very definitively pin down a level of slip rate on that fault using the full -- the 3D volume there is something that is very -- it's very -- is very impressive, new cutting-edge technology to getting all that -- all that put together, yeah.

Now in terms of -- you know, obviously, as scientists who always want more data. So I guess I try to -- or more experiments and more data. So I guess my question would be: What

would be the highest value additional steps to take in this area?

MR. WILLS: I have -- I have been asking PG&E to help me understand the -- the velocity model underneath the plant site and help me understand how that is amplifying or not amplifying the ground shaking there. I think there's some ground truthing that could be done at that site with -- with more modern technology. And every time I ask them about this I bring out these very old -- that's very old data from the '70s which I'm not very satisfied with and say, "Well, doesn't -- your new data doesn't look very much like the old data. Why not?" But you could go get new data with other techniques and compare it to the 3D model that they've -- that they've built. And it would be more convincing if the 3D model is what is really there.

So that's -- that's where I would like to -- understanding that the 3D model I think is important. And then understanding how that 3D model actually amplifies or de-amplifies the seismic waves is very important, which is -- that's data and then analysis.

MR. ABRAHAMSON: Could I --

CHAIR WEISENMILLER: Sure. Any reaction from PG&E?

MR. ABRAHAMSON: So this is Norm Abrahamson with PG&E.

What Chris mentioned is we develop our ground motion models. What we typically do is collect data from all around the world from earthquakes, large earthquakes at short distances, and build a model because -- because we don't have enough data in any one place to do that. As a result this term ergodic model means that we're assuming typical sites are the same as an average site around the world. And really what we're finding is that's not the case. Each site is different. And as the waves propagate or travel through the crust, that's different as well.

So the uncertainties that Chris showed you there at the end, right now from our uncertainties in seismic hazard and the most important frequency bands, about ten percent of that is from our models of the faults. About 25 percent of that uncertainty is from the site response conditions that Chris talked about. And 65 percent of it is from taking these models from

around the world and assuming they apply for how waves propagate from our faults.

So really if you want to take on this biggest piece we need to be getting additional data collections of how waves propagate in Central California crust. And we are beginning that process right now working with the Southern California Earthquake Center to -- to bring their techniques they're using down in Los Angeles up to the Central Coast and build a model for how waves propagate through the area in San Luis Obispo, as opposed to using these worldwide average models. And that's really the biggest bang for your buck in terms of trying to move forward.

CHAIR WEISENMILLER: And what's the process going forward in terms of PG&E studies and the role of the Committee in terms of do you see subsequent steps here? I mean, you know --

MR. WILLS: So as far as the role of the IPRP, we have reviews -- we have reviews online of the Central Coast Seismic Imaging Project. We last received PG&E's response to our reviews. We've also received copies of the -- the SHAC reports to NRC from PG&E.

One of the things we need to kind of go back into those SHAC reports and see if our comments and recommendations were considered and how they were considered in the -- in the determinations of seismic hazards, the calculations of seismic hazards that PG&E did and submitted to NRC. That process, reviewing the input of the -- the SHAC report, is something we expect to be doing over the next several months with another -- another public meeting or two. And so that's trying to find out how the AB 1632 studies effected the evaluation of seismic hazard at -- at the plant as -- as submitted to NRC is kind of what we see as our -- our remaining role at IPRP.

CHAIR WEISENMILLER: And when you're finished could you submit that to the record in this proceeding?

MR. WILLS: When we finish our evaluations of those reports?

CHAIR WEISENMILLER: Yes.

MR. WILLS: Certainly. That will be -- expect that to be an IPRP final report that we -- that we can submit to -- through PUC, and submit to the Energy Commission, certainly.

CHAIR WEISENMILLER: Okay. Thank you. Let's go on to the next panel.

MS. RAITT: Okay. Our next speaker is Jonathan Bishop from the State Water Resources Control Board. Let me get your presentation.

MR. BISHOP: Good afternoon. It's my pleasure to be here and give you an update on where things stand in relationship to the once-through cooling policy adopted by the State Board and Diablo Canyon.

Why don't you go ahead and change to the next slide.

Just as a little background, the State Water Resources Control Board adopted its once-through cooling policy on May 4th, 2010. There have been a couple of minor amendments to that since then. It was -- the policy was established to implement the Federal Clean Water Act 316(b), and it applies to all of the coastal water power plants that use cooling water for intake. The policy itself is not self-implementing. It's implemented through our permitting structure, the National Pollutant Discharge Elimination System permits of the NPDES permits.

Next slide.

The intent of the policy was to protect the beneficial uses of the state's coastal administering waters, and at the same tie do that in a way that didn't jeopardize the power needs of the state and the grid reliability. As I said, it applied to 19 facilities at the time including two nuclear power plants. A number of these facilities have either retired or retrofitted and repowered since then to move away from once-through cooling.

Next slide.

The basis of the policy required either that the operators come in to compliance through either Track 1 or Track 2. Track 1 compliance assumed a 93 percent reduction in intake flow rate which was commensurate with a closed-cycle wet cooling system that used the ocean water for makeup water. Track 2 requires that the operator reduce impingement and entrainment mortality to comparable with Track 1 through whatever means they propose to do that, and it relied on studies of the impingement and entrainment to identify the pre- and post-implementation levels.

The time that the policy was adopted there was considerable uncertainty on the cost

and feasibility associated with converting these two nuclear power plants to closed-cycle wet cooling. So the policy developed a special study, as we like to call it, that would be overseen by a Nuclear Review Committee to look at the ability to -- to meet the 93 percent intake reduction, and that that special study would be implemented by an independent third party that had experience in nuclear power plant construction.

The special studies went forward with -- we impaneled the Nuclear Review Committee, and we eventually chose Bechtel Power Corporation to develop the report. That report was completed. It was actually a year late, but we got November 18th, 2014. And I'll go in for just a short bit about the general results of the study.

The study actually was broken into two phases. The first phase was a feasibility evaluation looking at all potential methods of compliance. And those -- those were screened. And out of that there were three that were determined to be feasible and worth going forward with a Phase 2 analysis which would look at more detailed cost analysis, construction permitting

and scheduling.

The three promising technologies were an onshore mechanical intake fine mesh screen system, an offshore modular wedge-wire screen system while closed-cycle cooling system. Those were all very expensive. They range from just about a half a billion to $14 billion and range from about 8 years to 14 years in length. During that development another set of options were identified for cooling towers in the parking lot area south of the plant using saltwater cooling. Those were also scheduled out and costed out. They range from about $6 billion to $8 billion and would take approximately 14 years.

I should mention that the -- the lowest cost option, the half a billion dollars, was -- was evaluated. But it would have a very small reduction in -- in impingement mortality. It was deemed to probably not be very feasible since it reduced it by less than ten percent interim.

So the Water Board received that report from Bechtel in -- in November. The -- the policy allows for the Water Board to use that report and other information to determine if it's appropriate to require the nuclear plants to meet

full compliance based on their ability to achieve requirement, the environmental impacts, the cost of compliance. And so it also allows the Board to establish alternative requirements, essentially less stringent requirements for the nuclear plants if cost is wholly out of proportion to the cost previously identified in the staff report in the environmental assessment document.

And so the staff is actually looking at those -- that report now. We expect to -- to come back to our Board in the late summer, early fall with a recommendation on how to proceed. And then from the point the Board will either direct us to proceed with changes to the policy or to keep the policy the same.

I should note -- next slide please.

I should note that this is a discussion of the alternative requirements. The Board could just as easily determine that it is appropriate and feasible for the plant to come into full compliance and the policy would not need to be changed. Right now it has a compliance date of December 31st, 2024 for the plant to come into compliance. The -- if the Board decided to go

forward with an alternate compliance determination then the policy does require that PG&E fully mitigate any impacts that that would result in between the -- the approved compliance and the -- and the 93 percent reduction that's in the plant. And as I said, we expect to have something back for discussion later on this summer or early fall at this point.

I'm happy to answer any questions at this point.

CHAIR WEISENMILLER: Great. Thanks for being here. Given the drought, you have a pretty busy schedule.

A couple questions. One of those is a power plant consumptive use of once-through cooling, what percentage of that is PG&E (inaudible) facility?

MR. BISHOP: So I think what you're -- let me -- let me make sure I understand what you're asking.

CHAIR WEISENMILLER: Sure.

MR. BISHOP: The -- if you're asking at this point in time today with the different closures that have happened --

CHAIR WEISENMILLER: Right.

MR. BISHOP: -- my recollection is that -- that the amount of intake water at Diablo Canyon is about 80 percent of the impact around the state at this point. But that's based on, you know --

CHAIR WEISENMILLER: Sure.

MR. BISHOP: -- on SONGS being closed --

CHAIR WEISENMILLER: I understand.

MR. BISHOP: -- and a number of other facilities being closed. And so I think that's kind of a skewed look at it. It was -- my recollection was it was somewhere in the range of 40 percent --

CHAIR WEISENMILLER: Okay.

MR. BISHOP: -- at the time of adoption, but I don't have those numbers in front of me. I could be off by ten percent either way on that. That's my recollection.

CHAIR WEISENMILLER: No, that's good. I just wanted to get that for -- it helps us in perspective.

Other questions. In terms of the cost, how much of that, do you know, how much of that cost is replacement power cost?

MR. BISHOP: I'm sorry, I don't know off

the top of my head what that is. It's a fairly high part of it. But the biggest cost is the grading associated with getting it in at the right head for the cooling towers.

CHAIR WEISENMILLER: Yeah. So I guess PG&E can certainly submit for the record that number?

MR. BISHOP: Yes. And our -- our -- the analysis is available and if you'd like -- from Bechtel. It's a part of our public record. It's available with all the costs associated with their estimates.

CHAIR WEISENMILLER: Yeah. We'll take notice of that.

I was going to cheat and ask Peter Lam a question. So Peter, what -- what are the safety -- Peter is my representative to the Diablo Canyon Independent Safety Committee. And one of the things that Committee has looked at is the safety implications of different cooling technologies. So, Peter, could you summarize that in a couple minutes?

MR. LAM: Yes.

CHAIR WEISENMILLER: I know it's a tough question.

MR. LAM: Yes. Chairman Weisenmiller, the Independent Safety Committee had conducted several informal inquiries into this matter. There has been several potential issues, one of which is salt deposition. There may be a great deal of salt deposition on the adjacent facility which may or may not be safety related.

Now I was just onsite about a week ago and it turned out the salt deposition, they were chasing a different issue. It turned out it's exceptionally dependent on micro climates and how the buildings are configured. So potentially this is one issue.

Another issue we were concerned about, as you earlier indicated, replacement power would be an economic penalty on any facility. Therefore, it may compel the facility to continue some operation while the cooling tower is being designed and constructed. And during that process we had concern. You know, it's primarily a known configuration of men and equipment and operating procedure. If -- if for any unforeseen reason there may be a marriage, a perfect storm, that would be very difficult to predict. And then the third issue we were concerned about is

this tremendous financial cost in (inaudible) labor, a financial penalty imposed on the licensee. In our earlier meeting, Chairman Weisenmiller, you informed me this is federal law requirement. So being what it is, their financial penalty may distract the licensee from what they are obligated to do in terms of safety.

CHAIR WEISENMILLER: That's helpful, Peter. We should probably submit a new record here, also the studies the Independent Safety Committee has done on cooling tower issues. That would be good.

MR. LAM: Thank you. Thank you.

CHAIR WEISENMILLER: Thank you.

MS. WINN: Chair Weisenmiller, if I could offer for the record on the amount of water that Diablo Canyon is currently using, I believe Mr. Bishop noted it's about 80 percent of the state's total today for once-through cooling. But at the time the once-through cooling policy was adopted Diablo Canyon adopted -- accounted for about 22 percent of the state's once-through cooling flows, and only 8 percent of the entrainment and 1 percent of the impingement.

CHAIR WEISENMILLER: Thank you. Let's go

on to the next -- next panel.

MS. RAITT: Our next panel is on contingency planning for Diablo Canyon. And our first speaker is Jeff Billinton from the California Independent System Operator.

MR. BILLINTON: Yes. As indicated, Jeff Billinton. I manage the regional transmission for the north part of the system. I'm going to go over the -- the assessments that we've done with respect to -- to the absence of the nuclear with respect to the transmission system and the studies that we've done.

Next slide please.

In -- in the 2012-2013 transmission planning process the ISO undertook studies as a part of the annual transmission planning process which is -- which is a transparent process that we have taking place every year. The study in the timing of it had a significant -- or a significant part of it was with regards to the San Onofre generation. But the study did also look at the -- the absence of Diablo Canyon, as well, at that time as a part of that study. And the study focused basically on the transmission reliability concerns and any potential mitigation

options that there were.

As we've been looking at this the results of that assessment are still valid for the -- for the Diablo Canyon Power Plant with regards to the transmission impacts.

Next slide please.

The study itself, like I said, was -- was primarily on the transmission. It didn't -- it didn't get into a number of other factors of potentially things such as the acid evaluation or environmental impacts such as impacts on Co2 or on terms of RA-type things with regards to flexible generation or reserve margins, or in terms of cost impacts to the rates or market -- market prices. It was focused, as I said, on the -- being able to look at the impacts of -- on the transmission system in the SONGS of the local area, in particular, that are being -- being well documented as we went through the analysis, as well as to the transmission system and the bulk -- bulk transmission system.

Next slide please.

And this just -- just kind of highlights the -- the locations of where the generation is or was interconnected to the -- to the

transmission system. The Diablo Canyon is connected effectively to the bulk transmission via 3 500-kV transmission lines in the area tying into the -- essentially the backbone of the bulk transmission system within -- within California. There is 230-kV interconnection, but it is primarily for the load serving or backup serving of the station service in the area. They're not interconnected between the 500 and 230 in the area providing local requirements in the area. The generation itself is supply into the 500-kV transmission system.

Next slide please.

As I indicated the -- the assessment that we had done in 2012-13 transmission planning process focused on the immediate needs, 2012-2013 primarily, like I say, of the SONGS area. It did also look at a midterm in the 2018, as well as in the 2022 timeframe with the absence in terms of a SONGS and Diablo. The study results were or are documented within the -- the ISO's 2012-2013 Transmission Plan. This is within section 3 of the Transmission Plan, the details of the analysis are -- are reported.

Next slide.

In particular with -- with the PG&E bulk system studies for Diablo, we went through in terms of our normal transmission analysis with and without Diablo as part of the assessment, looking in terms of all their technical analysis of -- of basically (inaudible) transient analysis, looking at it in peak and off-peak conditions, and then looking at it under the -- this other contingency, single contingencies, double contingencies on the bulk 500-kV transmission system, as well as some extreme events on the system. The study itself looked at or included in -- at that time the commercial interest of the RPS portfolios that were all included in the 2012-2013 Transmission Plan. And at the -- at the time the replacement was dispatching of thermal beakers or hydrogeneration in the northwest area of the province -- or of the state.

Next slide.

The analysis itself concluded in the -- in the midterm and long term for Diablo that there were no material impacts to the transmission system. There was some small findings in terms of with regards to minor

variances of -- of overloads that we mitigated under normal conditions with or without, as well as some additional -- under extreme events of some additional load that would need to be dropped in, like I say, extreme event-type contingencies. And then there may be some additional reactive requirements within the system depending upon flows, primarily in terms of under peak conditions or heavy load conditions, the Diablo plant absorbs. Under lighter load conditions -- or I mean under heavy load conditions it provides (inaudible) to the system. Under light load conditions it absorbs. As there's less flows on the lines the voltages increase.

Next slide.

And so in terms of kind of summarizing with regards to that, we'll continue to monitor the assumptions that were part of the 2012-2013 Transmission Planning process with -- with respect to the -- any potential impacts to the transmission system. But as we look right now the -- the results of that study are still valid with regards to the findings and the impacts to the transmission system. And like I said, the

main one is just continuing to monitor potential reactive needs, dynamic reactive needs on the system.

CHAIR WEISENMILLER: Thank you. I certainly want to thank the ISO. I think in our first IEPR we asked the -- the ISO to study the contingency of what if either plant was out. When you look around nationally there's a lot of plants that have been out for a year or so. We obviously did not anticipate at the time or forecast San Onofre was going to be gone. But certainly that led to the basis for trying to put in place a contingency plan there.

In terms of reactive power of inertia issues are we talking about basically potentially synchronous condensers?

MR. BISHOP: That -- that may be one option as we look at it --

CHAIR WEISENMILLER: Right.

MR. BISHOP: -- most definitely. But it's probably something of a dynamic. If there's an inertia you need something with synchronous condensers. If not just things like a static VAR or an SVC of that nature for that purpose.

LEAD COMMISSIONER MCALLISTER:

How much does location matter in terms of does that reactive power need to be spent right there or is there some flexibility there in your view for the transmission system?

MR. BISHOP: It would -- likely, in terms of what we're looking at on the bulk transmission system, either in that location or somewhere, one of the locations relatively close to the Diablo with the interconnection of the 500-kV system there.

CHAIR WEISENMILLER: I think this the study was that was done was a forecast, obviously, one of the things that's changed over time is we've got a lot more renewables. I think the wind and solar numbers are up like two-and-a-half times of what they were in 2012 going to the current numbers systemwide. And so I assume one of the implications, too, is at this point is we're looking at some of the over-gen issues. That certainly connects to these issues.

MR. BISHOP: It is a part of it and part of the -- the LTPP process. There was some sensitivities that were done looking at some of those impacts. When you look at -- it's -- it's with regards to a base. It's a reduction in the

baseload generation. So it would have some potential impacts to -- to the -- to the over-generation from -- from being able to reduce baseload generation. However, there's issues with regards to the inertia, as well, as you reduce that -- that further, and having to look at it from -- from a frequency response requirement and obligation.

CHAIR WEISENMILLER: Okay. Let me ask. And it's probably a question for PG&E. My impression was that PG&E is at least doing some studies or ramping it down at night. I don't know if that in the record or not or if he put those results of those studies into the record. You want to talk about them?

MR. STRICKLAND: Sure. There is Jearl Strickland with PG&E.

We're going through a process of evaluating what type of options we may have to be able to provide additional flexibility for the plant. There is some flexibility today that the ISO does have before them to be able to have some minimal changes in power.

CHAIR WEISENMILLER: Well, I remember when it was being licensed Nolan Danes (phonetic)

told me that there was -- it was designed to be able to, you know, be able to flexible in operations. Obviously it's been run pretty much flat out. But are we talking a reduction from 100 percent to 80 percent or what sort of level would we be talking about?

MR. STRICKLAND: If you look at plants in Germany and France --

CHAIR WEISENMILLER: Right.

MR. STRICKLAND: -- that there are many, the -- pressurized water reactors that are designed to be able to fluctuate in power on a daily basis up to 50 percent load. And that with the additional changes to Diablo and additional analysis and studies that there could be a potential to be able to make additional power changes on a daily basis. But we're not a point at this point in time to be able to complete studies associated with flexible operations. It's something we'll look at as time progresses.

CHAIR WEISENMILLER: Okay. And, Peter, from your perspective, would there be any safety issues associated with ramping? I don't know if the Committee has looked at that or not.

MR. LAM: There are two thoughts on this

process, Chairman Weisenmiller.

One is just in the -- the plant would prefer not to disturb its ramping up or down the power. But there is an opposing view. In my humble opinion 30-some years ago each licensee of a nuclear power plant had experienced maybe ten trips per year, by which it means the reactor shuts down unexpectedly. That was a good 30, 35 years ago.

In my humble opinion that may not be too bad a thing. Because nowadays a reactor operator may not see a plant trip in three to five years. Now a plant trip, it's basically a drill to test the reactor to handle some unexpected operating procedure.

But there are really two opposing views to this matter.

CHAIR WEISENMILLER: At this point we tend to be taking the plant down to sort of clean the insulators --

MR. LAM: Oh --

CHAIR WEISENMILLER: -- you know, these (inaudible)?

MR. LAM: Right. But that -- that's one of the ways. But the operator has tremendous

discretion as to how he would manage ramping it up or ramping it down.

Now anytime the operator is asked to change a power level it involves some -- some processes. And right now, as you are well aware, the Nuclear Regulatory Commission had a safety indicator which is a lack of planned trip. They consider the less, the better.

As I indicated earlier, I would not mind to see an operator seeing a plant trip once in while so that he knows and he gets some real training other than being trained in a simulator.

MR. STRICKLAND: Can I add something to that? That -- when you look at periods of time we're -- we're cleaning condensers or cleaning our intakes tunnels, that we do bring the plant down to 50 percent power for extended periods. And so we do have the ability to be able to reduce power for specific actions such as cleaning tunnels and cleaning the insulators, as you noted.

In order to be able to do that on a routine basis, then it would require a change in fuel design and other modifications to the plant, and that we haven't performed a set of studies

yet to be able to completely identify what that would be.

LEAD COMMISSIONER MCALLISTER: What's your sort of current ability to ramp, sort of how many megawatts were hour or whatever?

MR. STRICKLAND: Right now the -- to be able to come down in power with -- off the top of my head I don't remember the specifics, but it's a small percentage. It's more in the range of no more than 10 to 18 percent to be able to come down at any point in time for -- for routine -- routinely bringing a plant down, for just, you know, a day-to-day type basis. There's an agreement that's set forth with the ISO right now that provides some flexibility for how often we would bring the plant down to be able to meet their needs. It hasn't been exercised to date as far as I'm -- I know.

LEAD COMMISSIONER MCALLISTER: It sounds like you would be planning that days in advance, bringing it down and keeping it there for a few days before bringing it back up.

MR. STRICKLAND: At least 72 hours in advance typically is what's required.

LEAD COMMISSIONER MCALLISTER: Okay.

Thanks.

CHAIR WEISENMILLER: Yeah. How fast do you ramp up?

MR. STRICKLAND: I don't know the specifics.

CHAIR WEISENMILLER: Okay.

MR. STRICKLAND: But I'm the -- the civil structural engineer --

CHAIR WEISENMILLER: Okay.

MR. STRICKLAND: -- not the nuclear engineer.

CHAIR WEISENMILLER: Thanks. Actually, if you guys can submit that for the record, that would be good. Okay.

LEAD COMMISSIONER MCALLISTER: I'm going to -- well, I guess part of the question, I would assume, if you're the civil would be looking at the -- sort of the cycle, if there's any, you know, negative impacts of cycling the plant more often versus, you know, keeping a steady stay.

MR. STRICKLAND: And that's a good point. That's an important part of the Aging Management programs in that you'd need to be able to quantify essentially what measures were in place to be able to continue to effectively monitor

material condition of the systems, structures and components that are important to safety.

LEAD COMMISSIONER MCALLISTER: Is that part of the studies that you're doing right now?

MR. STRICKLAND: We haven't initiated studies --

LEAD COMMISSIONER MCALLISTER: Oh, okay.

MR. STRICKLAND: -- for flexible operation at this point. But we have -- we do have the ability to be able to perform those type of studies, you know, in the future.

LEAD COMMISSIONER MCALLISTER: Okay. Thanks.

CHAIR WEISENMILLER: Next.

MS. RAITT: Okay. Our next speaker is Valerie Winn from PG&E.

MS. WINN: Good afternoon. Valerie Winn with PG&E. And today I'm going to be talking about contingency planning in the Diablo Canyon Power Plant. And I guess one thing that I want to make clear before I get started on my presentation is that I'm not doing my own career contingency planning by violating a CPUC ban.

I did want to -- I had some folks look at a ruling that Administrative Law Judge Gamson

issued on April the 20th in the Long-Term Procurement Plan proceeding at the CPUC. And that proceeding is subject to ex parte restrictions. But ALJ Gamson noticed in his ruling that the CPUC workshop is a public workshop, and therefore the ex parte communications don't apply because it is public, it is not an off-the-record communication. And he also indicated in his ruling that PG&E is not subject to the ex parte restrictions and requirements of the long-term plan -- or the ex parte ban decision for the CEC's workshop with regard to issues in the Long-Term Procurement Plan proceeding.

So that -- my understanding is then no ex parte needs to be provided because I cannot have ex parte communications at all. So I'll still have my job at PG&E, which make me happy. And I'll now talk about contingency planning for Diablo Canyon.

CHAIR WEISENMILLER: Yeah. I was going to say, for those of you in the audience I should note that for the Energy Commission we don't have a pending adjudicatory proceeding involving this. This is the Independent Energy Policy Report.

It's really a legislative type of proceeding. We encourage any and every one to participate. And certainly, this is a public meeting. And again, so certainly we're here to listen. But there is no issues of ex parte in terms of talking to us in this -- this afternoon.

MS. WINN: Thank you. So today I'm going to speak to you about contingency planning for Diablo Canyon, and in particular my focus today is on how we currently do contingency planning and how PG&E meets its customer energy needs on a short-term, midterm and a long-term basis if Diablo Canyon is not available to provide the safe, clean and reliable power that it does today. And I'll also touch on a number of outstanding regulatory issues. And also share some recent feedback from the CPUC on contingency planning and their outlook on that for Diablo Canyon.

So first -- well, if we could go to the next slide please.

So first, to set the framework for the discussions I wanted to share some of the key features of Diablo Canyon. And it is safe, reliable, clean, and a vital energy source for

California. And it's a significant economic engine in the Central Coast communities.

The two units at Diablo Canyon produce 18,000 gigawatt hours of carbon-free electricity annually, and that's nearly 10 percent of California's existing energy portfolio, and about 20 to 22 percent of PG&E's energy portfolio, which with eligible renewables and large hydro I understand we're probably at about 60 percent or more carbon free, one of the cleanest utilities in the country.

So for 30 years Diablo Canyon has continued to safety produce clean and reliable energy without GHG emissions. And we avoid about 6 to 7 million tons of GHG emissions that would have otherwise been emitted by conventional generation resources. And these facilities are currently licensed by the Nuclear Regulatory Commission to operate through 2024 and 2025.

So looking forward we expect Diablo Canyon will continue to play a key role in supporting our local communities and in helping California achieve its ambitious goals to reduce greenhouse gas emissions and to combat climate change.

So generally, how does PG&E plan to meet its customer's needs? So we procure power for our customers pursuant to a CPUC Authorized Procurement Plan. Some of you might know that as the AB 57, Approved Procurement Plan, the Bundled Procurement Plan, it's known by a number of names. But the Authorized Procurement specifies the type of procurement procedures PG&E can use. For example, the Authorized Procurement Plan allows PG&E to procure electric energy and capacity through a variety of mechanisms on a short-term, midterm and long-term basis.

The short-term purchases are made through the CAISOs day-ahead or real-time markets or other -- or other authorized brokers. And these mechanisms are used to meet customer needs whether load is greater than forecasted, if it's unexpectedly hot that day, or if a supply source is unable to generate as forecasted, like if it's less sunny than anticipated, less windy, or if there's a mechanical failure at a facility.

We are also authorized to procure power through bilateral contracts.

And then for longer term procurement needs, whether because of load growth or because

there's a plant retirement, through the CPUC's long-term procurement planning process PG&E is authorized to hold a competitive solicitation to secure a specified amount of energy or capacity.

So now I'll talk a little bit more about the long-term procurement planning process. And if we could go to the next slide.

So for those of you who aren't familiar with the LTPP, as we commonly know it because we have lots of acronyms in the energy industry, the LTPP is held every two years by the California Public Utilities Commission, and it looks out over the next 10-year period, sometimes a 20-year time horizon and says, how do we think load is growing, what resources are available, and then you kind of match up those supply and demand parameters and figure out how much you need.

The Commission, through the public stakeholder process, actually develops a number of different scenarios where we evaluate those energy and capacity needs. And they look through that process to actually balance a number of public policy issues, including the cost effectiveness, the greenhouse gas impacts, renewable integration needs, reliability needs, a

whole factor of things that are looked at for each of those scenarios that are developed.

Just recently we were working in the 2014 Long-Term Procurement Plan on the flexibility of the procurement portfolio. And particularly, you know, as we add more intermittent renewables to the system, you know, what sorts of flexibility do you need? And so Phase 1A of that proceeding was recently closed out with no finding that additional flexibility was needed to maintain system reliability. The ruling also said that there was not sufficient evidence at this time to authorize additional flexible or system capacity procurement through 2024. And the ruling states that,

"Continued work in the 2014 Long-Term Plan will set the stage for expanded future analyses which will examine the cost effectiveness and GHG impacts of measures to ensure system reliability."

So while the CPUC has not yet developed the scenarios for the 2016 Long-Term Procurement Plan, PG&E does expect that there will be multiple scenarios examined. And in the past the PUC has included scenarios with and without

Diablo Canyon, and these scenarios are intended to provide meaningful information to regulators about a variety of procurement choices and the GHG impacts, costs and reliability of those -- of those different portfolios.

So as we talk about kind of contingency planning and looking forward to perhaps the next Long-Term Procurement Plan, I did want to share some thoughts that the CPUC recently shared in a decision where they rejected an application by the Friends of the Earth to examine Diablo Canyon's economics and continued operations.

As indicated in that decision the CPUC indicated they already have a number of tools and proceedings to look at Diablo's operations, and that with the number of benefits and concerns that people have about Diablo, that it may warrant further consideration as the right time. But the decision notes that the time is not ripe right now to move forward, noting that there are some meaningful results that are still needed to inform the contingency planning process.

And so I guess the question would then, so what are some of those meaningful -- meaningful results that will influence that

discussion on contingency planning and the continued operations of Diablo Canyon beyond its current license life?

If we could go to the next slide.

So just PG&E has not made a decision yet to operate Diablo Canyon for an additional 20 years beyond its current license life. I think it was noted earlier that in 2009 PG&E applied to the NRC to renew Diablo Canyon's licenses. And we asked the NRC in 2011 to delay issuing a renewed license, if they were going to approve them, until our AB 1632 seismic studies were completed. And the NRC indicated that they would go ahead and complete their safety evaluation report and suspend work on our environmental impact report until our studies were completed. And since that time in 2011 we've continued to provide monthly updates to the Atomic Safety Licensing Board, as the NRC requested, as well as periodic and annual updates to the License Renewal Application as part of the federal process.

So we've been following the NRC's directions there, but we have not moved forward on the California portion of the license

renewable -- renewal process because there are a number of issues we want to consider. And those issues include feedback on the seismic studies, as well as getting clarity on the once-through cooling compliance requirements, and then also the steps that are needed to get a consistency determination from the Coastal Commission.

So as we get more information from the regulatory agencies on these issues we look forward to actively participating in any proceeding the CPUC might open to examine contingency planning for Diablo, whether it's as a separate proceeding or through the 2016 Long-Term Procurement Plan. And by working with the CPUC and stakeholders we expect to develop the meaningful results that will help inform the discussion on how California can best meet its greenhouse gas emission goals in a way that provides safe, clean, reliable and affordable power for our customers.

Thank you. I'm happy to answer any questions.

CHAIR WEISENMILLER: Thanks. I think -- I think the two things we need on the record at this stage, one is the -- that CAISO is doing

summer assessments, and my recollection is Northern California has a pretty healthy reserve margin at this stage. So as long as we can get that summer assessment put in the docket, that will be good.

I guess the other issue I think we probably should at least take note of is when President Picker voted out -- after the Commission had voted out the San Bruno decision President Picker then read a statement into the record expressing concern about PG&E's safety culture and whether it was perhaps too big. And I think we should at least have that put in the record too.

MS. WINN: Okay. Thank you.

CHAIR WEISENMILLER: Thanks. Let's move on.

MS. RAITT: Okay. Our next speaker is Rochelle Becker at Alliance for Nuclear Responsibility.

MS. BECKER: Thank you very much for inviting the Alliance to be a part of the panel today. We really appreciate it.

I'd like to remind the Commission that the Alliance for Nuclear Responsibility is based

on San Luis Obispo. And we have often heard PG&E brag about how Diablo Canyon provides an economic benefit to our community and to the state, close to $1 billion. Yet if we fail to learn from Chernobyl, the 29th anniversary was yesterday, Fukushima or SONGS, we can put a minus sign in front of that billion-dollar benefit, 20 percent of our school budget, 90 percent of our OES budget, 1,400-plus jobs and community benefits will disappear where we are.

Slide one please.

My first slide quotes the Energy Commission which is my favorite Commission. And it basically says that we need to consider contingencies as of 2008.

Second slide.

This is just a repeat of the ISO -- the Transmission Plan. But grid reliability assessment was evaluated in the absence of Diablo Canyon and determined that there's no material mid- or long-term transmission system impacts associated with the absence of Diablo.

Slide three.

From slide three you can see that the PUC has finally recognized the immediate need for

contingency planning, admitting that, quote, "When San Onofre went out we were caught pretty unaware." The same similar kind of thing could happen at Diablo Canyon at any point. And I think we need both the short-term and a long-term plan for dealing with the absence of Diablo Canyon.

Slide four.

This is the ISO -- this is from CAISO, and it basically says that curtailments in the expanded preferred resources in 40 percent of the RPS in 2024 were significant.

Slide five.

And as shown on Table 18, the trajectory without Diablo Canyon has -- has less curtailment, the least curtailment, 83 percent less. So if we are pushing a renewable portfolio, Diablo Canyon is in the way.

Slide six.

California's Energy -- California's Energy Assurance Plan states,

"Energy infrastructure disruption may take the form of terrorist attacks targeting power plants, and in particular the state's nuclear plant."

Slide seven.

The NRC struggles to balance the concerns of plant operators that additional security requirements are excessive and too costly, with the critics' concerns that the same requirements are inadequate.

Slide eight.

The NRC's process for determining which concerns need to be addressed and how they should be addressed has not always been transparent, even to governmental and quasi-governmental organizations.

Slide nine.

The NRC has not explained why the agency is confident that the current fleet of U.S. reactors could stand up to aircraft attacks with very low probability of radiation release, while some professionals appear to have come to very different conclusions.

Slide nine or slide whatever it is, ten.

Is Diablo cost effective? Roughly half of the U.S. 99 reactors operate in deregulated markets. As many as three dozen are at risk for economic closure. How long will regulated states passively absorb an increasingly obvious cost

subsidy?

Next slide.

Can PG&E safely and economically continue to operate Diablo Canyon? PG&E has been downgrade by INPO. The Water Board must soon decide if ratepayers should spend up to $14 billion for cooling alternatives, or as the Coastal Commission testified, allow California's, quote, "largest marine predator," unquote, to continue to devastate marine life?

The Energy Commission and the PUC advised the Water Board not to waive water requirements. Yet PG&E retracted its commitments to abide by California's OTC policy, seeking exemption instead.

PG&E rushed AB 1632 studies to the NRC before receiving required review by the Independent Peer Review Panel.

PG&E ignored a shutdown order from the NRC resident inspector for seismic design violation, and issue that is still being investigated by the Office of Inspector General at the NRC.

And PG&E is the only NRC utility licensee in U.S. history to have faced federal criminal

prosecution.

The Alliance for Nuclear Responsibility has spoken with our county government and business leaders. But it is very, very difficult to question the operation of our largest private employer and billion-dollar funder in our community. However, it is San Luis Obispo that will lose jobs and resources and be left with the radioactive waste on our seismically active coast.

Therefore, the Alliance for Nuclear Responsibility requests that as contingency plans are discussed the possibilities to soften the economic hit to our community be considered.

Thank you very much for your time.

CHAIR WEISENMILLER: Thank you. I guess actually I just wanted to follow up on the INPO issue.

MS. BECKER: Uh-huh.

CHAIR WEISENMILLER: This is obviously more for PG&E.

In the past when we've looked at INPO, obviously those reports are confidential. And I think in some of the prior IEPRs you gave us sort of a general score where PG&E had been very high.

It was downgraded significantly and then it came back pretty well.

So I don't -- so do the extent we can get that sort of general score, you know, we may -- you know, again, we understand the confidentiality requirements on -- on INPO. So we're not asking you to, you know, disclose those reports in any way, but just the sort of summary statistic.

MS. WINN: I'll check into that and see what we might be able to provide. If I could provide a little bit more info on that INPO rating, as I understand it this had to do with the emergency planning in the area and our ability or our requirement to warn folks within that ten-mile radius --

CHAIR WEISENMILLER: Right.

MS. WINN: -- of the plant at sea. And so that -- that issue has been addressed, and it's not indicative of current station performance. So I don't want folks to, you know, leave thinking that this finding, which was a White Finding, which was a less severe finding by the NRC, is something that indicates our plant operations are not safe today.

CHAIR WEISENMILLER: You know, actually that's what I was trying to understand. Because I was -- I was aware of that NRC finding but I wasn't aware of any INPO downgrade, which would be separate.

Peter, do -- again --

MR. LAM: Yes. Yes. Chairman Weisenmiller, the Independent Safety Committee routinely receives proprietary information from INPO. The Committee, as a matter of fact, had totally agreed as a result and consequence of our being provided information we will not publicly discuss the INPO's finding.

Now that said, may I give you a background, brief, on what my understanding of what INPO operations are which is not specific to the Diablo Canyon?

INPO as an industry trade group had numerous resources dedicated to improvement of nuclear power plant safe operations. Generically, every so often they come down to a nuclear licensee an conduct their performance reviews. They bring a lot of resources to any licensee. Each licensee that I had been aware of in the past 40 years has been very receptive to

the INPO examination. And the examination is very consequential in the sense that it had -- it is basically a self-policing group. You might want to label it that way. So there are -- in my exposure to their operation there may be financial consequences to a licensee because of their bond ratings. So the bond rating agency also closely fall into INPOs examinations.

This facility, which I refer to Diablo Canyon, in the past 30 years had been receiving high ratings. Now it's not exactly a scoring system. It's not a comparative analysis relative to some other facility. So they do have unique systems of examining safety practices. They are entirely separate from the United States Nuclear Regulatory Commission. They have different methodology. They had different people and they had different process.

So when we, the safety -- Independent Safety Committee go on site we are exceptionally -- at least I for one am exceptionally sensitive to their input evaluation. As a standard practice, every time I am on site my exit meeting involved with the most senior manager of the facility, either the Chief Nuclear Officer or the

Site Vice President. As a matter of fact, a week ago I met with Mr. Barry Allen, the Site Vice President responsible for half of the plant's operation.

So our inquiry also had to deal with what happened, and can you share with us. As I indicated, is strictly propriety information. But the Committee's inquiries is can you share with us what had happened? And more importantly, what are the therapeutic actions that the plant intend to take? And had that type of corrective actions been successful? And what is the schedule? What are the resources?

CHAIR WEISENMILLER: No, I've reviewed prior INPO reports, but certainly not anything -- any of them recently. And again, I certainly respect the proprietary nature. But again, at least in prior cases -- or actually, coincidentally, PG&E had pulled its rating up and Edison hadn't. PG&E was able to sort of at least give some sort of summary score.

But anyway, so I think just trying to understand, again, whether this is NRC and INPO? And if this is INPO, again, what sort of level of downgrade, if any, occurred?

MR. LAM: Right. And your office, Chairman Weisenmiller, I think it's routinely accessed to the INPO proprietary reports. I hope that would continue.

CHAIR WEISENMILLER: Okay.

MS. WINN: Thank you. We'll follow up on that.

CHAIR WEISENMILLER: Okay. Thanks.

Let's go on to the next topic.

MS. RAITT: Okay. So switching gears we'll talk about decommissioning San Onofre. And our speaker is Bruce Watson from the Nuclear Regulatory Commission.

MR. WATSON: Good afternoon. I am Bruce Watson. I'm with the Nuclear Regulatory Commission. I'm Chief of the Reactor Decommissioning Branch. I want to thank you, Chairman Weisenmiller and Commissioner McAllister for having me here to speak today.

With six power reactors currently in decommissioning status in California, I've added in the two plants at GE Vallecitos which were never part of the energy system here but are under current license by the NRC and are decommissioning, and the three research reactors

that are currently decommissioning in this state, I'm a frequent visitor to California.

Can I have the first slide? Okay.

We have the appropriate statutory authority to regulate the safe radiological decommissioning under the Atomic Energy Act. We have risk-informed performance-based comprehensive regulations for decommissioning that include the radiological cleanup criteria, public involvement, and of course the financial assurance requirements for that radiological decommissioning.

We have effective decommissioning guidance which has been developed over the past 20-plus years and has been revised to keep it current. We also provide appropriate oversight through the decommissioning of the plant through our Inspection Program.

If we can have the next slide?

Under a radiological release criteria we basically have criteria for unrestricted release and restricted release. Probably the most important one to most people is the unrestricted release which San Onofre has committed to. In the past we've had ten power reactors completely

decommission and met that criteria for unrestricted release. Seven of those were specifically under this criteria which went into place in 1997. We've also had over 30 research reactors decommissioned and the license terminated, and over 80 complete material sites decommissioned during this time period.

The next slide is basically a simplified diagram of the reactor decommissioning process. On the left is the licensing requirement -- the licensee's requirements for the actions to take place during the decommissioning process, the NRC's role, and of course the opportunity for public involvement. This regulation that covers this process went into effect in 1997. So we've got almost 20 years' experience with it.

Can we have the next slide please?

The licensee is required to submit to us two certifications. First is that they permanently will cease operations, and then when they permanently remove the fuel from the reactor. Once they do this they are not authorized to restart -- place the fuel back in the reactor or restart it.

The second item here is the Post-Shutdown

Decommissioning Activities Report. And we will hold a public meeting associated with that. The PSDAR, as we like to all it, is -- has to be provided prior to or within two years after the -- after the plant permanently ceases operations. So it's a fairly quick document that's provided to us.

I want to point out that our inspection oversight continues throughout the process, and actually continues to the license termination. So we don't go away once the plant permanently shuts down.

The program oversight responsibilities, mainly the licensing activities shift from the Office of Nuclear Reactor Regulation to the office that I'm in which is the Nuclear Materials Safety and Safeguards.

And the other point I really want to point out to you is that there are no -- the current license, when the plant shuts down remains in effect until the license basis is changed, and that is approved by the NRC. So just because a plant shuts down, really the licensing requirements continue.

Next slide please.

The PSDAR, or Post-Shutdown Decommissioning Activities Report as we call it is basically a letter, and it outlines three things to the NRC and to the public. It is not a licensing action, therefore we do not approve it. It is merely information from which we, the NRC, can plan our resources and get comments from the public on. Basically, it's a description and schedule for the planned decommissioning activities. And for San Onofre, I think they planned 20-year decommissioning effort, which is well within the 60-year requirement that the NRC requires.

It also -- the other part of this is that the site -- the licensee has to provide us site-specific decommissioning cost estimate, including the cost of managing the nuclear fuel. In our review, San Onofre has adequate funds to perform the radiological decommissioning.

The third part of this PSDAR is a discussion that provides the means for concluding that the environmental impacts associated with the decommissioning activities will be abounded by the appropriate issued environmental impact statement. And for San Onofre, they will still

remain within the current environmental impact statement. So there's no real issues with that and -- as far as San Onofre goes.

But the point that I want to make again is merely a letter to the NRC which we evaluate. We have content requirements in Reg Guide 1.185 as specified what's supposed to be in the level of detail and in this document. So it does get reviewed by us but it is not approved.

Can I have the next slide please?

The next major document is the License Termination Plan. And it's a fairly large detailed technical document that describes the site characteristics, the remaining work that needs to be done. The critical thing to us is it -- it provides the plans for the final radiation survey for the release of the site. It's a detailed -- it provides a detailed method for demonstrating compliance with a radiological criteria for the license termination -- termination. Basically, it outlines how they're going to do all the measurements to ensure they're going to meet the dose criteria.

So it is a very large radiological program that -- that they're going to follow to

establish how they're going to meet the criteria, from which we will also perform verification and confirmatory surveys to verify that the licensee has conducted the activities appropriately.

And of course at the end they have to provide an updated cost estimate to make sure they have the remaining financial assurance for the remaining radiological work and, of course, do the environmental review again.

One of the things I want to point out is that the License Termination Plan is not required until within two years of when they plan to request license termination. So at this point for San Onofre it won't be required until about 18 years, near the end of their 20-year plan.

We are currently doing the technical -- detailed technical review of the License Termination Plan for Humboldt Bay. We've been looking at that for about -- about a year-and-a-half now. We expect that we'll be completing that very soon and we'll be issuing that approval soon.

If we can go on to the next slide?

This is fundamentals for dry -- dry cask storage, excuse me, for spent nuclear fuel. Easy

for me to say. And it doesn't really matter whether it's a pressurized water reactor or not, or a boiling water reactor. But the principle is the fuel is placed in a stainless steel container, inerted, and then placed in a permanent shield, a concrete shield.

If we can go to the next slide.

This is the current status of the SSC (phonetic) at San Onofre. They have the new homes, horizontal casks, for -- in facility for spent nuclear fuel. As you can see, that was the construction, and then how it looks like today.

And if we can go to the next slide?

We understand they are looking at the Holtec International UMAX system which is an underground system. And I think we've issued the certificate of compliance -- or conformance for that particular system. It's very similar to the Holtec system that is used at Humboldt Bay, and their fuel has been in storage for a number of years now.

Okay, next slide.

I thought in closing I'd go over some of the public issues we've been hearing over the last few years concerning decommissioning,

specifically the issues are typically local-specific. Many sites or areas do not like losing jobs. They're concerned about a number of different issues but we listened to them all.

We do not require community involvement. We strongly recommend it, that the licensee perform -- provide or form advisory panels or groups to involve the public in the decommissioning process.

There are significant emergency planning reductions and security reductions associated with the reduced risk of the plant no longer operating and having the fuel in wet storage, as opposed to being in an operating reactor.

We do receive many comments on the Post-Shutdown Decommissioning Activities Report. And one of those is that we review the PSDAR and do not approve it. But like I said, it's not a licensing action.

There's many comments about the fact that the regulations allow 60 years for the decommissioning to be complete, but there are certain safety issues with that such as reduced radiation exposure to workers, reduced radioactive waste volumes created. And of course

if you're at a multi-unit facility the operator can focus on the operating units and not the decommissioning plant.

One of the big issues is the economic losses to the local community. We always have questions about the Decommissioning Trust Fund, specifically because under the current -- current law or act we are only authorized to regulate the radiological decommissioning. And so actually your site restoration is up to the state.

There's also the big concern, and this is pretty uniform around the country, people want a resolution of the long term high-level waste storage issue. Most people -- I mean, all people want to see a permanent solution to the -- for permanent repository for high-level waste. And there are concerns about the future available uses of the site. And some of the sites that have been decommissioned, some have built -- licensees have built -- which own the land, provide new generating capacity. Some turn them into parks. So it's -- it's up to the licensee to do that.

Specific to San Onofre, though, they have an agreement with the Navy. And so that is

really up to the Navy for the future reuse of that property.

And with that I'll entertain any questions or comments.

CHAIR WEISENMILLER: Yeah. So I was trying to figure out, for this site for the decommissioning there's going to be an intersection of the NRC requirements which are more on the radiological material, there's the PUC requirements on decommissioning which will presumably deal more with the site restoration issues, and then the Navy. And obviously the lease term basically calls for the site to be brought back to some fashion, to its condition prior to San Onofre being there.

So I'm just trying to figure out how that intersection is going to work from your perspective? Who's -- who's on point on which sets of issues?

MR. WATSON: Well, in order to restore the site the first thing you have to do is complete the decommissioning, the radiological decommissioning. Once that is complete we will terminate our activities or responsibility to the site once it meets the license criteria. And so

we will no longer be a party to the site.

The Navy agreement with Southern California Edison is an agreement between those two parties and we're not party to it. So it will be up to the utility to negotiate with them the final status of the -- of the site. So --

CHAIR WEISENMILLER: One of the -- when we were doing the ARRA siting projects, many of which were on Department of Interior or BLM land, we went through a process where we were trying to coordinate between CEQA and NEPA. And it turns out it wasn't easy to do that. We had a divorce midway, and then at the end made it through the process.

But at this point is there any coordination between the NRC's NEPA process here and the PUC's CEQA process?

MR. WATSON: I can tell you that I've attended one San Onofre Citizens Advisory Panel, or Engagement Panel is what they all it, an discussed our part of the process with the NEPA requirements.

We are presently going to be trying to schedule a meeting with the Navy to discuss our role in the NEPA process.

CHAIR WEISENMILLER: Right.

MR. WATSON: However, we're not directly involved with the PUC over the state's process.

CHAIR WEISENMILLER: Yeah. Somehow we -- I was going to encourage both sides to talk. Otherwise I suspect this is going to be longer and more convoluted. Then the only thing that -- it sort of squares the complexity when you combine CEQA and NEPA, you know, which -- and certainly for this -- this scale of project, it's going to be fairly -- the CEQA or NEPA processes are going to be fairly complicated anyway. And if there's ways to coordinate presumably it's going to save costs and money.

One of the other things I wanted to understand is does the NRC have any requirements in this place at this point for interim storage facilities in terms of permitting conditions or licensing conditions?

MR. WATSON: Are you talking about the spent fuel?

CHAIR WEISENMILLER: Spent fuel, yeah. Does --

MR. WATSON: Yeah. The spent fuel facilities can either remain under the Part 50

license --

CHAIR WEISENMILLER: All right.

MR. WATSON: -- or they can -- the licensee can apply for a specific license for the spent fuel.

CHAIR WEISENMILLER: Okay. I mean, there's -- there are various entities talking about setting up interim storage, you know, facilities somewhere in the U.S. And I'm just trying to understand how mature the permitting process is for those.

MR. WATSON: Well, the NRC will regulate all of the --

CHAIR WEISENMILLER: Sure.

MR. WATSON: -- Part 50 requirements, and of course the special nuclear material. That's --

CHAIR WEISENMILLER: Right.

MR. WATSON: -- what we're authorized to do by the --

CHAIR WEISENMILLER: Right.

MR. WATSON: -- congress. So if there were any new facilities I would imagine that we would be the licensing authority for those such -- those facilities, along with whatever the state

requirements may be too.

CHAIR WEISENMILLER: Right. Has the NRC ever licensed an interim storage facility?

MS. WINN: Actually, I believe we have one at tour Humboldt Facility --

CHAIR WEISENMILLER: Okay.

MS. WINN: -- where we have a separate license for the -- the plant --

CHAIR WEISENMILLER: It's the --

MS. WINN: -- that we're in the process of decommissioning. But there's a separate license that covers the independent spent fuel storage installation.

MR. WATSON: I think he's talking about a separate thing.

CHAIR WEISENMILLER: Yeah.

MR. WATSON: Each of the utilities can either get a Part 50 license -- keep -- maintain their Part 50 license under a general license for their -- for their dry storage facility, or get a Part 72 license for the (inaudible).

CHAIR WEISENMILLER: Right.

MR. WATSON: I think the question you were asking is -- is -- has the NRC licensed any interim storage areas in the country? And I

believe the answer is, yes. There's a facility called GE Morris up in --

CHAIR WEISENMILLER: Yeah, Dresden. Yeah.

MR. WATSON: Yeah.

CHAIR WEISENMILLER: Yeah.

MR. WATSON: And they have a tremendous amount of spent fuel and storage at that facility.

CHAIR WEISENMILLER: I think Edison has some. I mean, that was --

MR. WATSON: I think --

CHAIR WEISENMILLER: -- an unsuccessful reprocessing plant.

MR. WATSON: Yeah.

CHAIR WEISENMILLER: Yeah.

MR. WATSON: So that's the only one I can think of off the top of my head.

CHAIR WEISENMILLER: Sure. Go ahead.

MR. CAMARGO: Manuel Camargo with Southern California Edison.

Yeah, there's a second facility, also, that's been licensed in Utah but has never -- we were unable to get approval for the rail routes in order to get the fuel to the facility. So

it's never -- it's never been constructed. And that license still exists.

CHAIR WEISENMILLER: Is that low level or high level in Utah?

MR. CAMARGO: High level waste.

CHAIR WEISENMILLER: High level waste, okay. Yeah.

MR. WATSON: Yeah. It was based on the Holtec storage system. Private --

CHAIR WEISENMILLER: Okay.

MR. WATSON: It's called Private Fuel Storage.

CHAIR WEISENMILLER: Right. Right. I guess they're doing the decommissioning at one of the Exxon plants in Illinois; right?

(Inaudible.)

So how much -- how much experience and longevity do we have with this type of cask? You mentioned Humboldt. I mean, decades? Twenty?

MR. WATSON: You know, this is not my true expertise.

CHAIR WEISENMILLER: Right.

MR. WATSON: However, I can tell you that I was involved in the licensing of the new home facility at Calvert Cliffs probably 20 years ago.

CHAIR WEISENMILLER: Okay. Well, I guess San Diego has probably the longest (inaudible) on a dry gas system.

MR. WATSON: I don't -- yeah.

CHAIR WEISENMILLER: Okay. So we can look at that. Anyway, it would be good to get something in the record on how long the dry gas systems have been in operation, if Edison or PG&E can provide that.

MR. LAM: And Chairman Weisenmiller, may I --

CHAIR WEISENMILLER: Sure.

MR. LAM: -- chime in? The gentleman's referral to the use of facility, it's called the Skull Valley Storage Facility. And I happen to sit on that Licensing Board as a federal administrative judge for eight long years, so for adjudication. The facility was licensed with a (inaudible). And I happened to cast the descending opinion of the -- of the decision. But the facility was not built because senior senator I believe is Senator Johnson from Nevada insert a rider into one of the country's appropriation bill for Iraqi War. And furthermore, the riders indicated that the

surrounding area is (inaudible) was a national wilderness. So not transportation around would be permitted to go through that facility.

Now that said, really my comment is to go to what you are saying. The longevity of these casks, yucca -- not yucca - Skull Valley's is where the initial licensing request was for like 10,000 holding casks. And the longevity of it, if I remember correctly, the NRC had certified that these casks will last about 20 years. But the data indicated their useful life may be substantially longer than that.

CHAIR WEISENMILLER: Okay. Thank you. Go on to the next speaker?

MS. RAITT: Next we'll have a panel on Spent Fuel Management at San Onofre and Diablo Canyon. And our first speaker is L. Jearl Strickland from Pacific Gas and Electric.

MR. STRICKLAND: Good afternoon. As she noted. I'm Jearl Strickland. I'm the Director of Technical Services for PG&E. And I'd like to thank you for inviting me to participate on this panel today.

Next slide please.

So I always like to start my

presentations, as Dr. Lam knows from the Independent Safety Committee, with a picture of Diablo Canyon to be able to show the proximities of the plant and the topography around it.

As you can see from the photo we've got Unit 1 and Unit 2 containment structures with the spent fuel handling facilities directly inland or east of the containment structures. It's located approximately at elevation 115 feet above sea level for the fuel handling building area.

If you go uphill about a half mile from the coast itself is where the -- the dry cask storage facility is. And it's located about 300 feet above sea level.

Next slide please.

So approximately every 18 to 20 months the Diablo Canyon Power Plant has one unit that goes into a refueling outage. And during a refueling outage we remove and replace about a third of the fuel in the reactor core. The fuel that we utilize is capable of being able to support generation for approximately three fuel cycles, which is about a five-year period of time before it is considered no longer capable of being able to provide appropriate levels of power

within our reactors. So at that point in time it's discharged into our spent fuel pools. So that equates to about 65 fuel assemblies that go into the pool every 18 to 20 months.

The photo here is of one of those spent fuel pools. And in turn, it's a pool that's heavily reinforced concrete. The walls are four to six feet thick. And it's lined with a stainless steel liner.

The fuel racks have been re-racked at one point in time to be able to provide additional storage capacity in the pools. And this was in response to the fact that -- that originally when the plants were designed it was under the premise that the federal government would routinely collect spent nuclear fuel and take it for reprocessing. So as such you need a minimal storage within the spent fuel pools.

When the reprocessing programs were stopped in the late '80s, actually in the late '70s under the Carter Administration, then at that point in time Diablo Canyon, before it ever want into commercial operation, re-racked the pools with the higher capacity racks.

Next please.

This is a photo of our dry cask storage facility. That shows the Holtec storage casks that are utilized. It's -- what you see is the outer overpack. And the overpack itself is comprised of two steel vessels that are inch thick with approximately 20 inches of concrete in between for a shielding mechanism. The fuel itself is stored in multipurpose canisters that are constructed out of stainless steel, and in turn backfilled with an inert gas and welded shut. So it provides a very robust storage container for the fuel itself, and then a storage overpack.

One of the big differences for the Diablo system is that due to the higher seismic range in the region that we're in we've elected to anchor our storage overpacks. And to date we're the only facility in the United States that provides an anchored system for our cask.

With that, that causes a few different changes. Instead of having a relatively thin foundation like most other Holtec facilities have, we had to put a large imbedded structure under each one of the storage casks to be able to then transfer the high seismic loads into the

foundation. To prevent uplifting of that slab with the extensive weights under the seismic conditions we ended up with a foundation that's heavily reinforced and approximately eight feet thick. So quite a foundation system.

Next please.

This is a picture of the -- of the dry cask storage facility when I was originally constructed. We were licensed, designed, and permitted to be able to accommodate up to 138 storage casks on 7 foundations, 20 casks each, with a couple of extra locations. At the time that we constructed it we elected to construct two out of the seven foundations, simply under the premise that Yucca Mountain still had a chance of being licensed and put into operation in a reasonable period of time. And as such, that it wasn't appropriate to spend the capital expenditures to be able to develop the full facility.

Since that point in time we entered a program in 2014 to be able to complete Pads 3 through 7 so that we would then have enough capacity to store all the fuel that would be discharged from the two reactors during the 40-

year license life.

Next please.

So this is a picture of the completed facility that it -- like I noted, it was completed earlier this year and in turn is ready for us to be able to proceed with additional loading campaigns to be able to move more fuel from wet storage to dry storage.

Next please.

This shows you a curve of our Unit 1 spent fuel pool demand forecast. And what it does is it takes you through a process and shows from the first refueling outage at Diablo, all the way up to the current refueling outages, and then those projected going forward. And there's a horizontal line in there that shows the minimum cold assemblies that are required to be in the pool at any point in time. So what we're showing with this is that for the -- for the loading campaign that we'll have this summer, that we'll process nine casks, five from Unit 1, four from Unit 2, and then in turn follow up with the second loading campaign next year about the same timeframe where we'll load six casks from Unit 1 and six casks from Unit 2. And at that point

that will get us down to the minimum levels in the pool to be able to be consistent with federal regulations for -- for what's called B5 Bravo (phonetic). It's a rule to be able to make sure that you've got an adequate number of older assemblies in the pool to be able to provide additional shielding for new assemblies that have been discharged from a reactor.

Next slide please. So with that, that's what I wanted to cover today. And if you have questions, I'd be happy to answer them.

LEAD COMMISSIONER MCALLISTER: Let's go through the rest of the panel here.

So go ahead.

MS. RAITT: Our next speaker is Manuel Camargo from Southern California Edison.

MR. CAMARGO: Yes. And I'll extend apologies for Jim Madigan. He had a medical emergency and, therefore, is unable to join us here today. So I'm here to represent SCE.

I'll start, if I can, by addressing an open question from Danielle Mills earlier this afternoon at the beginning of the workshop with respect to the seismic studies.

So there was a question about the status

of the SCE studies for SONGS. And we have completed the fieldwork for that. We're working with Scripps and have yet to do the -- complete the analysis. And we expect to be able to file that by the end of 2015.

So, for my purposes here, thank you, Chairman, for having us here today. I'll talk about spent fuel management at SONGS.

So, in moving to the next slide.

Yeah, so this gives you some bearing in terms of physical location of the San Onofre site. Over to the left, if you will, near that white tent is where Unit 1 previously resided. And just above that, just inland from that, is the current independent spent fuel storage installation. I have some slides a little bit later. I'll give you some detail on that. And then sort of, you know, from left to right, the domes there are Unit 2 on the left, Unit 3 to the right. And just behind those, just inland from those domes, are the spent fuel pool handling buildings. It's a little challenging to see from here, but that gives you some perspective. This is in that Orange County -- you know, between Orange County and San Diego off the 5 Freeway.

So next.

So together with our co-owners, you know that we -- Southern California Edison has been the majority owner of San Onofre, but other participants include San Diego Gas and Electric and then the City of Anaheim and the City of Riverside. So, together, we are decommissioning this plant.

And as we -- as we embarked upon this effort, we decided that we should establish some core principles that will help us drive our activities over time throughout the decommissioning process. And those are the principles that you see here of Safety, Stewardship, and Engagement.

And, there, safety has always been our top property. And, certainly, as we embark on the decommissioning activities, remains a top priority for us. In fact, you know, now that we're no longer an operating plant, it's really that safety maintenance of the spent fuel that has to be our top priority. There's a little bit about safety.

Stewardship. So, there, we are working to try to leave the community in a better place

versus, you know, when we started there many decades ago. And stewardship also really relates to -- gives us a core principle around wisely using the funds that have been accumulated over time. We are fully funded; that is, we have adequate funds that allow us to cease contributions from ratepayers and we're in a position now to be able to fully decommission the plant. And that's a little bit about stewardship.

Engagement is trying to go through this process in a way that is inclusive and forward-thinking. And that's where one of the things you've heard about is perhaps our Community Engagement Panel. We do have the Chairman of the Community Engagement Panel for SONGS on the agenda here today. And then also in the audience today is Dan Stetson who is a -- one of the officers on the Community Engagement Panel. There are other elements to our engagement. We do -- over the last year, we've started public tours. So folks can sign up on our website. Anybody can sign up. You have to go through -- you have to register. But anybody can sign up for a tour. We do education fairs in

the community, and we have a website, SONGScommunity.com, that serves as a single repository for information related to decommissioning.

Next.

So, here, a few milestones. This really kind of speaks to, as you see there, down June 7th was the decision to retire Units 2 and 3. So as Bruce Watson talked about earlier, you know, in most cases, if you planned to decommission, you would start working on some of your documentation and filings prior to that time. This was an unexpected situation for us, dealing with the Unit 3 steam generator tube leak that occurred in January of 2012 and, therefore, is really kind of after that decision to retire the plant that we move forward with our key activities in order to prepare ourselves for decommissioning.

August, you can see there, transmission to decommissioning staffing. We went from 1,500 to about half. And, as of today, we're down to about 375 employees. Just reflecting the difference in an operating plant versus a decommissioning plant.

Next.

So 2014 is what you see on this slide here. And that was a big planning year for us. So we started by developing our 20 Year Decommissioning Plan. I'll show you a slide on that. And we developed our decommissioning principles. But at a high level, 2014 was also the year in which we submitted our primary regulatory filings with the Nuclear Regulatory Commission, so those were a pair of license amendments, as well as was mentioned earlier, the Post-Shut Decommissioning Activities Report, the Decommissioning Cost, Estimate, and the Irradiated Fuel Management Plan, and all those were submitted in 2014

So the next slide gives you a high-level image of -- it's a very detailed slide -- but this gives you on one page an image of our 20 Year Decommissioning Plan. So you can see a bold line about -- from top to bottom, a vertical line there about a third of the way through the chart. What that line indicates is everything to the left of that line is pre-decommissioning activities and everything to the right of the line, for the most part, is our primary

decontamination and dismantlement work.

Over on the left, you'll see a number of things related to really preparing for decommissioning, so our cold and dark program, which is, you know, draining systems and making the site a safe industrial site, if you will, that allows it to facilitate safe work by the folks who go in to do that D and D work.

Highlighted in blue are some of the activities related to spent fuel management, including the filing of our IFMP, the Irradiated Fuel Management Program, and then also there you'll see an ISFSI for our Independent Spent Fuel Storage Installation, a permit that we need to amend with the California Coastal Commission in order to facilitate that work.

So what that always means is that by the time you get to that 2016 time frame, we should be able to commence the major decommission -- decontamination and dismantlement work, and there'll be about a ten-year period during which we will -- we intend to do that -- major D and D activities.

The nearer part of that, in 2017, '18, '19, is our offload campaign. So that's where we

will be looking to get the fuel out of the pools and into dry cask storage by 2019.

Next slide.

So, again, safety is a priority.

Next slide.

Here, you'll see that, again, a little bit of iChart, but this goes over some detail in terms of the fuel assemblies that we have on site. Between Units 2 and 3, we have just over 2,600 fuel assemblies; and for Unit 1, just under 1,200 assemblies. And at the end of the day, we will look to transfer 3,855 fuel assemblies to the Department of Energy when the Department of Energy is prepared to receive them.

Next slide.

This is an image of our spent fuel pool. So, again, it's a concrete structure with a steel-lined pool seismically designed for the location.

Next slide.

This image gives you a pair of images, shows that on the right is the current AREVA system that we have with -- with horizontal installation and structures, about 50 casks on site now.

And then if you go to the next slide, this shows you what the future looks like so that the AREVA system is to the top of the page, and in red down toward the bottom is the Holtec system that we'll look to include. And, there, we need about 75 more canisters in order to accommodate the rest of the fuel.

Next is a little bit of background on Holtec. So as we went through the selection process, we looked at three companies primarily, AREVA, Holtec, NAC. We decided to start by considering those companies that were licensed for storage and transportation in the United States. AREVA and Holtec have the largest share of the market, about 90 percent, and, ultimately, we decided to go with Holtec system, which you'll see on the next slide.

This is an illustration of that Holtec system. You have a concrete base mat; a reinforced concrete top pad; and, in between, it's filled with concrete. So you'd be familiar with this vertical system, very similar to this system, that's installed at Humboldt Bay.

Next: Questions.

CHAIR WEISENMILLER: Yeah, I had a

couple. I mean. Edison had -- has extensive experience decommissioning San Onofre 1, which was obviously a smaller unit. And I was just trying to under lessons learned from that and how that shaped your current plans.

MR. CAMARGO: Lessons learned from Unit 1. You know, we're not finished with decommissioning Unit 1. So, there, it's really sort of planning ahead and also to use public engagement. So some elements of our public engagement as part of our core principles are new. One that's a longstanding element is the SONGScommunity.com website, which actually precedes our decision to retire the plant. And that was our primary means of communication with the local community.

CHAIR WEISENMILLER: And in terms of just trying to make sure that we have some sense -- so as you've shifted from an operating plant to a decommissioned plant, what are some of the changes in your licensing requirements at that point? What requirements have dropped off?

MR. CAMARGO: Well, we're still in the process of waiting for the final license amendment -- amendments to go through. So, at

this stage, we're -- some of the hazards that existed during a -- as we were an operating plant have dropped off, but we're still waiting for those license amendments to come through in order to -- in order to transition to the Defueled Technical Specifications and another piece.

CHAIR WEISENMILLER: Okay. I guess I'm going to ask the same question back to PG&E. What were your lessons learned from decommissioning Humboldt, if you know?

MS. WINN: Well, if you have any to offer, Jearl, please go ahead; otherwise, I could offer to provide that sort of feedback in our written comments.

CHAIR WEISENMILLER: That would be fine. And if you have any, fine, otherwise we'll wait.

Yeah, I was just going to note on Yucca in 2005 and '07 IPREDS we had DOE in talking about the status. And, obviously, in that two-year gap, the timing on Yucca I think slipped four or five years. So it seemed to be a never-ending target at that point. And, obviously, it's slipped a lot since then.

But let's go on to the next speaker

David.

MR. LOCHBAUM: Good -- excuse me. Good afternoon. On behalf of our members and supporters in California, I appreciate this opportunity to share our views on the interim spent fuel management.

Next slide, please.

Interim storage is a step in a nuclear fuel cycle. Uranium mined from the ground is made into fuel for use in nuclear power reactors.

The United States does not reprocess spent fuel from nuclear power reactors, so it goes into interim storage, pending final disposition.

Slide 3, please.

In a reactor, the nuclear fuel is so hazardous that federal liability protection is required for the owner and the vendor. And reactor cores are backed by multiple emergency cooling systems and housed inside robust containments to manage the hazard.

In the repository, the spent fuel is so hazardous that it must be isolated for [sic] the environment for at least 10,000 years.

Spent fuel in interim storage between those very hazardous endpoints is also hazardous.

Yet spent fuel is currently being stored without reasonable safety and security measures being taken.

Next slide.

The interim storage step has become the de facto final step in a nuclear fuel cycle in the United States. Under federal law passed more than 30 years ago, the Department of Energy was charged with opening a geological repository for spent fuel. Since then, the federal government has taken billions of dollars from plant owners but has not taken a single ounce of their spent fuel.

Next slide, please.

Under federal law and legal contracts it signed with plant owners, the DOE was obligated to begin accepting spent fuel in January of 1998. Had DOE met its obligations, the amount of spent fuel in interim storage would have peaked at nearly 38,000 metric tons and then declined as spent fuel was shipped to the federal site. Because DOE has failed, the amount of spent fuel in interim storage continues to rise.

The arrow on the right-hand side of the chart shows the widening gap resulting from the

federal government's sheer failure.

Next slide, please.

We seek the accelerated transfer of spent fuel from spent fuel pools into dry storage as well as better protection against sabotage of fuel that's in dry storage.

Next slide.

As was previously said, about every 18 to 24 months nuclear power reactors shut down for refueling. Some of the reactor core is discharged to the spent fuel pool and replaced with fresh fuel. The spent fuel pool water is continuously cooled and cleaned. The water also serves as a radiation shield so that workers can enter the area without excessive exposure to radiation.

Next slide please.

After a handful of years, spent fuel is cooled sufficiently to allow it to be transferred into dry storage. Dry storage is somewhat like Russian dolls, with spent fuel placed inside a canister that is in turn placed inside a concrete cask or bunker. The spent fuel continues to emit decay heat. That heat passes through the canister's metal wall and gets carried away by

air flowing through the space between the canister and the cask, through the chimney effect. It's passive low-tech safety.

Next slide, please.

This shows a side view of the spent fuel assemblies in a storage rack in a spent fuel pool. Decay heat from the fuel warms water, the warmed water rises out of the top of the racks. This upward movement draws in cooler water from the gap between the bottom of the racks and the spent fuel pool floor.

Next slide, please.

If all the water were to be removed from a pool, air flow through the fuel would be enough to prevent overheating damage, except for the fuel most recently discharged from the reactor core within the last few months. But air is not nearly as good a radiation shield as water, so workers would be unable to enter the area as needed to add water back into the pool.

Next slide, please.

The primary hazard from spent fuel pools involves it being partially drained. Partial drainage interrupts the water-cooling effect and, at the same time, blocks the air-cooling process.

If so, spent fuel pools can overheat and become damaged. Because spent fuel pools are not housed inside robust containments, radioactivity released from damaged spent fuel is more likely to escape into the environment.

Next slide.

The primary safety hazard from dry storage involves dropping a canister during its movement over the spent fuel pool. A few years ago, workers at the Hatch Nuclear Plant in Georgia dropped a 350-pound bolt into the spent fuel pool and it poked a hole in the floor. A hundred-ton canister dropped over a spent fuel pool wall or floor could cause even more extensive damage.

Next slide, please.

That was the primary safety hazard. The primary security hazard is sabotage for dry cask storage. There are weapons that can breach the integrity of the casks sitting out back.

Next slide, please.

Accelerating the transfer of spent fuel into dry storage lowers the risk by reducing the inventory of irradiated fuel in the spent fuel pools. Every fuel assembly that is transferred

out of the pool reduces the decay heat remaining in the pool and also allows that space to be filled with water. If something were to happen, these combine to give workers more time to intervene, increasing their chances of success. And if, should they fail, having less fuel in the pool means that the radioactive cloud emitted is smaller. Protecting spent fuel and dry storage against sabotage makes more sense than our taking shoes off at airports.

Next slide, please.

This chart comes from the Nuclear Regulatory Commission Spent Fuel Study issued in October of 2013. In Stage 1 on the left, the risk rises as spent fuel pools get filled to capacity.

Beginning in Stage 2, fuel is transferred into dry storage, matching the rate that it's coming out of the reactor and refueling. The risk initially jumps up to reflect the added risk from dropping a cask over a pool. That risk bump remains throughout Stages 2, 3, and 4, as fuel gets transferred from the pool into dry storage.

The spent fuel risk declines in Stage 5. The reactor has been permanently shut down by

this time and fuel empties -- and the pool empties as fuel gets transferred into dry storage.

With expedited transfers, the spent fuel pool risk is reduced dramatically by Stage 4, as shown by the huge green downward arrow.

Because the same number -- excuse me. The risk bump at the beginning of Stage 3 reflects the cask-drop risk from the accelerated transfers. Because the same number of casks are loaded and moved overall, the risk increase at the beginning of Stage 3 is matched by a risk reduction in Stage 5.

Next slide, please.

The NRC ruled last fall that the spent fuel can safely and securely remain in dry storage for an infinite period into the future, perhaps even longer. If the dry storage risk in Stage 5 for infinity is acceptable to the NRC, then even lower risk levels for a few years in Stages 3 and 4 should also be acceptable.

Next slide, please.

This table, which is admittedly busy, comes from the NRC Spent Fuel Study and puts some numbers on the curves that I just reviewed.

High density in the middle column is Nukespeak for the current practice.

Low density is a spent fuel pool with reduced inventory from expedited transfers.

The third row about mitigation credit merely means whether workers are successful in intervening to prevent spent fuel pool accidents or not.

The NRC concluded that a field spent fuel pool could overheat and that process could generate sufficient quantities of hydrogen gas to cause detonation, something the world saw too many times at Fukushima.

The NRC concluded that a field spent fuel pool could release nearly 20 times the radioactive cesium released at Fukushima. The NRC concluded that a field spent fuel pool could cause the long-term displacement of 4.1 million persons.

Next slide, please.

The DOE has not yet figured out how to put spent fuel underground for an infinite period, or for at least 10,000 years.

The NRC has concluded that spent fuel can safely and securely be stored in dry casks on

open concrete pads for an infinite period. In the meantime, dirt or gravel berms placed -- should be installed around the casks to make it a little bit harder for the bad guys to prove the NRC wrong.

Next slide, please.

The NRC's Spent Fuel Study accepted the very bad outcomes that I previously discussed based on science fiction, not science. The NRC assumed that the spent fuel pools would always fully drain and that workers -- nay, Superman -- would be able to defy intense radiation fields to *always* provide cooling spray at exactly the right rate, not too much to flood the bottom and block air cooling, and not too little to prevent overheating.

The NRC's assumption is quite simply wrong and fanciful.

Next slide, please.

In conclusion, spent fuel pools are overcrowded today because the DOE fail to meet its legal and contractual obligations to open a repository. Spent fuel pools are overcrowded today because the NRC has failed to properly evaluate the hazard. The people of California

deserve better from their federal government, as do the people in the other states as well for that matter. You should demand that the NRC take two steps to better manage the risks from interim fuel storage: Better protection against sabotage for dry storage and reducing the inventory in spent fuel pools.

Thank you.

CHAIR WEISENMILLER: Thank you. So a couple of questions. One of them, I don't know if you have dug into the question of how long we've had spent fuel repositories and sort of the -- so, one, is just how long -- you know, do we have any track record? And, Number 2, the differences of the different types of cask.

MR. LOCHBAUM: The first cask was loaded in the United States for commercial spent fuel in 1986 at the Surry Plant in Virginia.

CHAIR WEISENMILLER: Yeah.

MR. LOCHBAUM: We have a handful of cask technologies that have been used. The studies I've reviewed for both U.S. experience and Canadian experience and worldwide experience is that the corrosion rates are relatively low for the canisters, the cask themselves. The limiting

part of -- the Achilles' heel seems to be the gaskets that allow the lid to be fastened to the canister. Some of those gaskets have deteriorated faster than anticipated.

One of the things that was done to guard against that, or to at least warn about that, is the casks themselves are pressurized, so that if there is a canister problem or a gasket problem, the drop in pressure gives some awareness and some ability to intervene. But I -- the sound bite that I often say is that the worse cask is better than the best pool. So that's what we'd like to see happen.

CHAIR WEISENMILLER: Yes. So the Surry Plant in '86, so -- my impression was NRC licensed for 20 years, so they must have gone through re-licensing on that?

MR. LOCHBAUM: That's a great point. We debated internally whether it with be better to design and license a cask for a hundred years or 20 years, as it's currently done. We actually think that the NRC's process is the right way to go because that allows it to be formally revisited to determine if it's okay to run for another 20 years, or to use for another 20 years,

rather than hope -- not look at it until year '98. So Surry has gone through that recertification process. They have been -- my understanding is they've been recertified for another 20.

CHAIR WEISENMILLER: Okay. And, in terms of Fukushima, what was the experience there on the spent fuel pools? I mean, how much is that a counterpoint to the NRC's assumption?

MR. LOCHBAUM: Well, the hydrogen explosions created pathways for helicopters and fire trucks to add water into the spent fuel pools. That's not why --

CHAIR WEISENMILLER: Right.

MR. LOCHBAUM: -- the buildings were exploded. But, absent that, the situation at Fukushima might have been much, much worse, had the spent fuel pools overheated, boiled off, and partially drained rather than fully drained. But, fortunately, the timing was such that they were able to get makeup water into the pools to give them more time to restore closed-loop cooling of the spent fuel pools. So from was no appreciable damage to the fuel in the pools, other than what was caused by debris falling back

in after the explosions.

CHAIR WEISENMILLER: Okay. Let's go on to the next one, next presentation.

MS. RAITT: Okay. Our next speaker is David Victor, and he's joining us via WebEx.

MR. VICTOR: Excellent. Thank you very much. I just want to make sure you can hear me.

CHAIR WEISENMILLER: Yes, we can.

MR. VICTOR: Great. Thank you very much. Thank you to the Energy Commission for holding this meeting. This is a very important and timely meeting.

I want to acknowledge, in addition to Manuel Camargo, who spoke earlier, Dan Stetson, who I think is physically with you today. Dan is Secretary of the Community Engagement Panel. I'm Chairman of the Community Engagement Panel. And I just regret that I could not be there physically today because I teach and we do not yet have transport technology, outside of Star Trek, that would allow me to commute back and forth to -- between Sacramento and the ten-minute slots in between the teaching obligations today.

I want to talk today about what we've been working on -- next slide, please -- at the

SONGS Community Engagement Panel. And the panel is a -- reflects -- is designed to reflect best practice in the industry now about the decommissioning process. This panel is a group of 18 members, representatives from a wide range of the broader communities -- elected officials, NGOs from many different perspectives, experts.

By design, it is not a decision-making authority. And I think, on balance, that's been actually very good because it allows for more open and frank conversations inside the panel, and it is a two-way conduit for information between the co-owners, led by Edison, which is in the process of doing all the regulatory filings and preparations for decommissioning that you heard about from Manuel Camargo just a little bit ago, and the communities, many different kinds of communities, people with different interests.

It's a two-way conduit in the sense that we learn a lot through the panel about what's actually going on with decommissioning at San Onofre and the various regulatory filings, and Edison and its co-owners learn a lot from us about what the communities care about. And we've been working on a whole series of topics related

to decommissioning to try and improve that two-way flow of information.

The next slide, please.

We have spent a lot of time over the last year, year and a half, looking at various kinds of nuclear waste storage issues. And, in particular, the issue that David Lochbaum was just speaking about concerning casks and different kinds of onsite canisters for storing spent nuclear fuel. There's a lot of information about this on our -- on the website, SONGScommunity.com, including a large white paper that we helped put together to look at many of the issues that David Lochbaum spoke about concerning the safety of these casks, the re-licensing process, what to do after the first 20 years of license, the aging management programs that are emerging inside the industry, and so on. So we've been spending a lot of time on this issue -- not exclusively on this issue. We're looking at other issues like the employment impacts of decommissioning. A very large number of important environmental issues. In fact, those will be the focus of our next meeting later this year.

But what we've been working on most recently and continue to work on is the challenge that many of the speakers has referred to today, which might be called the "Yucca problem," which is that the permanent storage routes inside the United States all, in one way or another, lead to Yucca Mountain, and Yucca Mountain is not ready to accept this. I don't know, and I don't think anybody knows, whether Yucca is an option that's dead or it's taking longer than people had originally thought. Everyone, whenever there is a change in Washington, thinks that something has changed with Yucca and then surprise -- not so surprisingly not a lot changes. But we have to face the reality that the prospects of putting this in Yucca are dim, and certainly dim on the near term. And that has led to broad support for consolidated interim storage.

And Dave Lochbaum spoke at the beginning of his presentation about what consolidated interim storage is, but it's basically a place to move spent fuel off the site, especially decommissioned sites like San Onofre where you don't have an operational reactor where, after a few years, you don't really have the prospect of

a fuel pool, moving away from those sites to a place where multiple sites -- waste can be looked after by professionals in a safe and secure way and where it can be moved out of local communities.

This is not the thing that you just do lightly, and there are a lot of standards that have to be met. The Bipartisan Policy Commission and the Blue Ribbon Commission that the President convened a few years ago spent a lot of time focused on this, including with recommendations around consent-based sitings and making sure that if local communities are going to take consolidated interim storage sites, that they are consented, that there is consent in the process, and consent as well for storage -- for transport along the way, and a focus on safety at every step.

And so there's, I think, a growing interest, not only at San Onofre, but at many sites, including the sites here in California, to push for consolidated interim storage and to push for that because we see the problems at Yucca as very severe and difficult to manage.

Next slide, please.

We have spent a lot of time talking about this with various experts, experts from the community and experts from around the country, and have begun to develop what we think is an outline of a strategy for how -- not just (indiscernible) in San Onofre but, frankly, California could help jump-start the process of consolidated interim storage.

The views of the three leaders of the Community Engagement Panel, so Dan Stetson, myself, and Tim Brown as Vice Chairman, are reflected in a memo that we shared with the Community Engagement Panel on the 14th of April, which is now part of the public record and I've submitted as part of my testimony to you today.

And it reflects a sense -- it's not a decision by the communities; it's our sense of having talked with lots of different people in the communities about the views on a consolidated interim storage and some ways of moving forward. It is not intended to speak for the communities, but to help focus a conversation about how do we actually do this. Because I think a lot of people are getting frustrated with the difficulties at Yucca and they don't quite know

what to do. And one of the central arguments we make in that is we think the (indiscernible) California, more generally, but I think the CEC is the agent of the state, if you'd like. The CEC has potentially a critical role for articulating a state plan.

And this is very much a work in progress, this thinking. We are using this memo as a way to talk to a lot of different people and then report back to the Community Engagement Panel about what we're learning and then report back to you and others as to our sense of some ways forward.

Next slide, please. And this is my last slide.

So, as I see it, there are two broad elements of how we proceed next. First, at San Onofre -- and this a statement that applies to all decommissioning sites -- but at San Onofre, to articulate clearly what a defense-in-depth strategy means for the onsite storage systems.

So Dave Lochbaum showed you some diagrams, as did Manuel Camargo, of the different kinds of storage systems and the security and safety aspects of those storage systems.

One of the things we learned, the Community Engagement Panel, is that quite often it's easy for experts to become comfortable with these kinds of ideas because they understand all the technical things and they have some confidence in how the technology is going to work; that's not true for many members of the community, and understandably so. And so this needs to be articulated in plain English.

And one of the things that came out of the white paper that we issued -- that I issued last year reflecting a large and ongoing discussion inside the Community Engagement Panel is a request -- and Edison has said that they will honor this and I have checked with Holtec and they said they will honor this is well -- that over the course of the next year we articulate in plain English what this defense-in-depth system looks like so that we can confident that onsite storage, until it's possible to move the fuel offsite, an onsite storage is feasible.

The second major element is to prepare for consolidated interim storage. Here, as I said, we think the CEC is potentially a very

helpful role in focusing a California strategy. There are a lot of moving parts here and a lot details, and those are outlined more in the memo that I put into the public record.

We are not arguing that physical storage, that the physical consolidated interim storage facility, needs to be in California, although there is a range of views about this. Some people would like this to be a public facility. Some people think the private sector can supply that more efficiently. Some people think it needs to be in California. Other people are interested in what's been happening in Utah or now in west Texas, where you have private companies that have emerged to try and fill this space.

I guess I would summarize my personal view on this, which is, part of the reason we're in trouble at Yucca is because we created a monopoly on the business of permanent -- for a permanent repository. And when you create a monopoly like this, then you become hostage to whether the monopoly is going to function. And so we need to create as many options as possible.

Consolidated interim storage is not going

to happen automatically. It's an -- I think a very good idea for the logic that David Lochbaum outlined about the benefits of moving in an expedited way from the pools into dry cask storage and then into consolidated interim storage. And so that's a very, very important logic. But there are a lot of things that have to happen along the way that won't happen automatically.

If it's a private-sector solution or if the private sector is going to be viable, you need to create a credible incentives for investors to go off and build some of these facilities. There are a lot of important regulatory issues, transport issues, and on and on and on. Some of them might even include some legislative reforms, although at the federal level, that's very hard to do. And some of that relates, of course, to how you would move money out of a trust fund and use it for these kinds of activities, like consolidated interim storage. And we have some more discussion about that in the memo that I circulated.

I want to say one last thing about this, which is, there's also a large number of really

important technical questions that need some spadework. And where I think the CEC could at least help set up an agenda and a strategy for these technical questions to get addressed in the California context and then maybe in alliance with other states in the western states or southwestern states and so on.

Among those are the transport standards for rail and non-rail options; shipment sequencing, so how should -- we think which shipment should go first? Should we give priority to sites that are like San Onofre, now fully decommissioned? How should we think about moving the spent fuel? What is the timing for getting transport canisters and all the other technology that will be essential for making this work?

I want to just say one last thing in closing here, which is, one of the things that I've learned over the last year and a half in the Community Engagement Panel is that people are very worried about the continued onsite presence of the fuel. And a lot of people, frankly, are surprised that even though the plants, in our case San Onofre, the plant is being

decommissioned, that the fuel is staying there for the indefinite future because of all these problems at the federal level. And it is more than lamentable that the federal government has not been able to deliver, but it's also a reality that they haven't been able to deliver.

And I think I've been very encouraged to see the kind of broad coalition developing around the San Onofre communities, and I know around many other sites, around finding a solution to that problem. And this may be second-best, but, well done, a consolidated interim storage approach would be good for the local communities, would help with this larger policy of expediting the fuel out of the storage pools and into casks, and then out of the casks -- out of the local communities and into places where it might sit.

And it might end up sitting in these consolidated interim facilities for a long time until we get our act together at the federal level. But we have enough proof now that we're not able to get our act together at the federal level efficiently that I think we can no longer ignore the need to do the kind of careful spadework needed to take the good idea of

consolidated interim storage and make it into a reality. So, with that, let me stop and see if you have any questions and --

CHAIR WEISENMILLER: Yeah, I had a couple. And then I'll have some observations. First one is, in terms of -- so you have an eighteen-member committee that has a diversity of perspectives. What's the decision-making there? Is it consensual? I mean, how -- you know, you've indicated some of this you were talking for the three leaders, but I'm trying to understand is there any requirement to get more of a consensual agreement among all eighteen members, if that's possible.

MR. VICTOR: Now, that's a very important question. So we were not designed to make operational decisions. There are many layers of regulatory oversight on decommissioning where actual decisions get made about the use of trust funds, and the standards to be met and things like that. This panel was set up as a conduit to help promote the flow of information both ways. And so rather than encumbering that process with decision -- with formal decisions, we operate, in essence, through consensus.

As with anything of this magnitude, there are going to be some people who agree and some people who disagree. What we've committed to is to have a fair representation of the range of views and have that reflected in our documents and then use that as a way to help inform the public and inform the utility about what people care about.

CHAIR WEISENMILLER: Yeah, I was going to make the observation: Obviously, when the Energy Commission made its findings on nuclear waste storage in 1978, it was a historic moment. And, at that point, as we were dealing with, everyone was popping up saying, Well, the Germans or the Finns or, you know, someone is under control and they were going to have the geologic repository underground shortly. And, of course, we revisited these issues in 2005 and realized that no one really had made that much progress and that part of the Yucca problem was that it was not consensual.

I mean, you could talk about some of the technical or geologic issues on whether that was a particularly good or bad site, but when we were going through the process, the NRC had designated

a number of potential sites, and at some point it was just politically expedient to say, No, we're not going to look at New Hampshire, we're not going to look at Texas, that we can go all over -- over to Nevada. And, obviously, since then it's been a situation. I think certainly the (indiscernible) national academy or national groups are really -- and this comes back to the study that Holdren and Ramirez did at Harvard around 2000 and the update in 2005, that we really needed more of a consensual approach, that somehow finding a way to get a community to step forward and say, This is a good site, was critical. You know, otherwise, if we were to continue, say, to the Yucca path or whatever, you know -- and, as I said, just looking at -- in that 2005 -- you know, the 2010 period, it was pretty clear every -- every two years the thing slid, you know, another four years in the process. So I think the basic message of consensual is really critical.

I'm pretty skeptical about the ability to get any interim storage site in California. I look back at the Ward Valley experience where California could not permit a low-level waste

facility, which is, I'm going to say, infinitely easier -- I mean, it's an exaggeration -- than a high-level waste storage facility.

But, again, given the complexities, it's pretty hard to image a California site, so they're either left with the other sites in other states -- so even if it were a California site. The one thing we looked at in 2005, and I know David or someone talked about it, was that the experience in Germany when people were trying to move high-level waste around was something where you had massive civil disobedience, people saying that you just could not move it on that route. And the reality is, you know, these sites were not chosen for this. In fact, obviously, the Marines were really allowed to have their base back without any nuclear waste stored there and get back to their training mission, but at that this point it's there.

If we can come up with a storage bid, final or interim, then I think there will certainly be issues on transport. The Energy Commission has done a lot in the transport area. Obviously, there were high-level waste shipments from, let's say, military facilities to New

Mexico, some of that went through California, went to the West. And we were certainly involved in that part of monitoring that, you know, arranging CHP, you know, basically the testing. At this point, we've certainly given messages on routes we think people should not transport waste on, and also do some degree of coordination with the CHP and other state government groups to, again, deal with the safe transport.

But, again, there is -- there has been (indiscernible) waste transported through California. There may well be more, but none of it has been from the power plants themselves, aside from the railway transport from San Onofre and Humboldt to Illinois. But there's a whole different set of issues once you get to transport, I guess is what I'm saying.

I don't know, Lochbaum, if you want to comment on the transport.

I mean, we move a lot of dangerous stuff on highways, so it's not unique, but this certainly gets people's attention when you start transporting nuclear waste.

MR. LOCHBAUM: Certainly. And as Bruce mentioned earlier, that GE Morris facility has a

lot of spent fuel that came from commercial nuclear power reactors predominantly on the Midwest and Eastern Coast, but it was shipped to GE Morris.

More recently the Shearon Harris Nuclear Plant in North Carolina was licensed by the NRC to accept fuel from other nuclear facilities that were operated by that company in South Carolina and North Carolina, so it was shipped from those locations to Shearon Harris for a bunch of reasons.

So it is a thorny issue, but it is one we've faced before and we've dealt with. So it won't require any new lifting, just some paths that we've already used in the past that are somewhat bumpy.

CHAIR WEISENMILLER: Okay.

MR. WATSON: Can I comment briefly on that?

CHAIR WEISENMILLER: Sure.

MR. WATSON: I think the thrust of your two comments is exactly right. I, too, am skeptical of the California siting options, but I just want to report that some people are interested in the California options in part

because they think that that will give California greater regulatory authority and control, and some people are interested in leaving this on military bases.

And I guess what I've learned from this process is that these different views need to be heard and then we need some process, which is where I think the Energy Commission could be enormously helpful, especially given all the earlier work the Commission has done in this area, to pull this together in a set of views about how we could proceed.

And that relates to the second point that you made about transport. I think transport is going to be a hard problem. I think now that private firms see the prospect of making money in consolidated interim storage, we see lots of -- some ideas moving forward, and that's encouraging, but how you get from those ideas where you've got a consent-based local community willing to accept the waste to a whole string of communities allowing the waste to be moved through their communities, despite the fact that we already move a lot of hazardous stuff around, that's the part of the strategy that I think is

going to be the most difficult one and where, if we don't articulate this carefully -- again, where I think the Commission can play a helpful role -- if we don't do this carefully in the beginning, we could find that the whole idea of consolidated interim storage, that the idea comes undone.

CHAIR WEISENMILLER: Yeah. We had a hearing last year, I guess we had one again this year, on the sort of crude-by rail issues. You know, that certainly there's been a lot of public -- well, at this point, given the reality of where oil production is occurring, where pipe plants aren't where the loads are, there's a lot of oil being moved in trains. And a lot of trains aren't really designed to carry that crude. And there's certainly been a lot of work by California communities saying, Okay, let's look at the rail lines and look at what's right near the rail lines and start looking at how many schools or hospitals or people live in these (indiscernible) corridors, and then look at some of the consequences of accidents.

And, you know, certainly there's been some fairly lengthy permitting process. And you

can do comparisons of what's worse in terms of movement. But I'd say that the issue will not be trivial in trying to move stuff around.

I think the military base idea, I would say, certainly, we've done a lot of work with the military in California. They've been a key part of the California economy, the bases, you know, since 2008. And, certainly, they have a really valuable role in terms of the training mission where the kids going to desert warfare are being trained in California.

And at the same time the Presidential pivot is more to the Pacific from the Atlantic, and so there's a lot more shift of Marine -- bottom line is this is where the Marines are trained before they go to Afghanistan or wherever. So it's really critical to have very smooth training facilities for our troops going over there, and, at the same time, there's more build up on the bases for ships.

So it's -- again, as I said, if anything, when you talk to the military, their question to me is always, When can you get this stuff off of -- out of the way at Pendleton, as opposed to, Can we take any more in one of our remote bases.

So, again, it's not an easy situation.

But, yeah, I don't know the best forum, and, you know, it is one where, you know, San Onofre 1 was, I would have to say, in some respects remarkably quite. San Onofre 2 and 3 is much more -- you know, I assume Diablo would have a similar set of issues there. Humboldt, obviously, was an issue. That was the one where it was reported to have lost some of the fuel. And, certainly, there's a much higher tsunami risk at Humboldt than there would be at either San Onofre or Diablo, and, certainly, much higher than at Rancho Seco, but anyway.

Yeah. I don't know.

Peter, do you want to chime in at this point and give your perspective? We've laid out -- I think we've laid out a lot of the issues on spent fuel.

MR. LAM: Yes, indeed. May I begin my remarks or --

CHAIR WEISENMILLER: Sure. Please.

MR. LAM: Chairman Weisenmiller, I am honored to serve as the appointee of the Energy Commission to the Independent Safety Committee. Your trust and confidence is very much

appreciated. It has been a humbling experience for me to serve as the Energy Commission's appointee for the third term.

My remark --

Next slide, please.

My remark would be focusing on -- really, on the second -- on the third and the fourth items. The first two items are the five-thousand-pound elephant in the room on any policy discussions. It has been very well examined by everybody in this room and elsewhere. So my remark will really talk about safety of the spent fuel pool and the dry cask storage. And, if I may, I would strive to give you the most fundamental considerations in considering safety.

Next slide, please.

The NRC Confidence Rule has been around for 30 years. It's been (indiscernible) by two United States Circuit Court rulings; one, 35 years ago and then another one recently. It has been re-branded as the "Environmental Impact of Continuing Spent Fuel Storage."

The proponent of this technology would insist that the NRC Waste Confidence Rule is full of wisdoms and is well supported by expert

analysis and numerous research and studies.

The opponents would tell you that it is perhaps the triumph of hope over experience. Now the rule basically said, Trust a federal agency, like the United States Nuclear Regulatory Commission, that both short-term storage of spent fuel in the spent fuel pool and in dry cask storage is safe.

So the next slide, please.

Now the most fundamental consideration on spent fuel pool safety is as follows: There is not a containment structure to protect the spent fuel pool. There are fairly large radioactive inventory in the pool. The pools require constant and continuous and active cooling.

And in the past couple of decades, since we are running out of space to store them, the open-racking arrangement has been modified into high-density racking configurations. And to compound the issue of large inventory, you now had this specter being raised by some opponents that the zirconium cladding fire may happen.

The compounding comes from large radioactive inventory offered by some that may not be a great problem for you. But if you do

have zirconium fire -- *if* -- now the science and research is very ambiguous -- then there is the means of spreading them.

Now, to be fair, the NRC recently, as well as in the past, had examined this issue of spent fuel pool safety and has declared that storing nuclear spent fuel in the spent fuel pool is safe.

Also, the proponent has an important argument here, that there are fairly large water inventories there. In our business it's called "an inherent safety feature." It takes time for the water level to drop to about 10 feet above the spent fuel, it takes about 30 hours. In this business, 30 hours is infinity.

The next slide, please. The next slide, please.

Now, upon a disclosure, I, Chairman Weisenmiller, happened to sit on the licensing board 13 years ago to adjudicate the Diablo Canyon Independent Storage Facility. And I also happened to write the technical consensus opinion approving this facility's safety, these dry fuel storage.

The rationale of my approval is, the

cask, in the separate and different adjudicated proceeding, which is the Scott Valley Spent Fuel Storage proceeding the last eight years, the Holtec generic cask has been demonstrated it would not fall during an earthquake. Furthermore, if it were to fall, it would not break. And, furthermore, if it were to break, the amount of radioactive inventory in that cask is de minimis. And the mode of force for spreading that material is also again de minimis.

And one additional requirement at that time that I imposed on the applicant in Utah is that I wanted demonstration, if the cask is buried, it would not precipitate a major activity release. And that was provided to me and adequately persuasive.

So the inherent safety feature of the dry cask storage is, one, you don't have that much inventory. You have about 30 fuel bundle there relative to more than a thousand fuel bundle in the spent fuel pool. So you, basically, almost 2 (indiscernible) or less. And you do have the relatively robust structure of the spent fuel -- the dry casks. They typically weigh about 200 tons. And then, of course, you know, it only

require passive cooling.

Now, the last item is the diplomatic way of framing the issue of malice. Now, as everybody know, the NRC has a rule in practice: Do not entertain that issue in the public. And in some cases, justifiably so. For malice, we certainly do not want our adversary know about the plants' vulnerability.

And before 911, the NCR also has a rule of, some of this malicious action is considered not foreseeable. And with that phrase, "unforeseeable," the NRC, before 911, has systematically disallowed any litigation involving malice and they label it as "impermissible attack on agency rules." Now that may have changed a little bit after 911. But the point still is, the casks -- you put it in the open environment, of course, it is -- it has other vulnerability.

But, with that said, the inherent advantages do not get diminished by the last consideration, which I repeat, you have a relatively small inventory and then you have relatively robust structures and then you have -- only require passive cooling. So during any

potential, I will say, any potential intrusion into that system, the damages are relatively smaller than the spent fuel pool.

The next slide, please.

Now the Energy Commission has made numerous recommendations on the spent fuel pool. As recent as 2008 in the Integrated Energy Policy Report, the Energy Commission had recommended PG&E would return the spent fuel pool from a high-density racking arrangement into an open-racking arrangement.

And then as recently as 2011, the Energy Commission had also recommended to expedite the transfer of spent fuel from the spent fuel pool into dry cask storage.

Next slide, please.

The Diablo Canyon Independent --

The next slide, please.

The Diablo Canyon Independent Safety Committee had made numerous inquiry on the spent fuel pool safety issue. And (indiscernible) numerous fact finding team involving one member of the committee and a technical consultant who had a two-day meeting on site and also they (indiscernible) numerous presentation on the

requests of the Committee to the licensee, which is Pacific Gas and Electric Company, to present to the committee in a public meeting about spent fuel pool safety as well as how to expedite the transfer.

And then, again, in two separate annual reports, the Independent Safety Committee make recommendation consistent with what the Energy Commission's recommendations are.

May I go to the last slide, please?

Now there are policy and technical constraints on expediting the spent fuel transfer. The first one is post-911, the federal government, with the NRC, imposed spent fuel configuration requirements. More specifically, if you place a brand-new fuel in the spent fuel pool, it require neighbors to make sure it does not pose a criticality issue. If you put highly irradiated spent fuel into the pool, it also requires adjacent members to put a shielding for its radioactivity. And it's a company known has B5B. Now I have not been able to decipher that acronym, other than I know I came in through an NRC order. It publicly referred to a Section B, Subpart 5, and another Subsection B. So I was on

site at PG&E. I did not get an answer on that. I'm sure that plenty of experts here would tell me what it is so that I could learn my lesson there.

And then the waiting time is limited to about five years in the -- in the spent fuel pool. And to my surprise, I also learned recently the Holtec dry cask cannot accommodate all 32 bundles if all of them are exactly five years' old. So that would indicate to me that expediting it indeed had technical and policy barriers.

And then the other barriers could be easily accommodated by throwing money at it. I mean, they can hire more staff. They can build the pad more expeditiously. They can acquire the Holtec casks. I could see if they can make an offer to Holtec they cannot refuse.

So, in summary, I think the Energy Commission's recommendation on spent fuel pool safety makes a lot of sense. And I, for one, on the Independent Safety Committee would continue to follow their implementation and progress.

And thank you for your time.

CHAIR WEISENMILLER: Thank you. I mean,

I really appreciate your willingness and public service to take on this responsibility for another term. And I appreciate you representing me to the Diablo Canyon Independent Safety Committee.

I am going to provide a couple of things on perspective, just following up, Peter. One of them was, the Energy Commission Recommendation came out of -- there was a National Academy of Science study that I think was done in 2005 that dealt with potential fires, zirconium cladding fires. And at that point, we asked von Hippel to come out. He was obviously one of the grand old men of the nuclear issues. And he suggested Gordon Thompson instead. And they were both on that committee. And the thing that I found appalling, it was a national kind of sciences group of scientists, that basically the NRC, you know, figured that they were enough of a security risk, they never provided the science behind the NRC's determination and whether or not there was potential cladding fires.

And so they looked at it from the basic physics, convinced there was some danger there. And coming out of that, we concluded that, again,

you know, spend fuel, as you say, you have a lot of radiation, it's outside the containment vessel, all the reasons you talked about, but basically trying to expedite moving it into the dry cask was sort of our basic push.

And we would also note, I forgot to mention earlier, that on some of the nuclear waste issues -- I think it was in 2007 we had -- the then -- the eventual -- Allison Macfarlane, the eventual NRC Chair, came out and talked about waste disposal. But she has a very good book on the waste disposal issues and certainly has been on a number of the national panels that have looked at waste disposal issues that -- again, this is just generally for people to look at for more background in this area.

But, certainly, the transcripts and the presentations from the 205 hearings, I think David Lochbaum was here before that, or certainly somewhere online for the Energy Commission, and you can go back if anyone wants some more information on at least the basis for our recommendations, you can go back to that.

I think at this point we've gone through the panels, we're sort of transitioning to public

comment. And I'm going to suggest that we take a -- well, let's try for five minutes but maybe a ten-minute break. Go ahead.

MS. KHOSROWJAH: (Indiscernible).

CHAIR WEISENMILLER: Go ahead. No, that's good.

MS. KHOSROWJAH: Actually, I clarified with Valerie, that anybody who talked about LTPP, as I said in the beginning of the meeting, they don't have to file ex parte because there was a notice, a ruling. But anybody from any -- any other party who talked about any other open proceedings, like Edison, if you talked about the decommissioning proceedings, then you need to file an ex parte notice. That's what I said in the beginning. Just for clarifying, I want to make sure everybody understands that.

Thank you. Sorry.

CHAIR WEISENMILLER: Sure. So, anyway, let's take a short break and then we'll come back to Public Comment. And, again, I want to encourage people -- we're shooting for three-minute public comment.

(Off the record at 4:36 p.m.)

(On the record at 4:48 p.m.)

CHAIR WEISENMILLER: So we're going to switch over to Public Comment. And, again, we encourage everyone to shoot for three minutes. And I was going to say Donna has an enormous number of slides, so I was going to --

MS. GILMORE: I never planned on going through all of them, so don't get scared.

CHAIR WEISENMILLER: Anyway, I was going to have everyone pledge to read them all without making you go through them here. Go ahead.

MS. GILMORE: Okay, yeah. No, I made extra slides just for that reason, so people would, you know, be able to go and -- it's designed that you could just read them and not have to listen to me talk.

So, okay, go to the next slide. I'm going to be going faster.

Look at that canister up in the right. That's the underground canister that Holtec is planning for San Onofre. The green part is five-eighths-inch-thick stainless steel. And you see that air flow coming there to cool the canister? That little -- that thin canister is all that's keeping the radiation from getting out, in particular, if the spent fuel cladding is

damaged. So people see this big, thick thing and think we have all this extra protection, but there's actually air vents in there.

I'm going to skip this and go to the next one, just to speed this through.

Okay. This is new information that I don't think Peter had back those 13 years ago. In January 2014, EPRI, went to Diablo Canyon. There's a picture of the bottom. They went and they went through one of those vent holes, took the temperature of the canister in different spots, scraped the surface to look for sea salt, which is highly corrosive to the stainless steel canister. They found a temperature low enough -- they found sea salt and a temperature low enough to dissolve the salt. They call it deliquesce. And this is the precursor to corrosion and cracking of those canisters. And that's a two-year-old canister already has the conditions for cracking. Okay?

And according to Holtec CEO, Dr. Singh, who makes the canisters at Diablo, he does not recommend even attempting to repair the canisters and that millions of curies of radiation would be released from even a microscopic crack. Okay.

And there's no plan in place to repair the canisters.

Let's go forward. Next one.

Okay. There is no technology that exists today to inspect canisters for cracks that are filled with spent nuclear fuel. Now most of the canisters of this technology have been in use for less than 20 years. So it's a pretty immature technology.

And when they tell you that they inspect, it's a misleading statement. But the only way you can really inspect for cracks, the best way is you put a fluid inside, a dye, and see where the crack goes. You can't do that with these. Okay?

They don't have a monitoring, early-warning monitoring system, so we do not know when these canisters have a through-wall crack until after the radiation leaks into the environment. Okay?

Now, because we have so little experience with this particular technology, the NRC and their technical experts, they took other similar components at nuclear plants and they found, you know, they -- so we have experience on other

similar components made out of similar things.

Let's go to the next slide.

The Koeberg steel tank had a crack that's larger than the thickness of these canisters. And in 17 years, it failed. They have similar conditions to our coastal plants. They have ocean inland -- inland winds, incoming winds, high moisture, fog, and salt. And that's what you need to create the conditions for stress corrosion cracking.

Now Edison and Holtec will use EPRI's -- this report they did last year, but that report excluded onshore winds and surf from their analysis. So it wasn't a good study. And they eliminated mentioning this Koeberg plant. They eliminated mentioning their inspection of Diablo Canyon. So to base anything on that EPRI plant is not a good idea. Okay?

Now this plant that San Onofre wants to use, this is an experimental plant. It's never been used anywhere else in the world. And it's not like Humboldt. Humboldt, the pool cooled 35 years, so they didn't need to have vents to cool it. And they took that fuel in the thin canister and put it in a thick cask before they

put it in the underground hole. So it's a totally different system. Night-and-day difference. And that's been installed since 2008. So it's immature either [sic]. Okay?

Go to the --

And the Koeberg crack, the only way they found that was by using a dye test. That's the only way they found the cracks in that one. They said no other method worked.

Go to the next slide.

Okay. This is -- this is, you know things tend to get done if there's a deadline? Okay. Well, here is our deadline. All right. It's -- I'll go to San Onofre because that gets -- well, Rancho Seco gets ocean air, too, but we'll go to San Onofre.

So, San Onofre, the first cask was loaded in 2003. So if we -- if we're luckier than the Koeberg one, say give us 20 years, we've got about 8 -- we've got until about 2023 to do something about this or we have a risk of a through-wall crack with nothing that we can do about it.

MS. RAITT: We're going to need to wrap this up.

MS. GILMORE: Okay. So can I just go -- can we just skip a few so I can pick just one or not? No?

CHAIR WEISENMILLER: Yeah, actually, hit one and then we'll -- again, people are --

MS. GILMORE: Okay. All right.

CHAIR WEISENMILLER: This --

MS. GILMORE: Okay. So -- all right. I'll use this one.

The U.S. and all of the California ones use what I call the "thin" canisters. They -- the ones used in the rest of the world, pretty much, the international community, they either use an AREVA thick steel cask about 10 inches and then the ductile casks, (indiscernible) German casks, it's up to 20 inches thick.

And you can see the comparison. They're designed for longer-term storage. And in terms of a seal or a gasket, you can replace a seal or a gasket; you can't replace a crack in a canister.

And the thick ones have American certification. The U.S. ones we do, they don't even meet American manufacturing standards. They get exemptions for that.

So I think the only way we're going to survive having waste in California is we take -- is if we have in the CEC's policy to set user requirements, user standards, of what these canisters have to meet. They need to be inspectable, maintainable, repairable. And they need to keep the pools so if one of them fails we can put it back in the pool. Because that's the only way to do that now.

And I had one chart showing the --

CHAIR WEISENMILLER: Wait. Just point people to that page.

MS. GILMORE: Okay.

CHAIR WEISENMILLER: We'll go on.

MS. GILMORE: Okay.

CHAIR WEISENMILLER: I guess the one thing I would certainly encourage Peter to look at your slide -- I encourage everyone, but Peter in particular. And at some point, obviously, the NRC, again, we need to just get a sense of where we'll preempt it, you know, in this area. But, again, not --

MS. GILMORE: Well, we have the cost.

CHAIR WEISENMILLER: Yeah.

MS. GILMORE: Yeah. Yeah.

CHAIR WEISENMILLER: So Bruce Gibson.

MS. GILMORE: I have to mention one word. There is no license yet for Edison to use the Holtec. That was approved for low-seismic areas. They have to submit a license amendment for that.

UNIDENTIFIED MALE SPEAKER: (Indiscernible).

MS. GILMORE: Yeah. Okay.

CHAIR WEISENMILLER: Okay.

MR. GIBSON: Thank you, Mr. Chairman. I am Bruce Gibson. I'm the Second District County Supervisor for the County of San Luis Obispo, and I'm pleased to be here to offer you a little local perspective on the question of spent fuel transfer.

We are on record as supporting speedier transfer of spent fuel from pools to --

CHAIR WEISENMILLER: Uh-huh.

MR. GIBSON: -- dry casks. And I've looked into Rule B5B a bit. And it notwithstanding, I'm not convinced that there wouldn't be a way to move more quickly to the more secured dry cask storage.

That costs money, and Dr. Lam's suggestion of throwing money at the problem, I

think the increased safety is worth the discussion of the benefit that it might produce.

I also serve as our County's Representative to the Independent Peer Review --

CHAIR WEISENMILLER: Uh-huh.

MR. GIBSON: -- Panel by virtue of the fact that I have a doctorate in seismology. And I wanted to speak, offer you a couple of comments to questions you asked of the first panel. And the question, first of all, what did we lose by not being able to conduct the high-energy offshore surveys.

CHAIR WEISENMILLER: Uh-huh.

MR. GIBSON: I think the answer is, we're not sure. Because we're not sure exactly what those surveys would have produced. But in the interim, other issues, specifically, the site conditions around the plant, have cropped up that are, in fact, more affected on overall seismic hazard than some of the questions that we were looking at offshore. That speaks to the wider uncertainties at the top of the revised tornado diagram that you saw.

CHAIR WEISENMILLER: Uh-huh.

MR. GIBSON: You know, as to whether PG&E

is using the state of the art, they are in most instances here. The offshore images are striking in terms of finding out the -- the Hosgri Fault. Those are remarkable images. But the state of the art applied on shore, the land surveys, did not produce useful seismic images. And we have to remember that technology can only go so far. Its application in difficult logistical situations like the topography of the Irish Hills or in complex geology such as the Irish Hills had, don't guarantee a useful seismic image or greater understanding of geology. And Mr. Wills spoke to the conclusions of the IPRP on those matters.

You know, AB 1632 was optimistic --

CHAIR WEISENMILLER: Right.

MR. GIBSON: -- that application of technology might be a very good solution here. But sometimes it works and sometimes it doesn't.

The same is true with the detailed investigations of the velocity structure immediately around the plant, which is really now the controlling issue: What are the site conditions there?

And, as Mr. Wills indicated to you, the

issues that are at play now in further trying to reduce the uncertainty in seismic hazard are going to take some years to resolve. The question of a site term, how this site responds to earthquakes at various azimuths from it, very important. The detailed structure of the geology directly underneath the plant, again, is not resolved at this point.

And I appreciate your interest in bringing these issues to the front.

Thank you, sir.

CHAIR WEISENMILLER: Thank you. Thanks for being here.

Larry Chaset.

MR. CHASET: Good afternoon, Chair Weisenmiller, and participants.

I'm Larry Chaset with the firm of Keyes, Fox and Wiedman, and I'm here today representing Friends of the Earth.

I'd like to make a comment on couple of points from the first half of the afternoon.

Number one has to do with the State Water Resources Control Board's look and see at whether or not Diablo Canyon should be exempted from the once-through cooling requirements.

Mr. Bishop's presentation talked about a report that was done by Bechtel, but what his presentation left out was the fact that at the hearing -- that the Water Board held a public hearing late last year. Friends of the Earth presented to the Water Board a very detailed, sophisticated, expert study that concluded that cooling towers could be installed at the Diablo site for less than $2 billion, and, you know, really in the matter of months and certainly a few years.

So that study and the supporting materials are part of the record before the Water Board. And I would encourage you to obtain those reports, that study, for your record in this proceeding. It's really important to understand our perspective as the Water Board should in no way ever grant PG&E an exemption from the once-through cooling requirements.

If they were to do so, it would be the -- basically running a giant hole through the needs of the state to protect the marine environment. It would be the exception that swallowed the rule.

The second point I want to make follows

on a couple of things. One, I would like to thank Rochelle Becker for putting Commissioner Florio's quote up on the screen for you.

When the Commission acted on our petition to try to get PG&E to start looking seriously alternatives to Diablo, Commissioner Florio -- despite the fact they rejected petition Commissioner Florio stated very clearly on the record of the proceeding that we a need long -- short-term and long-term plan for dealing with the nonexistence of Diablo Canyon.

So even though our petition wasn't immediately adopted by the CPUC, Commissioner Florio indicated the need for the exact questions that we asked the Commission to look at to be explored.

And so our ask of you today is to recommend to the CPUC that it open an investigation at the earliest possible time in which evidence can be presented to prove that a prompt replacement of Diablo Canyon with preferred resources best serves the interests of California customers by providing reliable renewable electricity at the lowest possible price.

It's really curious you know, the PG&E, they say, "safe, clean, reliable," the resources that can replace Diablo are safer, cleaner, and more reliable.

Thank you very much.

CHAIR WEISENMILLER: Thank you.

I would note in prior IPRPs when we've had this workshop, Commissioner Florio has been on the dais with me. Actually, one of them Commissioner Sandoval was also up here. But that with the PUC ex parte rules evolving -- you know, obviously, Mike felt he couldn't be here today.

MR. GIBSON: Yes. And I used to work at CPUC, as you know, and the ex parte rules have gotten pretty interesting.

CHAIR WEISENMILLER: Yeah. Okay.

But, anyway, I would note that.

Let's go to Mr. Nelson of Californians for Green Nuclear Power.

MR. NELSON: Good afternoon, Chairman Weisenmiller. My name is Dr. Gene Nelson, and I serve on the faculty of Cuesta College, Physical Science. I have a PhD in radiation biophysics.

I'm going to modify our most recent filing. I basically put together a cover letter.

I talked about an article about our group. And I want to compare and contrast our group, Californians for Green Nuclear Power, with some of the other groups you've been hearing from at this meeting and other meetings like it.

CHAIR WEISENMILLER: Okay. Now I would note for everyone, if you have written comments, you don't have to read those at this point.

MR. NELSON: I understand that.

CHAIR WEISENMILLER: Okay. Thank you.

MR. NELSON: So I'm using them simply as a guidance. So I appreciate the interruption.

We are not dependent on intervener dollars, as many of the groups in here are. We do not receive intervener dollars, whereas, other groups, we've found, receive hundreds of dollars an hour to have their attorneys come and talk to you about the benefits of shutting down a nuclear power plant.

So, for example, we have -- the biggest intervener group for SONGS was a group called TURN, The Utility Reform Network. And they're estimated to receive over $7 million via the intervener system, and the ratepayers are going to be stuck with over $3.3 billion in additional

costs to make up for the power that SONGS was providing. And, of course, there's also already the escrowed costs for the decommissioning at $4 billion. A huge, huge cost. They're going to have to put in additional electric transmission capacity.

The same kind of thing, I think, is in the works if we, for example, fail to take the commonsense approach of utilizing the Appendix A recommendation from the State Water Resources Control Board for alternative compliance so that we can keep that powerful, reliable, power flowing into the grid from Diablo Canyon. California desperately needs that power. It's used, among other things, to recharge that huge battery called Helms Pumped Storage at night.

So we, essentially, have the equivalent now of three reactors during the day to help keep our grid matching supply with demand. That, in common term parlance, is exactly what grid stability is about.

So, again, abundant emissions-free power so we don't get into -- right now, we're a situation that's being exacerbated by global warming. We have a massive, persistent

high-pressure area that's preventing -- it's basically called "Omega Blocking" -- and it's preventing the Pineapple Expresses from hitting California and giving that lifesaving water to us; instead, it's going somewhere else. And that's because of global warming, because our PPMs for carbon dioxide now are well above 400 parts per million. That's trouble. And that trouble is being exacerbated. For example, we look at what's happening with the SONGS closure, well, we have to run the Four Corners a lot more. Bad news.

CHAIR WEISENMILLER: We run as plants; we don't run Four Corners for it.

I would note, we do not provide intervener compensation for any of you here --

MR. NELSON: I understand.

CHAIR WEISENMILLER: -- so don't think about it.

MR. NELSON: I understand.

CHAIR WEISENMILLER: Okay. Let's go on to the next member of your group, Bill Gloege.

MR. GLOEGE: Hi, my name is William Gloege. I'm from Santa Maria, California. Thank you very much, Chairman, for this hearing.

We are unpaid, volunteer citizens. We're educated. We've got four PhDs on our group. I've got a degree from Northridge and a Master's from Georgetown University. So, you know, we're concerned professionals, I guess you could call it, unpaid. We have not applied for intervener funds or any other kind of funds. I've got two grandchildren. I've got two children. That's why I'm here. I think this the most important Commission in the State of California by far because it impacts energy, and the kind of energy we use nowadays is mainly fossil fuel energy, as you well know.

Even the State of California, God bless us, a lot of CO2 is going up into the atmosphere. Fifteen million tons of carbon have gone into the atmosphere with the closing of San Onofre, sadly, sadly enough.

Diablo Canyon has prevented 210 million tons of carbon going into the atmosphere. This is our most important fight now. This is humanity on planet Earth. Says who? James Hansen, the top environmental scientist on NASA, now retired. Says who?

James Lovelock, a member of the Royal Society in

England who discovered the ozone hole solution, the reason and the solution. So a lot of top scientists say we better watch this one.

And you, Mr. Chairman, and your group is at the nexus of this for California. I would love to see California be a leader to lead us into a new form of power that is emission free. And we got it. We got it right here. I've toured Diablo Canyon four times looking for failures, problems, weaknesses. It's a wonderfully run plant, with really top professionals. I've got no stock in PG&E. I've got no ties whatsoever, except I live on this planet. I think it's a nice planet. I really like it. I'm attached to it, and my grandchildren are, too. So that's what's at stake here.

And looking and parsing these little, you know: Will it leak? Will the cask crack or not and when? You know, it just breaks my heart to hear this stuff. Once-through cooling, I went to the Butch Powers, who is the President of the Port San Luis Fishermen's Association, I said, "Mr. Powers, have you been decimated by what Diablo Canyon's done? And he said, "What are you

talking about?" I said, "They're saying that the fishing industry is decimated, and they put that out all the time." He said, "No. We're doing great. We're booming." I said, "Yeah, about what about Diablo Canyon?" He said, "No problem whatsoever." He said, you know -- he's doing great, and he wants to keep doing great.

So there's all these charges, one after the other, and fossil fuel has got some big friends and some big stakes in the game.

When San Onofre closed, fossil fuel started putting a lot of money, millions, into their pockets. So we got to look at -- follow the money, I really believe in it.

Thank you very much for your hearing and thank you for your work --

CHAIR WEISENMILLER: Okay. Thank you.

MR. GLOEGE: -- on behalf of the State of California.

CHAIR WEISENMILLER: Let's go to the last member of Californians for Green Nuclear Power -- the last one here, excuse me.

MR. IVORA: Thank you.

My name is Joseph Ivora. I'm a retired PG&E employee. I worked out at Diablo for

15 years. And I'm just here making sure that the nuclears sees -- the people see how great it is. I mean, it's the safest in the U.S. Nobody has died in the U.S. Look how many people have died from other forms, especially, fossil fuels. Look at how reliable it is. You know, between 90 and 100 percent. I mean, unbelievable. Thirty of this, almost. Thirty years. How many other forms of energy producers can say that?

And as far as low cost, no emissions either, there's no pollution of water or the air. So I'll make it short. Thank you.

CHAIR WEISENMILLER: Okay. Thank you. Ben Davis, please.

UNIDENTIFIED SPEAKER: Can we go back up?

CHAIR WEISENMILLER: No. Once for each. Your three minutes are shot.

Ben.

MR. DAVIS, JR.: Thank you.

I'm Ben Davis, Jr., from California Nuclear Initiative, and thank you for the opportunity to address you today.

I was here hoping to address some questions to PG&E's seismic experts because I am primarily interested today in lessons learned

from Fukushima. And the seismic experiments and updates that they did are basically a result of trying to learn lessons from Fukushima, and yet their report is worded in such a way that it's very difficult to tell what those lessons are because those lessons are not framed in terms of Fukushima. So I'm going to try to give some of the benefit of what I've learned about that up until this point and how I would like to see PG&E's report framed.

Largely, Fukushima was misunderstood because people concentrated on the fact that there was a 9.0 earthquake and that Fukushima's plants were only designed for 7.9. That's completely misleading because it gives you the impression that Japan did not know that they were vulnerable to this earthquake. The truth is -- and I learned this from the Japanese Nuclear Regulatory Authority, who is -- I was referred to by our NRC.

They had done studies that had determined that the plant could be subjected to .6 g's of ground-shaking, and those studies were completed over a year before Fukushima's earthquake happened. Fukushima was only hit by .4 to .5

g's, so less than they knew it would be hit by, by a 7.9 earthquake, and only about half of what PG&E's report says Diablo Canyon can withstand. I think that's an important fact to remember now, that Fukushima, as this Commission reported in its 2011 IAPR, was leaking radioactivity before the tsunami ever hit. Basically it failed because of the earthquake. And our Nuclear Regulatory Commission doesn't know why and isn't looking into why.

The question I think that we need to focus on more than earthquakes -- we already know they're somewhat unpredictable and I think it was shown today that PG&E standards for this were all -- everything was used to minimize our earthquake hazard. What we really need to look at is the science of predicting what our nuclear reactors can withstand. And the biggest lesson we could learn from that is what happened at Fukushima, and yet our NRC does not have access to that information and is not looking into it. That is where the science should be put: Not looking at earthquake predictions, but looking at whether or not Diablo Canyon can really withstand 2 to 3 g's -- or 2 to 3 times the amount of

ground-shaking that Fukushima was exposed to.

Thank you very much.

CHAIR WEISENMILLER: Okay. Thank you.

Nancy Nolan.

MS. NOLAN: Hi. I would like to make a comment that the myth that is used when I hear a statement such as "nuclear is clean" is if when you close a coal fire plant down, then it ends, the CO2 doesn't go in the air. But the storage for irradiated fuel, also known as "spent fuel," lasts for hundreds of thousands of years. How could anyone possibly consider that as being clean?

And radiation is not compatible with life. It destroys the DNA, as far as I'm concerned, from what I've read. And maybe other people on the panel here have more experience and can testify to that.

But I just looked at Donna's, her example of the thin casks that is proposed for San Onofre and the casks that are used in Germany, 20 -- 20 inches versus -- this is how thin San Onofre's is? Aren't we as good as Germany? Can't we get that? I mean, I think we should pay for that and, you know, at least it would help for a

period of time, not 200,000 years.

But that's my comment.

CHAIR WEISENMILLER: Okay. Well, thank you. Thanks for being here.

Sandra Bauer.

MS. BAUER: I want to thank the Commission for letting me speak today. I'm representing Citizens' Oversight, a group, and they are located in El Cajon, California. My remarks will be addressed primarily to the San Onofre Nuclear Power Plant.

I've listened to the remarks today, and there's a wealth of scientific information that has been produced. I'd like to summarize, by making the observation that, no matter how much we know about earthquakes or don't know, we know that, in California, we have earthquakes and we know that our coast is also susceptible to tsunamis.

And so I think that we should try to narrow our decision-making in what to do with spent fuel by recognizing that it really should move off the California coast.

My group suggests that there should be a permanent offsite facility in California, managed

by either the DOD or a state agency. That is what they're -- that's their basic proposal.

I, myself, live in Sacramento, and I have had experience with Rancho Seco in the past. Just wanted to say, they were opened in 1975, they were closed in 1989. It's taken 20 years to just close the plant.

I applaud the work that this Commission -- Committee is doing right now, because I think California can be a leader in a very large problem which we have facing us, which is the resolution of where to put the nuclear waste that we are generating.

It's going to be breakthrough thinking. And it's probably the largest public health issue we have in the world. I can't think, when I think of my family, what greater peril we could face then a catastrophe such as occurred at Chernobyl and in Japan.

And I think that we have to come to some kind of consensus fairly quickly about it. And I think it's going to come out of commissions, such as this one, in California. And I look forward to the work that you're going to do because I think it is so critical to our future safety.

CHAIR WEISENMILLER: Thank you.

Let's see. I'll confess, the day is long or the writing is bad, but the gentleman from the Thorium Group. Alexander Cannaro [sic], right?

MR. CANNARA: Cannara, yeah.

CHAIR WEISENMILLER: Okay.

MR. CANNARA: Thank you.

I'm Dr. Cannara from Menlo Park.

There are a few problems that I've noticed in the discussion going on here today. Some of them actually have to do with some errors in assessment of what the science is. For example, nuclear waste is not what comes out of a power plant after the fuel is termed to be spent. Ninety-five percent of what comes out of a power plant like that is not waste at all, but plain-old uranium, pretty much in the same condition as it was when it was taken out of the ground. Four percent of it is fission products, which are very radioactive and dangerous, and that's waste. About one percent of it is plutonium, a mixture of isotopes, which cannot be used for weapons.

So I think that it's important for people to understand, and that this Commission should make clear, that when we're talking about moving

spent fuel to storage, we're actually wasting a great resource that's going to be used in the future for advanced power reactors, as China and other countries are working on.

So the uranium that comes out, that's 95 percent of what went into the nuclear power plant's fuel. It should be saved and should not be thrown away or buried forever, because there's no need to do that.

The other thing I would mention is that, our problem in California is that we apparently think we know what we're doing. Here's a diagram that explains how a waste decay goes. You can take it and pass it around. You can keep it as part of the record. It shows why the spent fuel taken out of a reactor is very safe to use in the dry cask storage, if you want to do that, if you don't want to recover the (indiscernible).

The other thing that I want to bring up is that we are endangering California's reputation in the world by doing things like increasing our emissions for Earth Day last year, because we allowed the San Onofre plant to be closed for no particular good reason. So the rest of the world looks at us and they say,

"Well, wait a minute, California is supposed to be very green, but now they've increased their emissions because they didn't bother to fix a nuclear plant that needed the same thing that an Ohio nuclear planted needed last year." It was fixed for $600 million. The same problem with the steam generators. And it eliminated a few coal plants in operation; whereas, California is causing gas to be burned, for sure, maybe a little coal because we simply didn't really think of the value that San Onofre provides.

And the last thing I want to say is simply that we're building a Carlsbad desalinator. That's going to take 400 -- it's going to take hundreds of megawatts of power. And it's only going to serve seven percent of San Diego County's water needs. How are we going to meet San Diego County's water needs, right?

So here is how we've made the international --

MS. RAITT: Okay. Wrap it up.

MR. GLOEGE: -- an international magazine's front cover showing California lacking water. Eleven trillion gallons of water we're short in precipitation, and the Water Board says

we have about a year left of water if it continues that way.

So I think we need to actually get a little more scientific and environmental view of what the importance of nuclear power is to California. It's exceedingly important. Thank you.

CHAIR WEISENMILLER: Okay. Thank you.

David Weisman, please.

MR. WEISMAN: David Weisman, Alliance for Nuclear Responsibility.

Two quick things. I just came from the Assembly, would like to ask this Commission's support of AB 361. Assemblyman Achadjian just passed out of a Utilities and Commerce -- puts in place a stop gap -- there was going to be a sunset of the emergency planning and offsite responders in San Luis [sic] County 2019, but the plant is licensed until 2025. This bill would keep the funding mechanism in place to keep emergency responders in San Luis Obispo County through the licensed life of the plan. So I'd like to ask this Commission to support SB 361 [sic]. There's another bill -- that's AB 361.

SB 647, Senator Monning would make

permanent the Independent Peer Review Panel of Chris Wills and Dr. Bruce Gibson, which is itself set to sunset by contract at the end of 2015. I think that bill becomes an important one because that independence of independent peer review is something to be valued as opposed to PG&E's idea of independence and what independent review means.

And I will take no more time. I have a two-and-a-half-minute prepared video, which I will let them click on, and we will let PG&E answer in their own words as to what they think independence of peer review means as opposed to what we get from the state's appointed Commission. Thank you.

MS. RAITT: And I actually apologize. I won't be able to play the video. We don't have it set up to be able to do that. I'm so sorry.

MR. WEISMAN: Oh, I thought we tested that out earlier.

MS. RAITT: We didn't have time to test it out.

MR. WEISMAN: Very well, then.

CHAIR WEISENMILLER: Okay.

MR. WEISMAN: I will tell you where --

CHAIR WEISENMILLER: Wait. Can we post the video online?

MR. WEISMAN: Actually, it's on --

Are you on the Internet there? Are you?

MS. RAITT: I can --

MR. WEISMAN: It's on YouTube. We could stream it right off of YouTube. We had the file delivered earlier today.

CHAIR WEISENMILLER: I'll tell you what, why don't we move on to the next speaker while they work on the technical issues.

Jean, please.

MS. MERRIGAN: Hi, there. I'm Jean Merrigan.

And, let's see. I'll say I feel somewhat overwhelmed by -- as much by all the disparate interests represented here today as by the complexity of the problem itself. But I'll make a little comment, a few comments, about things I heard that perked my ears up.

One was -- are you Mr. Watson? Bruce Watson? Oh, guess I heard you say that the storage canisters will be rigorously tested for leaks. And that sounded nice, but I'd like a whole lot more detail on what that rigorous

testing will be, because it doesn't -- I mean, when I think of rigorous testing -- well, I would like to have more details to know that it really lives up to those words.

And, also, you talked about the Holtec system at Humboldt Bay. You just said very quickly that it was similar to the Holtec system that is now being suggested for San Onofre, but, actually, those are totally different situations and the equipment itself is different. When you say "similar," that's a vast overstatement. So that perked my ears up, too, because it's so easy to come here and just make statements without much backup.

And then the other thing that I heard, and I was just curious, was during the Diablo Canyon seismic update, I heard Chris Wills say that somehow the modeling that they're now doing doesn't match PG&E's old modeling from the '70s. And I hope there will be some follow-up to that because, given a lot of the other falsifications that have gone over the years having to do with Diablo Canyon -- I just heard what I heard. Oh, that's interesting. I wonder what PG&E submitted in the 1970s.

Thanks.

CHAIR WEISENMILLER: Thank you.

Is the video ready or --

We have one more in-the-room speaker.

MS. RAITT: If you can just give us a moment, we'll try to get the video --

CHAIR WEISENMILLER: Okay. Well, why don't we get to Mary Beth.

And if you can be patient, if he actually gets it going. But why don't you start talking. Why don't you talk. Please go ahead.

MS. BRANGAN: Hi. I'm Mary Beth Brangan from the Ecological Options Network. And I just wanted to bring up a couple of points. First of all, to the point that so many people here are ardently expressing that nuclear reactors are greenhouse gas emission free. That is so erroneous from all of the -- from all of the required fossil fuel input to construct such a plant. And then if you add in the incredible amount of fossil fuel input in dealing with the waste, which is never -- it's always ignored, it's not greenhouse gas free.

And then, to boot, it's also allowed - Carbon-14 is one of the legally allowed emissions

for nuclear reactors, and that's not only a greenhouse gas, it's radioactive greenhouse gas. So just think about that.

Also, I wanted to bring out that the Holtec license that the NRC has allowed for the San Onofre site, it only requires them to be responsible for 20 years. And after 20 years, they're off the hook. They're not thinking in terms of anything longer than 20 years. And the NRC, when questioned about that said, "Well, after 20 years, it's out of scope."

So please do compute that with all the other things you have to think about.

CHAIR WEISENMILLER: Okay. Thank you.

And the video?

(Pause.)

UNIDENTIFIED MALE SPEAKER: Oh, well. Technical malfunction with the video. Sorry about that.

CHAIR WEISENMILLER: Again, if you want to give us the link to YouTube, and we can put that on the Net for this hearing, at least in the docket.

Okay. Do we -- Heather, do we have anyone on the line for comments?

Well, actually, let's start -- my presumption is, everyone in the room who is going to have comments has spoken, and so now we will go to the telephone lines to see if we have anyone there.

MS. RAITT: Right. So we do have one comment on WebEx that the person asked me to -- or asked us to read into the -- read for them. So I will do that. It's from Gary Headrick, and his comment is as follows:

"As a leader of the citizens' group San Clemente Green, consisting of about 4,800 local residents interested in sustainable living, I'd like to lend our support to policies being recommended by Ray Lutz, Donna Gilmore, and Ace Hoffman.

Simply put, we feel that the recent investigation into the CPUS and Edison calls for a special committee or summit to be formed to better represent the public's interests.

The reasons for the failure at San Onofre still need to be determined. Our preferred dry cask storage is a CASTOR type because of the advantages they offer for longer storage life, inspection features, and transportation

capability.

Finally, with what we now know about the industry's inability to anticipate or predict beyond design-bases events, there is no justification to continue operating Diablo Canyon.

Thank you for considering our comments -- our concerns." Excuse me. "Gary Headrick."

And we have two more.

CHAIR WEISENMILLER: Okay.

MS. RAITT: So, Ray Lutz, we'll open up your line. Ray?

CHAIR WEISENMILLER: Please, go ahead.

(Pause.)

MS. RAITT: Okay. David Victor, are you available?

(No audible response.)

MS. BURCHMAN: No, my name is Patricia Burchman. Yeah, is it my turn?

MS. RAITT: Go ahead.

CHAIR WEISENMILLER: Go ahead.

MS. BURCHMAN: Thank you. Thank you.

I appreciate the California Energy Commission taking a leadership role. This is real important that you are here to represent

stakeholders in California. One of the things that I'm critical of as far as San Onofre is the (indiscernible) that SCE has forecasted for emergency-plan estimates. Their analysis relies on totally --

CHAIR WEISENMILLER: If you have a speakerphone, if you could turn off -- if you could just pick up the landline.

MS. BURCHMAN: Do you want me to --

CHAIR WEISENMILLER: You got an echo. You got an echo. Keep going, but there's an echo.

MS. BURCHMAN: Okay. Do you want me to --

CHAIR WEISENMILLER: Keep going.

MS. BURCHMAN: -- turn off the phone?

CHAIR WEISENMILLER: Heather, do you know?

MS. RAITT: I don't. I'm sorry.

CHAIR WEISENMILLER: Okay. Just keep going. We're --

MS. BURCHMAN: I'm sorry.

CHAIR WEISENMILLER: No. That's fine. Please.

MS. BURCHMAN: Anyway, the time estimates

that Edison has prepared for emergency conditions reflects an overly optimistic capability for a human, one of the Edison employees, to perform complex and difficult tasks, sequences of human operators under ideal conditions (indiscernible). Their time (indiscernible) that they're capable to respond -- have a human response with lots of -- have to have the pool emptied. If the pool -- cooling pool is drained, (indiscernible) there's a real critical time frame for restoration of cooling systems. And the plan that Edison has prepared is totally unrealistic. (Indiscernible) two different sequences that an SCE employee would be required to perform. And they're supposed to have pre-staged equipment and supplies on site, which are probably not even located near -- near the smallest (indiscernible).

So imagine if there were an earthquake or a large seismic event, they are going to have to deal with not only onsite damage, but let's look at infrastructure, like freeway bridges and the I-5. Okay. If they're bringing offsite supplies to bring water in water (indiscernible) tanks to refill the cooling pools, what if the freeway

overpass is damaged and, you know, the traffic is not able to be, you know, traveled to perform this. That's a definite risk not solved.

Thank you.

CHAIR WEISENMILLER: Okay. Thank you.

Who is next on the line?

MS. RAITT: Okay. We'll try -- Ray Lutz, are you there?

MR. LUTZ: Can you hear me?

MS. RAITT: Yes, thank you. Go ahead.

MR. LUTZ: Can you hear me?

MS. RAITT: Yes. Go ahead.

MR. LUTZ: Okay. Good. All right. Great. Thank you.

Yes, this is Ray Lutz with Citizens' Oversight and I'm in San Diego. We view the lack of plans for dealing with nuclear waste as one of our most pressing problems. I did send in a thirteen-page detailed letter which we can also -- anyone from the public can download from citizensoversight.org.

San Onofre is particularly poor for a long-term storage. The public never agreed to having, basically, these permanent waste dumps where these reactors are. It's very corrosive

salt air. It's a tsunami inundation zone. We have high earthquake risk and terrorist access unlike any other plant.

The canisters that they're using were designed with short-term storage in mind. These canisters with not designed for long-term storage. So they should be -- all reconsidered. And we need to do this now, because decisions are going to be made on the decommissioning of this plant.

The underlying philosophy that we'd like to promote is that states should be responsible for their own waste. I think this is only fair. And we'll encourage states to recognize that when they put these nuclear plants in, they're going to have to deal with the waste. We differ somewhat from the Victor, Brown, and Stetson paper, which is not a CEP paper but individual positions, because CEP can't have a position, and that we believe that it should be in California. But, at this point, we're asking the CEC to spearhead a project to have a nuclear waste summit to actively and seriously consider all of the issues. And this short meeting with a few comments by the commissioners about what you

think about it, is just not enough.

I've heard a few comments about how Ward Valley was not good and so forth. I mean, Ward Valley was just a bury-it-and-forget-it plan. These ISISs (phonetic) are actually carefully built and in subcontainers. Very different.

We believe that probably an environmental damaged area, not a new, pristine area, would be the place to put it. And we also need a moratorium on building something new. This Holtec proposal is a -- you have to build it all at once. They should finish using the new home's bunkers and the foundations before they start building a huge thing because we'd like to see the waste moved quicker now rather than later.

And there needs to be a balance here between maybe it isn't the best move too quickly put them in canisters if we have an offsite solution awaiting for us in the wings. This hasn't been considered enough. And so I encourage you to take a look at our carefully written letter and take a look of our views. And I would be happy to discuss those with the Commission in the future.

Thank you.

CHAIR WEISENMILLER: Thanks.

Anyone else?

MS. RAITT: We have two more. Next is David Victor.

UNIDENTIFIED MALE SPEAKER: Pardon me, Dr. Victor (indiscernible).

MS. RAITT: I'm sorry. Oh, excuse me.

CHAIR WEISENMILLER: Okay. He already did. Right.

MS. RAITT: I'm sorry.

Okay. Richard Margo.

MR. MARGO: Hello? Can you hear me?

CHAIR WEISENMILLER: Yes. Go ahead.

MR. MARGO: My name is Richard Margo, and I'm from Ramona, California.

I'm quite concerned with the storage of the nuclear waste and dry cask systems in San Onofre, based on the fact that they'll be so close to the ocean and exposed to salt air, which is known to accelerate chloride-induced salt corrosion cracking.

I think that there's a great alternative in the thick casks that are also more moveable later on.

Part of the problem with the thin

canisters is that they need to have a concrete -- a thick concrete over-pack, or encasement, for a radiation barrier, and that's a huge investment in infrastructure. That infrastructure then remains at site if there's any reason to move the material. If you look at how much that infrastructure is going to cost, it's pretty significant in the overall cost of the site.

Movement of the material is of paramount importance in decisions on deciding what way California goes in making a decision. There's a number of ways that the material could be moved that aren't necessarily planned.

Any terrorist activity that's successful anywhere in the United States would prompt an effort to try and move the material. And if it's in thin canisters, you have to install the infrastructure at the new site before you can move the canisters. Where if it's in thick canisters, you can move the -- or the thick casks, you can move those casks almost immediately to a site that doesn't require any infrastructure installation. Put them on sand for a while until you can figure out where you're really going to put them.

Additionally, there's a lot of talk about trying to get a consolidated interim storage site going. And so there may be some actions taken by the CPUC or the CEC to make that happen, and -- which I have mixed feelings about.

But then I think there's also another possibility for movement of the fuel, that may accelerate the movement, that is completely unpredictable, and that would be a California initiative that could be on the ballot as soon as 2016 that would require that the fuel be moved and that that would have to be something that the State of California would then have to address.

So there are many different reasons of why and how the fuel could be moved. And I think any decision that the state goes to decide to store this material needs to consider the plethora of reasons that the material might need to be moved and plan for that in the beginning rather than having to wait and wonder, "Well, I don't know, we'll probably never have to move it. Just leave it on the beach. Who cares?" That's not the right answer. We need to be planning on moving it and put it in good thick casks.

Thank you.

CHAIR WEISENMILLER: Thank you.

Anyone else?

MS. RAITT: I'm not certain if Ace Hoffman was (indiscernible) to make comments.

MR. HOFFMAN: Can you hear me?

MS. RAITT: Yes.

CHAIR WEISENMILLER: Yes.

MR. HOFFMAN: Oh, okay. Good. I want to thank you for having -- for holding this hearing, but I think that what you really need to take away from it is -- and I went over this in a letter that you hopefully got and can be included, yesterday or this morning. What we're really hearing is problem, problem, problem. Interim storage, okay, but it's got to be interim because of problems.

At the very beginning, it was at 1:08 p.m., we heard the idea of permanent storage. The word "permanent" was mentioned. So are we really fooling anyone? Is it possible that this is all going to be permanent storage? And, if it is, we're going to need much stronger dry casks than the ones we're putting in. One of the --

UNIDENTIFIED MALE SPEAKER: Almost done.

MR. HOFFMAN: -- people in charge of nuclear -- in favor of more nuclear power mentioned four percent fission products in the waste. And that, of course, decreases with time. That's really what the problem is here. That's what we're trying to protect the public against, or from, is those fission products. And the easiest way to protect the public from those fission products is to shut Diablo Canyon down. We heard a lot of good reasons to do that. And we didn't hear anything that proved that we need it. What we did hear is that we need to have solar power instead of fossil fuels, but that's easily done.

So those are my comments. I want to thank you again for this hearing.

CHAIR WEISENMILLER: Anyone else?

MS. RAITT: I think that's it. Is that --

CHAIR WEISENMILLER: Okay.

MS. RAITT: Yeah, there will be no more.

CHAIR WEISENMILLER: Okay. So, first, let me remind everyone that written comments are due on --

MS. RAITT: May 11th.

CHAIR WEISENMILLER: -- May 11th. Also, in terms of, we have a docket here, certainly I encourage everybody to file comments. If you need help filing the comments, we have a public advisor who can assist you to make sure that they go into the docket.

I would note that, you know, one of the landmark California laws was one saying that basically, you know, we will not permit any more nuclear plants until there's a solution to nuclear waste. That was from '78. So in terms of future plants. The existing plants were grandfathered. Certainly, as we've examined the waste issues in our various proceedings, we've never found a solution at this stage. So that at this point, one cannot build a nuclear power plant in California.

In terms of -- we realize everyone is concerned about finding a good site. Again, I would recommend you read Allison Macfarlane's book on the topic. I would note the federal government has spent $15 billion on Yucca Mountain, which is a failure.

So in terms of -- it's not easy, I guess, is the bottom line, to do this, although I do

think that the current push is for consensual. Senator Feinstein has had some legislation to try to move on interim storage, and, certainly, that's one of the things we referred to in the last IPRA, her bill on that.

But, again, it's, you know, a Faustian bargain, going back to the initial part, that we got very low-carbon -- relatively expensive power, I would have to say, but at the same time it, you know, low greenhouse gas emissions. It's certainly the challenge of the time, although I will point out, California, we are one percent of the world's greenhouse gas emissions. We're going to get a lot greener. At this point, for the power system, we are below the 1990 levels, which is certainly our target in AB 32 for statewide in 2020.

So, at this stage, we're certainly making a lot of progress. I would point you to the -- you know, as I said, solar and wind has gone up two and a half times in the last few years. So, again, we have a clean system moving fast, but, you know, there certainly are challenges. The climate is the challenge of our time.

So, with that, this meeting is adjourned.

(Whereupon, the meeting was adjourned at 5:49 p.m.)

REPORTER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a certified electronic court reporter and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 27th day of April, 2015.

TRANSCRIBER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were transcribed by me, a certified transcriber and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 29th day of April, 2015.

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Kelly Farrell
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