UNITED STATES

NUCLEAR REGULATORY COMMISSION

REGION IV

MEETING WITH DIABLO CANYON POWER PLANT MANAGEMENT

SAN LUIS OBISPO, CALIFORNIA

WEDNESDAY, FEBRUARY 4, 2004

6:30 P.M.

REPORTED BY CAROLYNN E. SPERE, CSR #10091

APPEARANCES:

FOR THE NRC:

T. GWYNN, DEPUTY REGIONAL ADMINISTRATOR

M. SATORIUS, DEPUTY DIRECTOR, DIVISION OF REACTOR PROJECTS (DRP)

W. JONES, CHIEF, PROJECTS BRANCH E, DRP

D. PROULX, SENIOR RESIDENT INSPECTOR, DRP

T. JACKSON, RESIDENT INSPECTOR, DRP

G. SHUKLA, PROJECT MANAGER, NRR

G. BAGCHI, SENIOR-LEVEL ADVISOR

V. DRICKS, PUBLIC AFFAIRS OFFICE, RIV

FOR THE LICENSEE:

G. RUEGER, SENIOR VICE PRESIDENT and CHIEF NUCLEAR OFFICER

D. OATLEY, VICE PRESIDENT and GENERAL MANAGER

J. BECKER, VICE PRESIDENT, OPERATIONS and STATION DIRECTOR

L. WOMACK, VICE PRESIDENT, NUCLEAR SERVICES

L. CLUFF, DIRECTOR, GEOSCIENCES

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MR. SATORIUS: Thank you, Pat, and the transcriber will go on the record now.

Once again, I'm Mark Satorius. I'm Deputy Director of the Division of Reactor Projects in our Arlington office, which is Region IV. Our division is responsible for the on-site presence of the safety inspectors that are with me here today to my right.

Pat had pointed out some of the administrative aspects of meetings that we are having tonight. I'll point out a couple of other things. I note that if you need the rest rooms, they are down the hallway and to the left and then to the right, so that's where they are located.

Within your handout materials, there are feedback forms, and we value feedback that you will provide us. So if you have feedback for us on the conduct of this meeting, we'd appreciate any insights that you have. You can either fill that out and give it to a member of the NRC staff, or you can mail it. It's postage-free.

There is an attendance sheet that is outside on

the table. We'd like to make sure that we get a good attendance, so if you would please make sure your names are on that. It's not required, but we certainly like to be able to document that we had good turnout.

Pat mentioned about the transcripts. Kind of going through a checklist here to make sure we take care of all the administrative items.

With that, I think we will go ahead with NRC introductions, and we'll start here at the head table, and there are a few members of the NRC staff in the audience. But we'll start to my far right.

Terry, would you start.

MR. JACKSON: My name is Terry Jackson. I'm a Resident Inspector at Diablo Canyon, and we have -- as has been said earlier, we do have our offices there at Diablo Canyon, where we report to daily.

MR. PROULX: My name is David Proulx. I'm the Senior Resident Inspector at Diablo Canyon. I am the senior NRC on-site presence on a daily basis.

MR. BAGCHI: My name is G. Bagchi. I work at the headquarters office in Rockville, Maryland, and I'm a Senior-Level Advisor. And my background is in earthquake engineering and review of Diablo Canyon, going back to 1976.

MR. JONES: Good evening. My name is Bill

Jones. I'm the Branch Chief in Arlington, Texas, with responsibility for Diablo Canyon and oversight process.

MR. SHUKLA: My name is G. Shukla. I'm the NRC Project Manager for Diablo Canyon Power Plant in Washington, D.C. My responsibility is for all the interface between PG&E and NRC headquarters in Washington, D.C.

MR. SATORIUS: And then, in the audience, we have Victor Dricks, who is our Public Affairs Officer; S. Wong, who is also assigned at the station; and Agnes Jan, who is the site secretary; and Bill Maier, who is our State Liaison Officer. Thank you.

Before I turn the meeting over to Pacific Gas & Electric for their discussions on the insights and perspectives that they have taken away from the December 22nd earthquake, I would just like to point out that our purpose for this portion of the meeting is to understand Pacific Gas & Electric's perspectives following the earthquake, especially their analysis that was provided in a special report made available to the NRC early in January.

Based on our reviews of that report, NRC has concluded that Diablo Canyon has been and continues to be operated safely. We understand that Pacific Gas & Electric intends to provide the NRC a revised report, and

we would like to understand what, if any, new information the revisions may contain, and what they mean to the continued safe operation of the facility.

So with that introduction, I would ask that Pacific Gas & Electric go ahead and provide their introductions. And if you would, please, continue with your presentation.

MR. RUEGER: We'll start with our introductions. I'm Greg Rueger, Senior Vice President, Generation and Chief Nuclear Office of Pacific Gas & Electric.

MR. OATLEY: My name is Dave Oatley. I'm Vice President General Manager, with overall responsibility for on-site activities at Diablo Canyon.

MR. CLUFF: I'm Lloyd Cluff. I'm director of geosciences for PG&E.

MR. WOMACK: And I'm Larry Womack, Vice President with Nuclear Services for PG&E.

MR. BECKER: I'm Jim Becker. I'm the vice President, Diablo Canyon Operations and Station Director.

MR. RUEGER: I will start with our presentation material.

As you mentioned, we have provided one report that was provided to you shortly after the earthquake. We are in the final versions of providing a supplemental

report to you, with more information that we have gathered since that time, and our analysis. It's still undergoing quality verification. That's why it is not out yet, but it will be shortly. We will go over, at least in summary fashion, and be glad to answer any questions you have of what will be found in that supplemental report.

First of all, with the first slide here, this will give you an idea of what we will be presenting today. We have broken up our material into a number of components. First of all, Larry womack, our Vice President of Nuclear Services, will talk about Diablo Canyon and the seismic design, go over some of the design history for Diablo Canyon and the Design Basis with regard to seismic activity, and also talk a little bit about the Long-Term Seismic Program.

After Larry has completed his discussion, Lloyd Cluff, our Director of Geosciences, will talk about the San Simeon earthquake in particular. And what he'll be discussing is what occurred. And then the context of that, relative to historical seismic activity in the San Luis Obispo area, he will make comparisons with the Long-Term Seismic Program and tonic framework or model; in other words, how did the earthquake we saw here compare with what would be predicted and analyzed in our

models.

He'll also talk about blind faults, as has been a hypothesis that has been discussed in the community, and we'll address that issue, and then talk about how the plant structural performance was in this event.

After that, Jim Becker, our Vice President in charge of operations at Diablo Canyon, will go through a chronology and our lessons learned with regard to our response to the event, talk about the actual event chronology, and what that response was, what the equipment performance was during the event, and then also lessons learned from some analysis we performed, in terms of what did we learn from that response, what modifications should we be doing to our proceedings, as well as to perhaps some equipment, so that we can respond even better if we had a similar event in the future.

And lastly, I'm going to ask that David Oatley be the man to draw some conclusions and summarize what some of the findings are from our analysis. Next slide, please.

Before we get into that, I do want to just highlight some of the key points that will be made. First of all, Diablo Canyon does have a very robust earthquake design. The San Simeon earthquake did exhibit characteristics that are typical for the area and were

anticipated in the tectonic on which Diablo Canyon's design was based. The ground response of Diablo Canyon, that we actually observed in this earthquake, was actually less than predicted for this type of event, and was actually very insignificant, relative to design of the plant.

The Diablo Canyon structures did perform as expected, and our response to the event, we believe, was thorough, and there was no damage to equipment. And we are incorporating lessons learned, so we will be going through all of these, but I wanted to kind of summarize some of the highlights of our observations and our conclusions.

With that, I would like to turn it over to Larry.

MR. WOMACK: Thank you, Greg. And I am going to start off with a little bit of background regarding Diablo's design. And I want to pick up on a point that Greg made earlier, regarding the robust nature of Diablo's design. And I also point the members of the public that are here tonight to a page in the NRC handout of materials provided, which in essence covers the same elements I have on this slide.

Diablo is actually designed to several earthquake requirements. And within the business, the

first of these is described as the Design Earthquake. And in this particular case, our design requirement is to meet 0.20 g's acceleration. And for simplicity, I've only put the horizontal on this slide. In each case, for the DDE and Hosgri, the vertical component of design is roughly two-thirds of the horizontal, so I simplified it, so I need to start out with what is a g.

G is a measure of acceleration. Most often, we see that in the form of gravity, that which holds us to the earth. And in terms of analysis for the facility, the g loading is important because it can be related to the force that acts on a piece of equipment, a structure, a person, anything that is responding to a seismic event. Let me move on.

Diablo is unique. We do have a seismic reactor trip. What this is, is if the ground motion felt underneath the facility reaches a level of 0.3 g's or 30 percent g, that would automatically trip the reactor, that would in turn trip the turbine generator and result in the plant being shut down.

The next earthquake of design significance is the Double Design Earthquake, and there is no mystery here, that it's twice the Design Earthquake, at 0.4 g's. Both the Design Earthquake and Double Design Earthquake have some subtle differences that must be factored into

the design of the facility.

Next, and increasing in magnitude or size, is the Hosgri Event. This particular design requirement is for 0.75 g's, and is a quite substantial earthquake. Lloyd will get into a discussion of this later, relevant to the motion we felt during or as a result of the San Simeon quake.

The last point on this slide is to mention the Long-Term Seismic Program. And it's important to characterize that the Long-Term Seismic Program is not a design requirement. It's a post-licensing commitment we made to the Nuclear Regulatory Commission to reevaluate the performance of our equipment and structures based upon a broader knowledge of both the earthquake potential of the Central Coast area and earthquake learnings worldwide. And again, I'll say a couple of words later about it, and Lloyd will also address it.

Briefly, I just really wanted to indicate that -- the history of the seismic design for Diablo. This was originated in 1967. John Blume, a consultant to PG&E, very experienced in this area, developed the initial design. We kind of fast-forward about ten years to Hosgri, the discovery by the oil company geologists in the mid-'70s, early to mid-'70s, and subsequent determination that the Hosgri was capable of a

7.5-magnitude earthquake.

And I will point out, as part of the licensing review and approvals for Diablo, NRC and PG&E agreed on a Hosgri evaluation criteria that really superimposed or combined the input PG&E's consultant, John Blume, provided, and the input that Newmark, a consultant for the NRC, in the licensing proceeding provided, so it really became a superposition of both of those.

Next, a couple of points about the Long-Term Seismic Program. It began with our commitment in 1984 and lives on today, although as my second subbullet indicates, did culminate in 1991, with final review and approval by NRC.

This program is very significant. There was a seven-year reevaluation. And if you don't mind, I'll just read what's on the slide, "of the geology, geophysics, seismology, ground motion, soils-structure interaction, structural performance." And it included an assessment of seismic margins through both deterministic and probabilistic analysis. All in all, this is the most comprehensive analysis done for a nuclear power plant in probably -- and Lloyd can comment on this -- probably for facilities within the world.

As I said, NRC approved this report, this study, in 1991. And as the slide indicates, USGS acted

as a consultant and reviewer for this through the term, through the seven-year term of the study, as did other parties, consultants to the NRC, National Laboratories in the United States.

And probably most important, when I say that our LTSP goes on, that it's a living program, is that one of the commitments we've made is to look at significant earthquakes worldwide that will generate -- by their nature, will generate learnings that could be applied to the evaluation of Diablo's design and give us better insights as to the safety of the power plant. This remains a continued requirement for us, one that we regularly communicate with NRC on.

With that, these conclude my remarks, but I would like to introduce Lloyd Cluff. And Lloyd, as Greg had said, will discuss PG&E's analysis of the San Simeon earthquake. But I think it is first good to share with you a little bit of Lloyd's background and experience.

As Lloyd had said earlier, he is Director of the PG&E Geosciences department. He has been in that role since 1985. In that capacity, Lloyd manages two very important programs within PG&E. One of them is the Long-Term Seismic Program, so Lloyd is indeed our in-house expert. But the other is PG&E's Earthquake Risk Management Program, which looks across all PG&E

facilities and assesses the safety of those facilities, our employees and our customs, so Lloyd has cast quite a shadow within the company.

Lloyd also served as a commissioner and was twice chairman of the California Seismic Safety Commission, between 1985 and 1995. Prior to joining PG&E, Lloyd was a vice president, principal and director of Woodward-Clyde Consultants for the period of 1960 to 1985. And in that capacity was responsible for geologic, seismologic, geophysical and earthquake engineering activities, worldwide.

Lloyd has made some other notable professional contributions that I would like to indicate. And first among these is as a participant in numerous international power plant siting missions for the International Atomic Energy Agency in the years 1969 to 1985, and also served as the Chairman of the Seismic Safety Review Panel for the California Public Utilities Assessment of the Proposed L&G facility at Point Concepcion.

These are just a couple of examples to really indicate to the group here the experience that Lloyd has, and are by no means representative of the many items I can go through in introducing Lloyd.

So Lloyd, if you will take it away.

MR. GWYNN: I have a question on the point of

order. I anticipate that we may have some questions as you go through this. Would you prefer that we ask them as we have them, or that we ask them after you finish?

MR. CLUFF: I would say, have at it as I am speaking.

MR. GWYNN: Okay. Thank you.

MR. CLUFF: Thank you, Larry.

As it's been mentioned, my name is Lloyd Cluff with the Geosciences department. I will talk about seven topics. The first one will be the activity of the faults in San Luis Obispo County and surrounding region, as we characterize it during a Long-Term Seismic Program. The second item will be the tectonic framework or the model that we developed during that period that we use to continue to evaluate earthquake hazards and what importance those evaluations might have to earthquake risk at Diablo Canyon, and to put that information in context with the San Simeon earthquake that occurred on the 22nd of December, and look at how we looked at the occurrence of an earthquake like the San Simeon in our tectonic model. And then a consideration of blind faults or blind trusts. This has been in the newspapers and so forth. It is not a particularly new idea, but I'll show how we have considered it in the past and how we are considering it now. And then a performance of the power

plant and its related facilities during the San Simeon earthquake, and then summary conclusions.

The Long-Term Seismic Program, I won't read all of this, but it's a little bit more detailed than what Larry Womack just mentioned. It was a comprehensive review of all of the geology, not just reviewing of what was available, but we did a lot of additional study of the faults and tectonics and earthquakes in the region, of the seismology and geophysics, earthquake engineering, and all of the aspects that go into understanding the hazard, what the level of hazard is, and then how that hazard is being accommodated into the design of the structure, and then we did a probabilistic risk assessment.

The next item is, as Larry mentioned earlier, this extended over almost seven years, and the advisors to the Nuclear Regulatory Commission included the U.S. Geological Survey, not only for Menlo Park, but from their Golden and Denver, Colorado offices and from Reston, Virginia. Also, the University of Nevada had a large contingent from their geologic group in Reno, and then there were a number of professors from various universities, and then all of the national laboratories had a contingent that were involved in a very formal way.

During these almost seven years, we conducted

60 public meetings, many of them in this very room, some of them out at the power plant, some of them in San Francisco, some of them in the field, after the Loma Prieta earthquake in 1989, and then at Rockville.

Then PG&E, as mentioned, continues to monitor earthquakes wherever they occur, local ones like the San Simeon, or big earthquakes like the last big one that occurred in Alaska in 2002.

This is the first map in a diagram that I need to make sure that I don't go too fast. This is a block diagram and a map looking at -- I've got a pointer here, if I can keep it steady. The coastline starts here at Point Concepcion, around San Luis Bay. Here is San Luis Obispo. The power plant is right there. It goes around to Estero Bay, and then up to San Simeon, and then around to just off the map would be Monterey Bay.

On this map are shown the San Simeon fault, that is mostly offshore, but it comes onshore just west of the Hearst Castle area at San Simeon. And then that's part of a broad zone of faulting that is mostly offshore, and that fault zone connects with what we call a step-over at this location, onto the Hosgri Fault, and that continues southward and terminates where there is a change in the topography of the coastline. And that's an interesting story, but I won't take time to explain why

that happens.

Then on this map also is the San Andreas Fault. Then you'll notice these little triangles. Those triangles represent locations where the U.S. Geological Survey has sensitive seismic instruments to monitor earthquakes. These are not ones that record motions or necessarily the shaking, for engineering. These are to detect where earthquakes are, what their size is, and what their mechanisms are. So the little triangles are the USGS stations. The big triangles that are closer to the coastline, extend from San Simeon down to the last one down here. There is 18 of those. That's a special seismic network that we voluntarily decided to put in, because there was concern about the paucity of stations from the U.S. Geological Survey and UC Berkley and Cal Tech, this is the area where all of those areas kind of come together, and there is a big hole here.

And so we decided to try to help the situation, to put in this 18-station network, so these are continuously-recording seismometers. Marsha McClaren, who is here -- Marsha is in the front row right down here -- Marsha, wave your hand. She is our seismologist that's responsible for operating those stations, keeping track of all the earthquakes, and she interfaces with the U.S. Geological Survey's office in Menlo Park.

And while originally we wanted to tie these in electronically, because of fire wall problems and all kinds of things, what happens when an earthquake like the San Simeon earthquake occurs, Marsha analyzes the data, shares that data on a daily basis with the USGS, and then we get together with the Survey and integrate all the data from our stations and their stations, to make the most accurate interpretation of where the earthquake was, how big it was, how deep it was, and what the characteristics of that earthquake have been. And we were in the process of doing that for the San Simeon.

The earthquake that occurred, occurred right up here near San Simeon, just a little bit east of where the San Simeon earthquake comes offshore and connects with the Hosgri.

The next slide shows a map that comes out of our Long-Term Seismic Program executive summary. This is a map of all of the active faults that we studied or discovered. Some of these were known prior to us starting a Long-Term Seismic Program. But about six or seven additional active faults were discovered by PG&E's program, that are in the vicinity of the Diablo Canyon Power Plant.

Again, the coastline, I've shaded it here in blue, and the power plant is this dot right there. And

again, the San Andreas is well-known. And some of these other bigger faults are Rinconada and the Oceanic, and so forth. But the Los Osos Fault was the fault that was not known to exist, and we discovered it in our program. It is now part of the State considerations, as well as a number of others that I won't take time today to talk about.

But let me show you where the earthquake occurred. That star that just came up, right there, that's the San Simeon earthquake, magnitude 6.5, and it occurred on the 22nd of December, so it's quite a ways. The earthquake itself was about a little over 50, 60 kilometers from Diablo Canyon Power Plant. And then the aftershock zone, which I'll show in a moment, extended a series of earthquakes in the southeast, and the closest point was about 35 kilometers from the end of those.

Next. Let's go back to that last one, because I want to show you that I took a helicopter and made an aerial reconnaissance some time ago, after the earthquake, to look at the effects of the earthquake. And I am going to show you images, mostly in the vicinity of San Simeon and Paso Robles, so all of the things I am going to show you are from the vicinity of the earthquake, none at Diablo Canyon.

So the next slide shows a ground crack that one

can see from the meadow into the trees. The initial interpretation by some geologists from the Geological Survey and others that were out there the first day -- I was in constant touch with the USGS and was prepared to grab a helicopter and go down, if they found something of significance. The fact that this earthquake was so far away, and we had already modeled earthquakes like this, I wanted to wait and see what they were finding, before we spent time in the field.

And they told me the first night, they found some ground cracks. They didn't know what they were. They could be surface faulting. But as it turned out, they have interpreted these, and I've looked at these in the field as kind of incipient cracks that have relations to ground cracking, due to intense shaking that's kind of like a small landslide. It hasn't really moved in a big landslide, but it's a crack that with further shaking and further ground or water infiltration from rainfall could end up having part of this hill slide by the force of gravity, or triggered by another earthquake.

The next slide shows -- the light here isn't really conducive to seeing these features -- but there is a series of cracks right here, and then another series of cracks over here. In some places, these cracks line up along where some people would say the Oceanic Fault comes

to the surface. I don't know whether this is at one of those places, but they were like this.

I was in the helicopter with Lou Rosenberg, who was the County geologist. He had already been out, so he was very helpful in taking us to where he had seen these same features. And all of the geologic interpretations by the State of California and the U.S. Geological Survey are these, are shaking-induced cracks that are related to ground failure, and not surface fault displacement. This is kind of behind what some people have said, "Well, the fault didn't break to the surface; therefore, it's a blind fault." That's a fault that doesn't make it to the surface. I'll talk more about that later.

The next slide shows a view of where -- the epicenter is east of Hearst Castle, over in this area here. Actually, over that ridge a little bit. Hearst Castle got a very strong jolt. And the next slide shows a close-up of the Hearst Castle. That site is conducive to very strong earthquake activity, due to its being perched on the top of a sharp ridge. Topographic amplification is very significant, so when you have a site like this, you need to make sure that it's well-founded into the rock, which it is. And Julia Morgan, the architect, and engineer that she worked with, had experienced the 1906 earthquake, and they drilled

deep footings into the rock and made this a very good structure. If we were to compare it with Diablo Canyon, it would probably be about a fourth of the design of Diablo Canyon, I would judge. But nonetheless, it survived without any structural effects whatsoever. They did have some loss of some of the artifacts that are stored in the estate, the museum, that were a loss, but there was no structural damage or any breakage of the facility at all.

Next. Let's look at Paso Robles. This is where the two people were killed in this partial collapse of this unreinforced masonry building. You see a lot of other buildings here. And with close inspection, there were more than a hundred buildings that suffered some damage, some pretty severe.

The next is a slide of a close-up of -- you can see the unreinforced masonry walls still standing here, but bricks scattered all over, a car that's crushed down below. And this is where two people lost their lives.

We knew this was going to happen to these kinds of buildings. There are literally thousands of those very vulnerable, unreinforced masonry buildings in the older parts of our cities, including San Luis Obispo, and still more in Paso Robles and other places -- Berkley, San Francisco, Oakland, Los Angeles. And we are having a

difficult time, when I was on the Seismic Safety Commission, in trying to get people to be responsible for cleaning up this kind of a problem. It's a big political problem, a lot of resources are needed. Really, these kind of buildings should be demolished and rebuilt, but there is a historical preservation issue that tries to keep the building. And so there are all kinds of public issues that come around. But eventually, earthquakes are going to do it for us.

Next slide. So flying over Paso Robles, a lot of buildings come through without any damage. There are a lot of things. This is a modern building and, of course, experienced the same level of shaking, and had no serious effects.

Next. So coming back to that long-term seismic map, I pretty well described the map, other than there is a little inset map that I'll show an enlargement of in a moment, but that's our tectonic model. This is a section of this map in here, and we've defined a major structural block that is responding to the plate motion on the San Andreas Fault, and then there is a big fault over here called the Garlock Fault, that comes here. And that's why this bend in the coastline is there. And that interaction is rotating and uplifting the whole California coastline.

The next slide shows the historical seismicity. This map covers earthquakes from 1830 to 1991. And these are felt reports. In the early days, in the 1800s, there were no seismic instruments. I think the first seismic instrument was in the late 1800s up on Mount Lick, Mount Hamilton and Lick Observatory. But nevertheless, through felt reports, the shaded ones are probably accurate, within 0 or maybe even 10 kilometers. And the open circles, like some of the other bigger ones that have occurred in this area, are not quite as accurate. But still, they've been assessed, and they think they're still pretty good picks of where the earthquakes occurred.

The size of the image gives you an idea of how big they have been. So there are some earthquakes the same size as the San Simeon. The San Simeon is right there. I'll show you in a moment. Just leave it there, Larry, for a moment.

AUDIENCE: Can we turn the lights down so we can actually see the image?

MR. CLUFF: That might be a good idea.

Can we darken these lights up here?

That's better. Maybe those two floodlights that are shining on the screen.

Well, that's better.

Much better.

So here is the coastline again. Diablo Canyon is right there, where the pointer is pointing. And then Estero Bay is here and San Simeon is there. And these earthquakes are large earthquakes, some of which were bigger than the San Simeon earthquake.

The next slide shows the same slide with the San Simeon earthquake on it, so I can see a 6.5-magnitude earthquake occurred in an area. And the mechanism on the earthquakes that were there before were reverse slip and strike slip, both. But the ones up in here, there is one right here that I can't read it, but I know it's 1991. This occurred when we were in this room in a hearing on the Atomic Licensing Board, the final one in 1991, and a magnitude 5.2 earthquake occurred right there. And these chandeliers in this room were shaking all over, and we immediately got our data to tell the Board where the earthquake was and what the motions were.

So that earthquake was a reverse-slip earthquake. So was the San Simeon, a reverse mechanism. So this area clearly had been modeled by us in previous earthquakes as an area with reverse-slip earthquakes.

Let me just talk about the tectonics of reverse-slip earthquakes for a moment. The San Andreas Fault and the Hosgri Fault are pretty straight,

near-vertical faults. And most of the earthquakes on them are strike slip in nature. And that's been pretty well proven by the work that the U.S. Geological Survey has done and we have done.

And then, there are the other faults that you see on this that are more northwest, southeast in the stripe, the trend of these. About a 30- to a 45-degree angle to the San Andreas or the Hosgri Fault.

Now, when you, just by the geometry of that weak plane, and then the stress that comes from the plate boundary of the San Andreas, this area is under compression. The near-straight faults, like the San Andreas, slip lateral, and these at an angle slip vertically. It's pretty simple, but in many ways, very complex. So we have both reverse-slip faults and strike-slip faults.

And the next slide will show the seismicity that was recorded on the PG&E network from -- for a ten-year period, '87 to '97. And again, I'll show the coastline. Here is San Luis Bay. Diablo Canyon is here, so San Luis Bay is down here. This is Estero Bay, and San Simeon up here. And you can see, from these little dots, here is the symbol for the size of the earthquake, these are much smaller. They are up to about magnitude 4.5 or so. But these are earthquakes that are controlled

on their location by PG&E with interface with the USGS.

And you can see a whole string of earthquakes aligned directly along the Hosgri Fault. Even though we recorded earthquakes along the San Andreas, we are not showing them, because that's too far away. But these all have strike-slip mechanisms, pure strike slip along the Hosgri system.

The faults that are angled at an angle, like the Oceanic Fault and a number of the other faults, are reverse mechanism. So the fact that the Oceanic Fault -- that we think that was associated with this earthquake -- is a reverse-slip fault, was expected. This was not a surprise to anyone who knows these kinds of data. Next slide.

So there is the star of the San Simeon earthquake, right in the area where Marsha's interpretations of this over this ten-year period clearly document reverse mechanisms in that area. Next slide.

So this is a map showing the aftershock sequence. Again, the coastline, Diablo Canyon, San Simeon here. The main shock occurred, this red dot up here, and then the blue and the orange and yellow ones are the sequence. This is up and through January the 5th. Several-thousand earthquakes.

Marsha, what, about 3,000 now, or more?

MS. McCLAREN: There is about 1500 in that two-week period.

MR. CLUFF: Two-week period, but now we've had about almost double that, I would say.

So the magnitude of some of the bigger ones were up a little over 5. And you can see that they started up here with the main event, and then kind of expanded to the southeast. And the lines across this, perpendicular to the faults, are cross sections. I am going to show you one cross section that's a section through the earth. In other words, this is looking at the face, the ground surface is up here. This is down to almost 15 kilometers down here. And then the distance is along here in kilometers, so we are looking at a section of the earth's crust, as if we would slice with a big knife. We are looking along at almost 20 kilometers on this side, and 12 to 14 kilometers on the vertical side.

This is where initially the USGS interpreted the location of the main shock. And then a lot of the aftershocks at this cross section are scattered along this area. Marsha has been integrating some of the USGS data with her data, and it looks like that aftershock will probably end up down here at this great a depth, once it's all integrated with the USGS data. Our network recordings are much more accurate than the distant USGS

recordings, but they will all be integrated by us.

Larry, hit that button twice more.

Here is my interpretation of where one might draw a line, whether it be here or over here somewhere, or up here is immaterial. What it shows is it matches the focal mechanism that's calculated from the motions that Marsha and the other seismologists are doing. And the arrows on this indicate that this block went relatively up, with respect to the block on the other side of the fault. And so that's called a reverse-slip fault.

And the dip of that fault plane, as we would interpret it here, is about 50 to 60 degrees. And prior to the San Simeon earthquake, we had stated in the work that we did, under the Long-Term Seismic Program, that the angle of dip of the Oceanic Fault was about 60 degrees. So we feel pretty proud that we had this pretty well nailed prior to this earthquake, and it was not a surprise that this kind of a mechanism occurred in this location. Next slide.

So coming back to that block diagram of our stations and the coastline, our next step now is to work with the USGS. All the data you see on the USGS website is purely preliminary. A lot of those epicenters will move around and be at different depths, and so forth. So

once we give them all of our data, and Marsha is already doing that now, and we integrate that now, we will come up with a master interpretation, which we and the USGS will adopt. And that will be in a future report that we will be sending to the Nuclear Regulatory Commission, on the seismology of this earthquake. It will also include geologic observations as well, but that's going to take a while to have us do that.

And Goodum can tell you that we've always done this in past earthquakes when something like this has happened. In a few months, we gather all the data and then send another report on these events. Not only here, but when we investigate an earthquake somewhere else in the world. Next slide.

MR. BAGCHI: May I ask a simple question here?

MR. CLUFF: Yes.

MR. BAGCHI: Given so much discussion in the local press, do you now feel that the difference there was -- between your postulation of completely strike slip and a very small component of reverse slip at the Hosgri Fault, does that need any reinterpretation, or are you still working on that?

MR. CLUFF: Well, there have been opinions all over. I saw in the paper the other day there are some scientists who would still argue that the Hosgri Fault is

not a strike-slip, but it's a reverse or a thrust fault. That was the main objective of the Long-Term Seismic Program. We actually did geophysical surveys offshore, clear off to the continental slope. We spent about $15 million gathering additional data on the geophysics, the geology. And at the end of that, we concluded that the preferred interpretation -- and the U.S. Geological Survey agreed with us -- was -- primary slip on the Hosgri is vertical.

That data, with additional data from our recordings and the USGS recordings, and a lot of oil field exploration, is in publication as we speak. Marsha McClaren is one of the authors. There are four or five authors, geophysicists, geologists. And that will be the definitive paper. I can tell you it has concluded that the -- proves the Hosgri is a pure strike-slip fault. And the USGS is publishing that in a professional paper, which is the highest caliber of paper publication in the survey. That will be finished within the next few months.

There are several other papers in the works that address this. And we're always looking for additional data. The San Simeon earthquake will be one that we will look at and say, "Okay. What does this tell us about the regional tectonics?" And the fact that we

had already characterized the area with the San Simeon earthquake as a thrust mechanism, doesn't add much to the Hosgri style of faulting interpretation.

So we are always open to new data. And when we get new data, we will change our minds, if we are convinced there is valuable data.

So the next slide is the tectonic model that again, the coastline, the coastline is behind these intense colors, so the line terminates at the Hosgri. And that's the western boundary of what we call the Los Osos/Santa Maria domain. It's a structural term for geologists. And the other boundary just north of Santa Barbara, on one of the big faults down there. And then the east and northeast boundary is the Oceanic West Huasna Faults, which is the boundary of that tectonic block. And by nature, in that this is being uplifted very slowly, we measured the rates as being -- of uplift as being around a half a millimeter to three-quarters a millimeter per year. That's very slow. Where the San Andreas is slipping at about 40 millimeters per year, the Hosgri is slipping at about 1 to 3 millimeters per year.

And so this is this area, in compression and strike-slip motion, is uplifting this crustal block within the earth, kind of as a block, but it has other

faults that have little earthquakes in it, that will go off every once in a while. But this shows that -- this comes out of our 1998 report, that this Oceanic part is a reverse-slip fault. And we've termed it an active or capable fault, by the definition of the Nuclear Regulatory Commission.

So, as I've noted there on the side in writing, that the model allowed this to be a reverse-slip fault on that northeast boundary. So there is the star for the earthquake, and there is the San Simeon earthquake right on that area, up where it intersects with the San Simeon earthquake. Next slide.

Now, there has been talk about blind faults, blind thrusts, and I said what they were. They are earthquakes that occur, and the fault never comes to the surface, for a whole set of reasons. One is the focal or hypercenter, the depth in the crust of the earth is too deep for the slip on the fault to reach the surface. All earthquakes are caused by slip on fault in some way. But sometimes, the slip isn't big enough to reach to the earth's surface.

So nevertheless, in 1990, around, a couple of researchers from Southern California postulated this blind-fault hypothesis in this region. One of their cross sections was near our area, and so we decided to

model this. We did what we call the blind-fault hypothesis during the LTSP. And we actually made the conservative assumption that this shaded area, which is directly beneath the power plant, was the ramp that would release an earthquake right under the power plant. And when you compare the energy from that earthquake with the red zone, which is the Hosgri Fault, there is no comparison.

Next slide shows our conclusion is that the -- it's the -- shows the Hosgri Fault, even when we have a blind thrust or ramp directly beneath, the Hosgri Fault continues to control the earthquake input at Diablo Canyon. So it's kind of a so-what kind of result. We did model it. Since various researchers are talking about the San Simeon earthquake being a blind-reverse fault, we will reevaluate that and see what sense it makes. But we'd already characterized it, and it's so far away, it doesn't make that much difference to Diablo Canyon. It makes a huge difference to Paso Robles. And as some geologists have hypothesized, there could be the potential for one of these ruptures to occur right under San Luis Obispo. That would mean you'd better get busy fixing the unreinforced masonry buildings. Next slide.

MR. BAGCHI: Now, let me just ask a point of clarification.

MR. CLUFF: Yes.

MR. BAGCHI: Is it because of the length of the fault, the blind thrust is so much smaller, compared to the Hosgri?

MR. CLUFF: That's part of it, yes. The Hosgri, we are only showing a section of the Hosgri. The Hosgri is a little over a hundred kilometers long. The full length of this ramp is -- there is a scale up there, but I can't quite read it. It's, what, about 10 kilometers or something?

MR. SATORIUS: 15 kilometers.

MR. CLUFF: 15 kilometers. So maybe that's about 30 kilometers, or even 40. But then you can see these lines in here. There is geophysical constraints that segment this system, that if it did release an event, it probably wouldn't rupture the whole thing. It's clearly terminated by this boundary here and the Hosgri over here. In fact, if you believe that ramp is there, it's real, the Hosgri Fault would be inactive, if that existed.

So the hypothesis is that if, in fact, it does exist, it doesn't matter to the ground shaking. And if it really exists, it, by the rules of doing the modeling, you would have to say the Hosgri Fault is not an active fault. So you can't have it both ways. We want to adopt

the most conservative interpretation for the work that we've done.

MR. JONES: Mr. Cluff, if we were to assume that it was active, what would be the ground accelerations that would be experienced at the site?

MR. CLUFF: From what?

MR. JONES: From the blind --

MR. CLUFF: From the blind thrust? Let me describe the characters that influence the ground acceleration. It's the size of the earthquake, the depth of the earthquake, the travel path from the hypercenter, up through the site, and then the site conditions. So when you take all those considerations into account, the plant is on rock, that's a good piece of news. That lessens the intensity of the shaking. The distance to the earthquake that would be on this, by the constraints of the model that is there, puts this, at the closest, about 6 1/2 kilometers beneath the plant. And probably is down around 12 to 15 kilometers. So by nature of that, it's much farther away.

And then the size of the earthquake, we believe -- and others who reviewed this -- that it probably wouldn't rupture more than just this 15 kilometers. It probably wouldn't be much over a magnitude 5.5, but we allowed that it could be as high as

6.5, like the San Simeon. And still, that didn't produce a ground motion that was anywhere near the Hosgri.

I've forgotten the exact numbers, but it's in a response to the question from the Nuclear Regulatory Commission. And all of this diagram, I just scanned in, out of our response to the Nuclear Regulatory Commission.

Next slide. So let's go now to talking about the ground motions and the response of the power plant structures. Here is what we call an attenuation relation plot. Now, what this is, is it's strictly a log-log scale that shows a plot zeroes down here, even though it's a 1, and then .001. So on this side, it's the percent of gravity and acceleration, so it goes up to 1 g there, and is down to almost nothing down here.

And then distance from where the earthquake occurs on the fault, and this goes out to a hundred kilometers. So what you do is you take worldwide data for various types of faults and various types of site conditions, and you plot them up. And that's what all these words are in here. We use the Sadigh rock and the Sadigh soil model for the ground motion. And this blue and red are the median values of what you would expect.

So what you do is you use this model and you say, "If an earthquake occurred like we had at San Simeon at about the closest point, about 30 kilometers away, we

would predict, from this median value, that we should be getting an acceleration of about 12 to 15 percent g at Diablo Canyon power plant for this size of an earthquake."

This X shows what we recorded. It was 5 percent of g, much lower than what we would have predicted. Had someone asked us the day before, "What would be the ground motion at the plant," we would have said 10 to 15 percent. Well, that's the uncertainty in these kinds of models. This doesn't matter that much. It's just a variation. You can see higher values over here on the other side. This is over near Parkfield.

These are USGS strong motion recording stations, and they show accelerations way above, even two sigma levels above what the median is, and that shows the variation in the ground motion. And it's probably influenced by what we call "fault rupture directivity." The fault tended to rupture to the southeast, and it probably focused some energy off toward the San Andreas Fault and where those recorders are. That's my quick interpretation right now. We'll be hearing about this from the USGS, when they publish their data. But that's how I would look at this.

This doesn't surprise us, that it was a lot lower than what we would have predicted, but we like to

show that we were conservative. That's really the important thing to get out of this.

MR. BAGCHI: Lloyd, just one observation here.

MR. CLUFF: Yes.

MR. BAGCHI: We do have a program that we use sometimes, using the information about the magnitude of earthquake and the coordinates, the latitude and longitude of where it happened. And based on that input, we have two models of how the ground motion would spread from the source to the site. And based on that, we had two values. One was .04 g, and another one was .05 g.

MR. CLUFF: That's very interesting. That's because the models that you are using are probably Sadigh's model, or one of his models that's in there. There is Endrus models, Sadigh models, Joyner & Boar models. They would all give you similar answers.

MR. BAGCHI: Joyner & Boar is in there.

MR. CLUFF: Joyner & Boar is probably what he used. And it would give you -- and so that's good, independent confirmation, but they all come from the same kind of model so that would be expected, but thank you for that comment.

So at any rate, so what you can do is just play the what-if on this, any time you want. You can see that if you are very close, according to this model, if you

are very close to where the earthquake started or the fault started rupturing, you can get 1 g accelerations. And we've seen in excess of 1 g accelerations. Northridge had some accelerations in excess of 1 g. And the big earthquake in Alaska a year and a half ago had some big accelerations off in some distance, so that happens. But it doesn't necessarily mean that that's the most dangerous place to be. Depending upon the site conditions, the soil, how it might amplify the motions on the top of a ridge, or how the structure is built. So there are a lot of variables that have to come into account that we -- you regularly use in all of our structures at PG&E. So the next slide.

This is the response. The upper spectrum, you heard Larry Womack talk about the Hosgri and the Blume Newmark. This is what we call here the DCPP design spectrum, but it includes also the Hosgri. This little bump that -- we call it "The Hat," that was when Newmark and Blume combined their spectra, and so that was the result. And so you can see that this is the capacity. Any line that is below this would not have the potential of doing any damage. And even excursions above this line, would have to be way above the line before it would be serious damage.

The blue line down at the bottom is what the

San Simeon earthquake produced at the Diablo Canyon Free-field station, 5 percent g, so you can see where, up here, this is anchored at .75 g, over here, and the spectral acceleration goes up to a little over two and a quarter g for the design of the plant.

Almost all of our power block structures are within this band from -- this is in Hz, about two Hz out for about 8 Hz, or from about 2/10ths of a second period to about 8/10ths of a second period. That's where most of our power block structures are.

Next slide shows the summary of conclusions. The upper point I made here is that the San Simeon earthquake characteristics were not a surprise to scientists, geologists and seismologists who had studied this area, including our group and folks with the U.S. Geological Survey and the National Laboratories. And the earthquake occurred where numerous historical earthquakes have occurred, with similar mechanisms.

The next bullet shows the earthquake was associated with in the LTSP. It was identified, the source of it was identified in the LTSP as an active-reverse. And also nearby were strike-slip faults, so we had both mechanisms. And in this case, the other side, we found it was a reverse slip. The mechanism was similar to all the historical records, where the

San Simeon earthquake occurred, as we had characterized it in the LTSP.

And the next slide shows the structural model evaluation. We did it in two ways. The observed response of the structures, where we took the recordings of the structural response, and then we evaluated the structural models that we used in the design of the power plant, as well as in the LTSP comprehensive review. And during that review, we did change some of the models and improved them, because they were pretty crude early on, and a lot better modeling techniques were available when we did that work. And it had to do with natural frequency and the spectral amplification.

The next theory shows the accelerometer locations on the containment structure basemat and at the top of the dome of the containment structure, and the auxiliary building foundation, and also up in that structure, at 100-foot elevation. And then also in the turbine building basemat.

The next slide --

MR. SATORIUS: Could I ask a question?

MR. CLUFF: Yes.

MR. SATORIUS: Those are the locations for the seismic accelerometer?

MR. CLUFF: For some of them, yes.

MR. SATORIUS: And all of those accelerometers are the instruments that you use in developing your special report; is that correct?

MR. CLUFF: Yes. We have analog instruments and digital instruments, and we are right now in the process of putting everything digital and getting rid of the analog.

MR. SATORIUS: Were all of those instruments used in the report that we received early in January?

MR. CLUFF: Larry, you want to go ahead and take that.

MR. WOMACK: Let me go ahead and take that.

No, they were not. And due to the nature of the report being completed by the Regulatory requirement in 14 days, we included information in that report with regard to one of the sensors, the containment structure basemat. And again, looking at the Regulatory requirements, the time that is available, that's what was included.

As we indicated when your inspector was on-site a couple of weeks after the earthquake, we would be making an additional report, or supplementing the 14-day report. We are currently preparing that, and it is nearing completion. And in fact, some of the conclusions that Lloyd communicated here come from that report, but

it unfortunately is not available here today. It will be out shortly. It will include all of that information.

MR. SATORIUS: Are you prepared to give us a sense tonight as to whether the inclusion of those additional accelerometers come to a conclusion in the report?

MR. CLUFF: Yes.

MR. SATORIUS: I'd appreciate hearing that.

MR. CLUFF: Okay. Let me give an overview, and then Larry can probably add to that.

MR. JONES: Mr. Cluff, before you move on to the actual response of the facility, Has the review of the information from the USGS and yourselves and Cal Poly, have you identified any other faults, based on the information you've looked at so far, that would indicate there are other faults in the San Luis Obispo area that were, until the San Simeon earthquake, were not identified?

MR. CLUFF: Well, until you identify them, you don't know whether they are there. As we did the Long-Term Seismic, as I think I mentioned earlier on, we discovered about seven -- in the region, about seven active faults that were not known previously. And one of them goes right in front of the San Luis Bay Inn, where all of the hearings were held on the '70s. No one had

ever looked there. It was kind of covered with brush. And it's a minor fault. It turned out to be not significant, but it hadn't been identified.

I would judge, based on my experience in looking at active faults, in a lot of tectonic environments and looking at earthquakes, that there is always going to be little faults that when you look closer in some places, you might find them. But I would say that we have identified the ones that are really important. And the others that might be found, would have no significance to the structural integrity of our power plant.

MR. JONES: Thank you.

MR. CLUFF: So we have recordings in these places that we look at these accelerometers in how we modeled it and then the responses, and maybe the next one gets into that.

Free-field ground motions. The ground response to the power plant was, as I showed, was less than predicted. And then the next bullet was the structural responses; now here is where I can elaborate, and then Larry might want to add to what I say.

The structural responses, the power plant structures behaved as we had expected and modeled them. And it provided confirmation that the models used in the

design and so forth were accurate, and it did it in two ways. One, in the frequency characteristics, where it peaks, and the next -- I don't know whether I have another bullet on this or not. No, I don't. So that's the end of my presentation.

In the report, I was reviewing a draft of the report yesterday. And so in that report will be some figures that will show the recordings, and you will be able to see that the frequency content of our model and the frequency was at about, I think, 4 1/2 Hz, right where we had modeled it. And then the amplification varied, and there was a lot of uncertainty on it, but it was in the same area, so it shows that we were using that model. But there is all kinds of things that Larry will talk about, in terms of damping factors. We are looking at a small earthquake at a great distance. And to look at recordings from that, you can't directly compare a large Design Earthquake that's on a nearby fault, and so the behavior would be quite different.

Larry.

MR. WOMACK: Lloyd, I think you really said most of what I would have said. And I would just add one word, that as we look at the analysis, the spectral analysis, looking both at the base of containment, the top of containment, and just use that as an example here,

we see that they are consistent with the models that were developed and used in the original design, and to support the licensing of the facility. We have seen nothing anomalous in our review. So in fact, that is what I expect we will be reporting as a part of our supplemental report.

In turn, as Lloyd mentioned earlier, some time is necessary for the USGS and PG&E to integrate the body of data that is available here, so we will anticipate -- it's hard to predict when that will be complete -- but probably within the next two to three months, submitting a further follow-up to characterize the best knowledge at that time.

And to use an example, one thing Lloyd mentioned earlier is initially USGS located this earthquake, the initiating earthquake, at a depth of approximately 7 kilometers. Subsequent study is now indicating, or subsequent evaluation of the data is now evaluating and determining that that's more like a depth of 10 to 11 kilometers, so we would expect to capture that kind of additional analysis in those future reports.

MR. BAGCHI: With respect to the structure behavior, I would like to explore the possibility that the plant, having been there for so many years -- is there any indication that the degradation could influence

the response and somehow be weakened by this San Simeon ground motion?

MR. WOMACK: I'm not sure I entirely understand the question, but let me take a shot, so let me start by repeating. Diablo and its structures have been on the site for quite a period of time. Structures and equipment can degrade if not maintained, so is there anything that we've seen that would indicate a degradation of the structure, and a change in the response to the structure as a result of the time our buildings and our equipment have been there. Is that a reasonable characterization?

MR. BAGCHI: That's a fair characterization, yes.

MR. WOMACK: First, I'd start off, as we indicated, that the input ground motion, and using that input ground motion in our building evaluation model, indicated that the building vibrated or responded at the right frequency when we looked and evaluated that at the top of containment. So intrinsically, that tells you that the structure of the building has not degraded substantially; otherwise, the frequency at the top would be different than our analysis would predict.

In addition -- and I'm certain that the NRC is aware of this -- but for the public that is here, we have

many, many requirements in our license and additional programs that we utilize to monitor the performance of the power plant, both its structures and its systems, on a regular basis. Probably at the top of that list is the maintenance rules, and CFR 50.65, and in particular our application of maintenance rule principles to our civil and architectural structures. We monitor that. We have in essence, a system engineer, design engineer that follows that quite closely. And to my knowledge, we have not observed any degradation.

MR. BAGCHI: That's a pretty good answer.

If you had been able to detect the natural frequency of the building from your recording, this is something I was not aware of. If you have been able to determine, from the amplification response, the natural frequency signature, then, of course, that's a fair indication that model that predicted the natural frequency has been observed in actual ground motion, recorded motion at the plant.

MR. WOMACK: Thank you. I look to Lloyd, and I look to other members of my staff that are here tonight, and I think I've gotten that one right. I am looking to my civil engineers.

MR. SHUKLA: It's nice to say that the earthquake was predicted and the plant behaved as

expected. But how would you translate this into safety aspects? Are you saying that earthquake was well below the design of the Diablo Canyon Power Plant? How would you do that? I mean, in terms of safety.

MR. WOMACK: Well, let me start off, and then maybe Lloyd or others here might want to add to it. I think it first starts with the initial slide that Greg Rueger put up; that we have a robustly-designed facility. It is a very capable facility, to use the term in a civil engineering perspective, or from the civil engineering perspective. Then looking at the facility through the evaluations that have been performed, both during the initial design, the licensing reviews done before initial licensing, and then on top of that, and really from my perspective, dwarfing the review is what we undertook during the Long-Term Seismic Program, which really did two things that pop out in my mind.

One, it characterized the inputs. In other words, what faults exist and what inputs could they provide to the power plant. And then as a part of that study, we looked again at the structures of the power plant, you know, in some cases, 10 to 15 years later, with better modeling and analytical techniques that were available at that time, and confirmed, in essence, what we knew when the plant was initially licensed. So that's

where I'd really come from here, is the sense that the facility is robust.

As Goodum so correctly pointed out, this earthquake gave us the opportunity to confirm the design, our understanding of the design, and one of the important characteristics of that design, and that there has been no degradation that we can measure, insofar as that one data point would provide us.

MR. CLUFF: Let me add one little point, to amplify one of those, in terms of seismic safety. When we did the long-term seismic reevaluations, Larry said we had much more modern analytical tools. And what we discovered was that there was a lot more conservatism in the design than originally thought. It's inherent nature of good structural and civil engineers to, every time they have a chance, they add conservatism. So in the team we put together to do this, they found that there were conservatisms that weren't known, so the safety factors were much higher in a lot of the structures, not all of them, but in a lot of the structures, than what was originally thought.

MR. SHUKLA: You mean the margin?

MR. CLUFF: Yes, the margin, yes.

MR. SHUKLA: So tomorrow, if we discover a new earthquake, bigger and better, as NRC regulation

requires, you need to factor in that information into that Long-Term Seismic Program, and you will take appropriate action?

MR. CLUFF: Yes.

MR. SATORIUS: I have a question, and I am going to have to provide a little bit of context, so you know where I am coming from, so you'll know how to respond.

And that is, I understand in your Long-Term Seismic Program that you've developed a model, and that model predicts how the plant would respond to various seismic events, depending on where they would originate. And that is a model that's in place and it's part of our NRC requirements, and it's that you evaluate it after you have every seismic event.

How many times have you had to change that model? How many times have you had to go back and make changes to it, either to make it more conservative or less conservative? Could you give me a perspective on that?

MR. CLUFF: Larry, do you want me to take the first crack at that?

I understand what you are asking. And really, what we do when we go through evaluation, we would discover that from a margin perspective, either the model

shows that we have less or more margin than we thought before.

MR. SATORIUS: Right.

MR. CLUFF: And in this case, I would say it's not a very good test because it's a puny, little earthquake, just to be frank. It's a long way away. What this shows is that we are very conservative. And we would have predicted, if this were the true nature of bigger earthquakes closer by, that that rule held, it would show that we've maybe got 30, 40 percent more margin than we would have thought. Now, I wouldn't want to bank on that, because the next earthquake might be on the other side of that median value.

MR. SATORIUS: Are you going to use the results of this earthquake as a basis to change your model?

MR. CLUFF: No.

MR. SATORIUS: Or are you going to keep your model like it is with the conservatism, or are you going to use that conservatism to change that model?

MR. CLUFF: The model is the model. It's tested by earthquakes, and then we see what significance that has. To change the actual physical aspects would mean doing structural changes to the facilities, and we see no need to even consider that now.

MR. SATORIUS: Okay. That answers my question.

Thank you.

MR. PROULX: You have to help me out a bit in understanding what you mean by your model was consistent with what you predicted. Earlier in the week, I was led to understand that the amount of acceleration you had at the top of the containment dome was somewhat higher than it had been predicted. Can you give me a perspective on that?

MR. CLUFF: Yeah. I've got some thoughts to give, but Larry, why don't you start out.

MR. WOMACK: Let me kick that off. And we'll provide data in our report, and follow up on this. But as I said earlier, we have the Unit 1 containment well, instrumented. We have a sensor at the base of the containment. We have a sensor at the top of the containment.

As I mentioned earlier, the input motion that we registered at the top of the containment, its spectral content, bore out the model, the results of the model that would tell us the frequency at which the structure would vibrate or resonate. Now, in comparing the magnitude of the acceleration recorded at the top of the containment, it was approximately the same level that the model would have predicted. And for the sake of argument here, I don't remember the exact numbers, but it was very

close.

Now, to fully understand this -- and "very close" may not be comforting to some people here. To fully understand this, our model is really benchmarked or plugged in for a large earthquake. And there are certain assumptions made in developing the model, related to what is called structural damping. And this would be the degree to which the structure absorbs energy that's transmitted from the base as it moves up to the top.

Now, our model, again, for looking at an earthquake with an input of roughly three-quarters of a g, assumes a level of structural damping that an experienced structural engineer or other expert party would say is appropriate.

For the type of earthquake we had here, the San Simeon, with low ground motion, low vibratory motion, the degree of damping by the structure, anecdotally and experientially, is much less. Yet, when we evaluated the data, we used the model with the higher damping.

So kind of where I am headed here, David, is that we will be refining our model to look at a lower damping level. The level of amplification that we saw in this earthquake is completely consistent with our model, but since that model was at -- and I'll throw out a couple of numbers -- is a 7 percent damping, versus what

would -- might be appropriate for this earthquake at 2 percent damping, because it was such a much smaller earthquake, our model isn't going to be exact in this regard.

So if that answer made any sense.

MR. OATLEY: I would like to add a little bit to that, if I can. I think when you were informed of that, David, we had some early data from -- we had both an analog recorder and a digital recorder at these locations. And on the analog recorder on the tape, there was -- it looks like some larger accelerations than we would have predicted, but those also did not match the data we had on the digital recorder. And further analysis, and with confirmation by the vendor, that was noise from the aging of the tape on the analog portion. When you compare the digital to the non-noise spectrum from the analog, they match perfectly. And that, of course, coincides with what we were predicting for the top of the containment.

Do you want to add anything?

MR. CLUFF: No. That's fine.

MR. OATLEY: Next is Jim Becker. And I think some of the statements that Jim is going to make is going to augment the statement of safety. Jim is going to talk about the actual chronology of events that happened at

Diablo, and what we've learned from that, as far as our response from our original perspective.

MR. BECKER: Thank you, Dave.

So as Dave said, the two things I'm going to talk about are the chronology of events, basically what we did that day at the plant when the earthquake occurred, and then about what we are doing to improve further for the future, because part of running very well and being safe and reliable is taking every opportunity to learn when things happen, so those are the two things I'm going to talk about.

First, the chronology. This slide shows the beginning of the chronology. On the day of the earthquake, December 22nd, both units at Diablo Canyon were at full power. At 11:16, the earthquake that we've been discussing, and Lloyd covered in detail, occurred. And when that happened, it was felt in the control room, instruments in the control room alarmed to further warn the operators that an earthquake was occurring. And so the operators implemented Procedure M-4. That's our earthquake procedure. It's a procedure that we've had for years that directs our staff on actions to take, should an earthquake occur at the plant.

And the procedure is laid out with varying degrees of actions to be taken, based on the magnitude of

the earthquake. So when the earthquake occurred, the operating staff got that procedure out and they started following it. And a lot of other things I'll talk about here that happened that day were directed by that procedure.

When the earthquake happened, a number of alarms were received in the control room, like I said. I am going to go into some more detail on the bulk of the alarms in a few minutes. But probably the most significant alarm that operators received was on Unit 2. We received an alarm warning them that the running electrohydraulic pump had shut down. Now, these are nonsafety-related pumps, and their purpose is to develop hydraulic pressure for the system that controls the control valves for our main turbine on Unit 2. When the operators received the alarm, they verified the alarm. They checked the system conditions. They observed that the system hydraulic pressure was lowering, which is consistent with having a pump shut down, so based on those indications, they reset the trip signal on the pump and they restarted the pump. That was the appropriate action to take. And as a result of that, Unit 2 continued to run smoothly through the event.

I'll also point out that the trip signal happened as a result of the shaking causing a relay to

pick up spuriously and shut the pump down. It was basically a false low-level signal that caused the pump to shut down.

MR. GWYNN: I would like to go back very briefly to your statement that you implemented Procedure M-4 Earthquake.

MR. BECKER: Right.

MR. GWYNN: Other than in training exercises, have you ever implemented that procedure before at Diablo Canyon?

MR. BECKER: Yes. That's a good question. Yes, in fact, we have. That procedure is taken out any time we have an earthquake that we detect on-site. And so we have had, in the past operation of the plant, other earthquakes, smaller, in terms of ground acceleration, than this one, but we have had other earthquakes where the procedure has been used. And in fact, just six weeks or so prior to this, in October, we had a smaller earthquake, and that procedure was used in response to that earthquake as well.

MR. GWYNN: Thank you.

MR. BECKER: So that concludes my discussion about what the operators did with respect to the EH, or electrohydraulic pump.

And then, per procedure, teams are dispatched

through the plant to do walkdowns. And those teams consisted of people from Operations, Engineering and our safety organization. And I'll get back to the results of those walkdowns in a minute.

Okay. So this is the second of the two slides talking about the chronology. So moving on.

There is an instrument in the control room called an Earthquake Force Monitor. And that's a monitor that reads a maximum upscale deflection, if an earthquake were to occur. So what that means is if there is ground motion, if there is acceleration, that recorder is going to record the peak acceleration that was detected on-site.

In this case, the reading that was observed was 0.04 g's, as I think that has been referred to earlier. I would also point out, and I would compare that 0.04 g's to the value of our seismic reactor trip-set point. I think Larry mentioned in his opening comments, that is set at 0.3 g's, so we are talking roughly 15 percent or so, if that set point was the peak acceleration felt on-site during the earthquake.

That reading is significant in a few ways. One is that it puts the earthquake in a certain category. As I mentioned earlier, the procedure has varying levels of actions, based on the severity of the earthquake, so that

directs the operators to a certain section of the procedure. It also triggers us to declare what we call a "Notification of Unusual Event." For that magnitude of ground acceleration, that's what we would declare, an NUE, or Notification of Unusual Event, as you know, is the lowest of the four levels of emergency declaration at the plant.

So following the procedure and reading the Earthquake Force Monitor, the control room staff at 11:22 declared a Notice of Unusual Event, per procedure. Within 12 minutes, we had notified the State and County of the Notification of Unusual Event. In the next 24 hours, I believe, we made five follow-up notifications to the State and County to let them know what we were doing with the plant, what the situation was at Diablo Canyon.

We also dispatched -- although it is not required for an NUE -- we also dispatched some of our personnel to the emergency operations facility in San Luis Obispo to assist the County, both in responding to the event countywide, and also in answering questions about what was going on at Diablo Canyon, so that action was also taken.

I mentioned it was about a 24-hour period where we were making updates. The reason we held the Notification of Unusual Event status open for that long,

for 24 hours, was twofold. We, after talking with our geosciences personnel post-earthquake, we learned that the greatest likelihood of a significant aftershock exists in the first 24 hours after the main quake, so we felt it would be prudent to wait for that time period to pass, before we decided to terminate the Notification of Unusual Event.

Additionally, we wanted to take the time to use our seismic instrument, de-log the instrumentation, so we downloaded all the data off of it, and also reset the instrumentation so that if another earthquake were to occur, we would accurately measure the level and implement the emergency plan at the proper stage. So for those two reasons, we did delay for about 24 hours; it was the next day before we terminated from the NUE.

And so now to get back to the control room and the plant walkdowns. I mentioned they were dispatched per the procedure, earlier. There actually are several phases of walkdowns that occur. The operators and safety personnel are dispatched by procedure to basically pretty much the entire plant to look for any signs of a fire or damage to our fire protection or fire detection equipment. So those walkdowns occurred in a period of several hours after the earthquake.

There are also plant walkdowns performed by

members of our engineering staff. And those are system walkdowns in selected areas of the plant. And they are looking for damage to plant systems, structural damage, leaks, you know, anything like that. So those walkdowns were also started in that same time frame.

And then in the control room, there is a series of walkdowns done by our control room operators. They scan our instruments and actually record the values of the instruments in the control room, and then come back a period of time later and repeat that scan, and repeat recording those values. The reason you do that is to look for a change; a change in a level, a change in a pressure could be an indication that there is a problem developing with that system, so that's why we do that, post-earthquake.

All those were done that day. And we are talking about a six-hour time frame, from the time of the earthquake until all those types of walkdowns were completed.

And then finally, as part of our lessons-learned effort, that I'll get into in a second, we also ask our engineering staff to do site walkdowns in the days following the earthquake. These are not so much in the power plant, as in the other structures, the administration building, other structures on-site, and

also to walk the grounds, looking for any signs of soil movement, things like that. So those occurred in the days following the quake.

To summarize the walkdowns, all walkdowns were completed, and they were completed satisfactorily. There were no indications of damage as a result of the walkdowns.

Now, I'll get into the lessons-learned part.

MR. GWYNN: Excuse me. Before you go forward, I would just like to make a comment, from my own perspective.

Of course you know that almost immediately following the feeling of the ground motion at the plant, our on-site inspectors responded to our control room and established communication with our response centers, both in headquarters and in Arlington, Texas. And so we had very quick information and feedback from our on-site safety inspectors. And of course, David is going to brief the community on those actions later in the evening.

But very shortly after we got our initial reports from the on-site inspectors, we saw that the national news media started to pick up what was mischaracterization of the situation at Diablo Canyon. And so when I saw that your emergency response

organization promptly corrected that information and got the facts out to the community, I thought that that was a very responsible action on the part of Pacific Gas & Electric Company. Of course, if we had a question about the validity and veracity of that information, we would have made our own statement to the media.

So I just wanted to mention that I thought that that was exactly the right thing to do at that time.

MR. BECKER: Thank you.

So Larry, we'll move on to our lessons learned. Before I get into the lessons learned, some perspective on it. In looking back on what we did that day, we feel that we handled the event -- overall, our handling of the event was a success. And the reasons that I say that are we properly implemented our procedure; we used it to classify the event properly, per our emergency plan; we completed our walkdowns; the plant operated well through the event; all our safety systems worked as designed, and finally, we had no personnel injuries on-site. So we do look at our handling of the event as a success. But like I said earlier, the way you get better is by always taking an opportunity to learn, going forward. So this is what this represents. Our lessons-learned effort is an effort to learn from this event.

So we put together what we call an Event

Response Team. This is a mechanism that we've used over the years at Diablo Canyon. When something has happened, we put together a multidiscipline team. In this case, we had members of Operations, our training organization, Engineering, Maintenance. It's headed up by myself. And we get together, and we look at what happened. We look at what our responses were. We look at how our procedures worked, et cetera. And we look for opportunities to improve from that. And I'll go into some detail now as to where we've been looking at what sort of actions were taken.

So we divided our efforts up into several areas. And the next two slides show the areas that we focused our efforts on in the Event Response Team, so I'll briefly step through them.

In the area of personnel safety, like I said, we are very glad that we had no injuries on-site when the earthquake happened. Looking back on it, we have decided and have completed some personnel safety training for our own employees. And this consists of guidance. Next time that they experience an earthquake, whether they are at work or at home, what sort of commonsense actions can they take to protect themselves. When an earthquake hits, you don't have a lot of time to think about it, so if you've thought ahead of time about the actions you

would take in an earthquake, there is a high likelihood that you are going to do it and you're going to help protect yourself. So we've done that.

And the other thing that fits into this category is the engineering walkdowns, the site walkdowns, those follow-up walkdowns I talked about, those were aimed at verifying the safety of our site structures and the site overall, and that action is now complete.

In the procedure revision area, this is about our Procedure M-4 that I referred to earlier, a few things we're doing there. We are reformatting a bit to improve the human factors, make it easier to follow. This is based on comments of the individuals that were using it that day. And the folks that implemented the procedure on the day of the earthquake, they also used their judgment to take some additional steps, to do some additional checks and things like that, that actually would not have been required by the Procedure until we had a larger earthquake. But in their judgment, that was the right thing to do. And looking back on it, we concur with that. So we are going to change the procedure to require those sorts of actions that were taken in good judgment, but we're going to require them in the future for this type of an earthquake. So those are some of the

changes we are making in the procedure.

In the emergency plan implementation area, there are two things I would talk about. First of all, I talk about the logic and the reasoning that went into maintaining the NUE status for 24 hours. Looking back on it, we think that was appropriate, so we are changing our M-4 procedure to have those requirements for the next time there is an earthquake. We will follow that same logic about giving -- you know, giving time for aftershocks and resetting our instrumentation, before we terminate from the NUE.

I would also point out that we are aware that there were 50-some sirens in the county, that went out of service during the earthquake due to the loss of power that occurred in the county. And we have been informed, we have verified that the County has a standard operating procedure, in the event that the sirens are lost at any time, for backup mechanisms to alert the public to tune in their radios to the broadcast. And basically, that would be using emergency personnel, fire and police, to do that.

In the training area, I mentioned the personnel safety training we did. We are also planning to train our operations staff on lessons learned from this event, the changes we are going to be making to the M-4

procedure. And we will also run our simulator to bring in some of these sorts of alarms and indications the operators saw that day, so that what they experienced and saw that day, other crews get a chance to see that on the simulator and practice it, so we will be doing that in training.

A couple of things in plant system response. In the operations area, what I'd point out is the EH pump trip that I talked about earlier, we will be changing the design for that trip. We don't want that to happen. We don't want that to challenge the operators, if there is a earthquake in the future. Like I said, that was a spurious trip. So we'll be changing the control system for those pumps, to prevent that from happening in the future.

Also in the plant systems response area, our engineering folks have looked at our plant systems and how they responded during the earthquake. I mentioned the alarms that were received in the control room. Some of these alarms were brought in by what we call mercoid switches. These are on the secondary or nonsafety-related part of the plant, but they are a switch that has mercury in them. And in the shaking of the earthquake, it caused the switch to change state repeatedly. This brought in alarms. There were on the

nonsafety side of the plant. But nevertheless, the alarms are a challenge for the operators, from a standpoint of handling that information. So we're going to be going through and modifying some of these switches so that if we have another earthquake, the operators won't be challenged with the spurious alarms that they had to deal with this time.

MR. GWYNN: Can you give me a sense for the schedule that you have to complete that work? Because I agree with you that having that sort of a distraction for the operators is not a desirable situation in this circumstance?

MR. BECKER: Right now, the first thing we need to do is evaluate the switches that we want to change out. And we want to have that evaluation done by the end of this month. From there, we are going to have to look at what switches they are. Some of the switches, I am sure, would require an outage to go in and do. So I am sure we will be doing those in the next available refueling outage.

Other switches, I'm imagining could be done on-line. So it's going to depend on the location of the switch and the nature of the switch with the schedule. Our first step is to do the evaluation, and that's what we're going to be focusing on.

One other thing I would add, in the plant systems response, we have what's called a relay chatter analysis that was already existing at the plant. And it looked at, if we had shaking like this, what relays or other devices would change state, sort of erratically, because of the shaking. And we compared what we saw in the control room and in the plant that day to this chatter analysis, and the results were consistent. Chatter analysis looked at safety-related and shutdown-related systems, and we saw no problems with those systems, as reflected in the chatter analysis. The issues I've been talking about were in a nonsafety-related part of the plant.

And finally --

MR. JONES: One question for you. To kind of clarify some previous history at Diablo Canyon, and I'm trying to use the opportunity to evaluate the information you received from the San Simeon earthquake, understanding up front that the horizontal and vertical accelerations of the ground that were seen was significantly less than what the facility is designed for.

Going back to 1981, I think it was referred to as the mirror-image issue at Diablo Canyon, which in essence dealt with some seismic supports for a

containment spray and also -- I think it was the main feed water system associated with Unit 1. And as a result of that, you initiated an independent design verification program.

What I would like to understand is in your review and evaluation of the data so far, have you seen that the Unit 1 and Unit 2 containments, given the response to the San Simeon earthquake, were as you expected in both cases? Were they similar? Have you seen any differences? Any differences in the accelerometer readings between those two?

MR. WOMACK: It's been completely consistent. And in all candor, I've got to point out that we have, as I said earlier, a sensor at the base of the Unit 1 containment, a sensor at the top of the Unit 1 containment. The response of the sensor at the top of the containment was completely consistent with the analysis models and licensing basis. So really, on that basis, I conclude that the unit containment performed similarly.

So I think, in short, they were completely consistent with what we determined originally and through both the design verification, independent design verification program, and most importantly, the Long-Term Seismic Program, because that program did go back and

look at those structures for their capability.

MR. JONES: So you saw no differences in any seismic supports that had actually moved, or any hangers between Unit 1 and Unit 2 containment walk-throughs?

MR. WOMACK: In the course of the walkdowns, and Jim could add to this as well, we've seen nothing that is surprising to us. It's totally consistent with what we would expect in response to this type of shaking.

MR. JONES: Thank you.

MR. BECKER: So to wrap up our lessons-learned effort, in the plant response area, Civil Engineering and Geosciences have taken some actions. I talked about some of the walkdowns that have already occurred. We are going to be adding to that walkdown guidance so that in a future earthquake, we can use that as part of our walkdown strategy in the plant.

And we also tasked our representatives from Geosciences on the team, basically verifying what Lloyd had talked about earlier, with verifying that the site structural response was within what would be predicted by our models for an earthquake of this magnitude and location. And as Lloyd went through in some detail, the answer was yes, it was consistent with those predictions.

Finally, in the security area, we did security walkdowns after the earthquake. We did not have problems

with our security equipment that affected our security plan; however, we will be adding to our plans to define security system walkdowns so the next time there is an earthquake, we'll have a preplan for doing it, and that's the action we're taking there.

So that completes my overall chronology of the event and what we're doing in the lessons-learned area.

MR. OATLEY: I'd like to wrap this up. It's been a long presentation, but I'll conclude with basically what Greg opened with. The Diablo Canyon Power Plant has a very robust earthquake design. The San Simeon earthquake characteristics were very typical for this area, and anticipated in the tectonic models used in the design for Diablo Canyon.

The ground response at Diablo Canyon was less than what we predicted for this type of earthquake. And I believe Lloyd called it "puny," relative to our design.

Diablo Canyon structures performed as expected. There was no surprises there in our analysis. And PG&E's response, subsequent to the earthquake, was very thorough. We know there was no damage, because we have looked. We did the physical walkdown detailed of all our buildings, all our structures and components, and there was no damage to the facility. We also tested our safety-related equipment to verify that it would start

and operate as designed.

And finally, Jim Becker talked about incorporating other lessons learned to train our operators, in the event that we have another earthquake like this, so that we are better prepared. And that really concludes our presentation to you this evening.

MR. SHUKLA: Mr. Oatley, I have a question. When you say that there was no damage observed, do you have any reason to suspect there could be some hidden damage or subsurface damage that you could imagine?

MR. OATLEY: I'll answer that two ways. One, this earthquake was very small, compared to our design. So given that, it would be surprising to have something like that. Second, we did walkdowns of all the visible areas of the plant and found nothing, and the testing of our equipment found nothing. So I can't imagine that there would be something like that that occurred.

Now, as part of our license, we have in-service testing we must do. We have to do various radiographs at times, various other testing going forward, as part of our routine operation of the plant. And if there was anything like that, our regular inspection program would detect it going forward. And of course, we would have to notify you at the time.

MR. SHUKLA: Thank you.

MR. SATORIUS: Were there any other questions from the staff?

We typically poll our staff to see if there is a need for us to meet outside of the meeting to see if there are other issues we need to discuss. I am looking at the staff to see if -- there appears that we've gotten the answers to our questions that we've asked.

Pat, did you have any concluding comments that you would like to make, prior to moving on to the next portion of the meeting?

MR. GWYNN: I would like to thank Pacific Gas & Electric Company for taking the time to meet with us this evening. I think it was important for us to hear this report.

We still have ongoing reviews. Of course, we need to get our supplemental report, for us to continue our review, and we are looking forward to the additional report, once USGS and Pacific Gas & Electric come into alignment on the analysis of the earthquake results. So we do appreciate your meeting with us this evening and sharing this information with us and with the local community.

MR. OATLEY: Thank you.

MR. SATORIUS: And I guess lastly, if we could get a copy of your presentation, such that it could be

combined with the meeting summary and be available for the public; we would appreciate that.

MR. OATLEY: We will make it happen.

MR. SATORIUS: Thank you.

The next part of this meeting, which will remain open -- we have completed our business with Pacific Gas & Electric -- is to open up the floor for comments from members of the community.

What we would like to do is Victor Dricks, our public affairs officer, will kind of take a role and, I guess, moderating the questions. We would like to ask everyone to limit their questions to five minutes. And also, be aware that after -- immediately following this meeting, there will be a meeting solely between the NRC and members of the public for us to brief the members of the community on our inspection activities, and then to take questions on our inspection activities and other issues that the members of the community may have.

So we will take questions from the community now on this particular aspect of the meeting that we performed with Pacific Gas & Electric.

And Victor, would you just --

MR. DRICKS: Yeah. I'm Victor Dricks. I'm the public affairs officer in Region IV. What we would like to do is we've set aside plenty of time this evening for

anyone who wants to speak and ask questions. What we would like to do at this portion of the first meeting is ask you to restrict whatever comments or questions you have to the technical presentation that you just heard. And then when that's finished, we will take a brief intermission, five or ten minutes, and then have a second meeting, which is specially designed to allow you all to ask what questions you have on a variety of different topics.

So, anyone have a question?

Come up to the podium. Please identify yourself, if you would.

You are a familiar face.

MR. WEISMAN: Thank you. My mother says that often too. In limiting the question to the matter at hand, it would have to do, I guess, with the somewhat -- seemed to me, a pretty glib and facile answer to the failure of nearly half the sirens in this --

MR. GWYNN: I'm sorry. Could you identify yourself?

MR. WEISMAN: You're right. I'm such a familiar face. I thought that spoke for itself.

MR. GWYNN: The court reporter didn't hear you.

MR. WEISMAN: David Weisman, Morro Bay.

MR. GWYNN: Thank you, David.

MR. WEISMAN: Where were we? Oh, yes.

-- glib and facile answer to the reason that nearly half the sirens in the county were without power. What it seemed was that was just passed off as the county has a standard operating procedure, and the county has to deal with the backups needed for that. And I am reminded that the only reason this county has sirens is because Diablo Canyon is here. So it would seem to me that sort of throwing the responsibility onto the county doesn't actually answer the question, which is, one, why was there a loss of power, why is there no backup power provided to these sirens? Two, to the NRC here, didn't you experience a loss of power and siren thing at the big, blackout thing of the east coast last summer? Shouldn't things have gone into effect immediately, issued, saying "Wow, when power is cut, there could be an emergency. We need to have backup in place."

Radios and television, that would be great, except for people in A.G., and Grover Beach, and all who didn't have power or television to turn them on. I suppose you could go down and get in your car in the garage, hoping to keep the door open when you turn it on, and listen to the radio at that time.

But what we didn't hear is why did the power fail to these? Why is there no backup system? You know,

I've driven by. I've seen those sirens on the side of the road. You've got a pole, you've got a siren. About 10 feet up, there is a big shelf with a big box on it. All these years here, I've always thought that's where the backup battery and the radio transponder are getting a signal, in the event the land lines go down, was. But see, I'm not an engineer, so I don't know what's in the boxes on the siren tower. So given that, I'll limit this just to the questions involving this; that would be the first question.

And the second was, if it was prudent to hold the Notice of Unusual Event open for 24 hours because there could be a substantial aftershock, and I don't think it is unusual. It has occurred that there has been an aftershock that ends up being more powerful than the initial shock. It has happened in places in the world, not necessarily here. If it was prudent to hold it open for 24 hours, why not get a -- ramp down the power as a precaution, make sure that battery backup generators were there to keep cooling water flowing and so forth, because the public didn't get that impression at all.

I'm also curious, please, if you could clarify when the statement was made that the national media had suddenly picked up some misinformation. I don't know. I started taping KSBY about 15 minutes after the event

occurred, once I was able to get past all the broken glass in my kitchen. And I didn't hear any national misinformation. So if you have an indication as to what that national story was and the text of it, I would be quite interested in hearing.

Thank you. That will be the limit for this.

MR. GWYNN: With respect to the alert and notification system that's required by our regulations for this facility, that process is administered through the Federal Emergency Management Agency and San Luis Obispo County, and so I think that's why you heard the type of an answer that you did. I personally am not intimately familiar with all of the provisions of the County's emergency plan for Diablo Canyon. But I know that in general, those Federal regulations that relate to alert notification systems provide for backup systems that do alert and notify the public. And I am just not familiar with the specifics of this emergency plan. Perhaps Pacific Gas & Electric could give us some Particulars.

MR. OATLEY: I'll start answering, and if Jim Becker has anything to add, please chime in here.

I would like to address this in two parts. First, there was a question on why the loss of power. Clearly, the earthquake caused a lot of damage to our

distribution systems which deliver power to this neighborhood, which took about 24 hours to restore it fully to service, although most of the sirens were restored much, much faster than that.

The box on the side of the pole, that was referred to, is for the radio transmission system, for the signals to get to the sirens. The sirens are powered by the power pole they sit on. While there is no requirement for backup to the sirens, we have thought about that, and the County has thought about that, in the context of what Jim Becker has mentioned, in that it is always possible you could lose siren power.

Our new system we installed a few years ago now provided immediate information to the County's watch commander on whether there has been a loss of a siren in the county, and whether it's due to power loss. So we know what sirens have been lost, we know where they're at, and that information is available to the local emergency authorities, to dispatch police or fire to use their public address systems and notify the County.

Now, many of the larger centers with people in it, such as hospitals and the like, have another way of gaining information. That's called a tone alert radio system that we've provided them, that's automatically activated upon the emergency broadcast system being

activated, and tells them what's going on. They don't need the siren nor a separate radio to get information there. So that's really the siren power and how that works.

Now, this has been evaluated by the Federal Emergency Management Agency, the tactics and strategies, and we in the County of San Luis Obispo use -- are consistent with what's used elsewhere in the United States, not only for nuclear power plant emergencies, but emergencies of other natural disasters.

Communication by use of public address system, with the sheriff's department or other emergency vehicles, is a very viable way of communicating with the public in areas where there are no sirens and where natural disasters do occur.

MR. DRICKS: You had also, if I understood, asked a question --

MR. WEISMAN: Why the power, if it was held as an unusual occurrence --

MR. GWYNN: That was your third question. I think your second question related to misinformation. And that was a personal observation that I made in our Incident Response Center. In our Arlington, Texas, offices we continuously monitor several national news media -- CNN, Fox News, others. Typically, they run

tickers at the bottom of their screen, with text. And it was a ticker that came across one time. And to be honest with you, I can't recall the exact report that was being made. I can only tell you that what I saw was inconsistent with what we were being told by our resident inspectors.

MR. WEISMAN: Then we can use that when we look at the national media and we hear other stories, to kind of judge what we think of the tickers on the bottom of Fox and CNN.

MR. DRICKS: If I recall, I think it said the plant had shut down. And that was not the case, which brings me to the third question you asked, which is why didn't the plant shut down. And if I understand correctly from the presentation from the folks of PG&E, and also from our own technical staff, the size of the earthquake was such that it wasn't necessary for the plant to shut down. It was such a small fraction of what the plant is able to operate through, that there was no reason for the plant to shut down. And in the event of a real emergency, power might be needed from the plant for emergency functions.

MR. OATLEY: If I could add two statements to that. That's very accurate. I would like to add that we were in constant communication with Lloyd Cluff and his

staff regarding the aftershocks that were seen and what did they mean, and that factored into our decision. And we also had, as mentioned earlier, an automatic rapid trip-set point well below the design criteria for Diablo Canyon, so in the unlikely event that we were wrong, the reactor would automatically shut down, before exceeding any of our design limits.

MR. GOTHRUP: My name is Bill Gothrup. I was a seismologist for the USGS for a number of years. I also teach seismology here at the local university, Cal Poly.

I've dealt a lot with Lloyd in the past, and we've agreed on a lot of things, and I agreed very much with what he said about this particular earthquake; that it's far enough away, small enough that we would expect to have accelerations fairly low from this particular earthquake, at the power plant.

Some of the areas where I disagree with Lloyd relate somewhat with the mechanism of the earthquakes that occur right near the Hosgri Fault. I've done a lot of work with looking at some of the older earthquakes along the Hosgri Fault, and found significant thrust components along there. I know a number of the earthquakes you've seen recently have been more strike slip, but I do know that there is actually -- can't say the earthquakes are on the Hosgri Fault. We couldn't say

that unless they actually broke through the surface, but they are right in the vicinity where the Hosgri Fault is.

A second place where I tend to question some of this stuff is when we look at a very, very near field, what the accelerations are when we get very close to the fault rupture itself, data that is right next to the fault rupture is extremely scarce. We know that there is, for example, in the 1971 San Fernando earthquake, the accelerometer at the Pacoima dam measured 1 1/4 g's from an earthquake, which was 6.8, I believe it was, 6.9, on the Richter scale. That's one of the few data points we have very close to the earthquake.

And when he showed the plot that came up to clear zero distance, everything tends to curve over to where it seems like the accelerations get almost stable, when you get in close to the fault. I don't think that there is information that says that it actually should necessarily curve over. In fact, with the scarcity of data, if anything, being conservative would say you shouldn't really assume it would curve over.

If you have most of your measurements from fault ruptures which are very deep in the earth, you have that extra distance from the brittle part of the fault giving off the energy to the surface, even if the fault were right underneath where your accelerometer is.

In the case of some of the thrust earthquakes, it's quite possible you have a fairly brittle zone right up near the surface. You can exceed much higher accelerations from a thrust earthquake, just because the brittle zone does get much closer to where you can get your accelerometers.

The other thing which I am a little concerned about is when they talk about how far offshore the Hosgri Fault is from the power plant. It's quite possible to map faults that are onshore. It's also possible to map faults which are well offshore, where you can bring your boat in and do a seismic line out. But the very near-shore region, what we call the transition zone, generally requires a completely different kind of survey to figure out whether you actually have faults right next to the shore.

The question I have is, Has a transition zone survey been done in the vicinity of Diablo Canyon to see if there are any faults that are right next to shore, but not actually onshore where a geologist has been able to map it?

MR. SATORIUS: If I could ask you a question on your second issue. And that is, if you look at the one chart -- I believe it was the log-log chart -- rather than it being a curved plot, you would suggest it might

appear more linear, from looking at it?

MR. GOTHRUP: Potentially. The amount of data you have in the very close-in region is so sparse that it's hard to say really what it is. And that's really the critical area where you could see the very high accelerations. And it's also where you could see the power plant being very, very close to a thrust fault or a thrust component of an earthquake fault out there.

MR. SATORIUS: I just wanted to make sure I understood what your position was. Thanks.

MR. CLUFF: Did you want us to say anything, or just keep quiet?

MR. GWYNN: Well, we do not have a staff seismologist with us tonight. Of course, we have a number of seismologists, both on staff and under contract to the agency. We sometimes utilize USGS as a consultant. I think you've raised some concerns that are worthy of discussion amongst our seismic staff. And for that reason, what I would like to do is take the record, go back to the office, have them look at what you've said. And then, perhaps we can provide a written response at a later date, if that's acceptable to you.

Pacific Gas & Electric, is there anything that you'd like to say at this time, with respect to the comments that we just heard?

MR. CLUFF: Just a couple of quick ones, because Bill and I could talk for the next hour. And it would be very entertaining to us, but maybe not the audience.

The Long-Term Seismic Program was aimed at answering the questions that Bill has raised. And I would ask him to go back and read that. I understand Bill has never read our report.

MR. GOTHRUP: Not true.

MR. CLUFF: Well, that's what you told me the other -- last summer, that you hadn't read the whole report.

But nevertheless, it doesn't mean that our opinions get changed. And Bill raises some important questions. I completely agree that they are important questions.

But with regard to his question about the flattening of the attenuation curve, we've discovered, in the last several years, some very dramatic changes in helping us get insights into that, and it surprised us all. And that is that in many earthquakes, and big ones that I'm thinking of are the two big earthquakes in Turkey in 1999, where we had good recordings within a short distance from the source of the earthquakes. The near fault would cause that fault to go way down, because

there was hardly any shaking near the fault. It had to get out a ways before that could come back up, in both of those earthquakes.

In the Chi-Chi earthquake in Taiwan, a thrust earthquake, to address your other question, Ben Sign, who was a member of our staff, during the LTSP, is the chief seismologist in Taiwan. He installed 600 strong motion recorders within a year; he returned to Taiwan to take over that program, and then they had this big earthquake, a magnitude 7.6.

The fault slipped 8 meters in one location. In one location, on the hanging wall, they did get some accelerations of -- approaching 1 g, in one place slightly more. But right next to the fault, on both the waning wall and particularly the foot wall of the fault, the ground motions were hardly detectable. There were buildings that were unreinforced masonry within a few tens of meters on the down-thrown part of the fault. I walked through those houses. The dishes in the cabinets were not even disturbed.

So all of a sudden, we are seeing it depends. It depends on how the fault ruptures, what kind of buildings are there, what the site conditions are, and I have seen that. I have investigated about 50 destructive earthquakes in different parts of the world. And I keep

coming back, telling the engineers that I see a lot of evidence for near-source effects, depending upon the frequency, that we are worried about, where the ground motions are not very strong.

When you get out a ways, you get the travel path, basin effects, and site effects. You can get a lot more damage out at 10, 20, 50 kilometers than you do right next to the fault, so it's a very complex question.

The Pacific Earthquake Engineering Research Center that's headquartered in Berkley, that we are a partnership with, with the Energy Commission and Caltrans, are addressing this question and we have a program called "The New Generation Attenuation." And later this year, you will be seeing the first revisions of all these attenuations that are going to show all these variations. So I would invite you to keep up, and I will make sure that I send you a copy of some of this.

There is a number of other things that I would like to get into, but I think that's enough for right now.

MR. DRICKS: Next question.

MR. MARKS: My name is Steven Marks. I live in San Luis Obispo. On December 22nd, I found myself enjoying the bumping and shimmying of the earthquake as I stood in my study doorway, but then immediately being

quite frightened and anxious about what was happening at Diablo Canyon. I phoned the television station to see if I could just get some news about what was going on there. They said, yes, they had experienced the earthquake quite dramatically too, but they had no information from Diablo Canyon. They didn't know anything about what was going on out there. There was no other source of information. I phoned a radio station; got no information.

About 15 minutes later, I again called the television station. At that point, they just had received some information that there was no damage there. I was quite relieved at that news. But that experience, together with the information I just got tonight about the sirens not working, makes me feel that there is some serious problems about communicating with the public, who are directly affected by this tremendously dangerous facility that we live near. And I think that there really should be some exploration about passing information out to the public. If there was a more serious earthquake, if it was an event where there was some damage, if the conditions of communication and reporting that were in place in this nonsignificant event, the lack of communication could have had disastrous effects. Thank you.

MR. DRICKS: Let me respond to that, if I may.

Let me suggest that I'll give you my card. You can always call our office, and we had information available within five minutes of our folks reporting to the control room, as you'll hear in a few minutes.

I can't apologize for the media. I didn't get any calls maybe until 30 minutes or an hour after the first earthquake, and they were from local media in the Dallas/Forth Worth area. I believe the licensee issued a press release, and how quickly the news media in the area disseminated that, is something -- I understand your concern there.

But certainly, in terms of getting information from the NRC, you certainly should feel free to give us a call, and we will share with you the information that we have. I apologize for your frustration.

MS. GROOT: My name is Henrietta Groot here. I'm here on behalf of the local chapter of the Sierra Club. My first question is kind of a follow-up on the question that Mr. Jones asked. I felt that either I misunderstood his question or it wasn't adequately answered. I think Mr. Jones asked whether there was a similarity in the readings of Unit 2 and Unit 1. And I believe the answer was, "We didn't measure Unit 2. We just concluded it was okay, based on the measurements from Unit 2" -- "from Unit 1."

Did I misunderstand your question or was that --

MR. JONES: That dealt with the nature of the question, and it also dealt with some other information I had from my on-site safety inspectors, David Proulx and Terry Jackson, and the walk-through that was actually performed of the Unit 2 containment, my understanding of the answer that they gave me. So I have some additional information in assessing what came forth.

What I was interested in was the response of the components within the containment within both units and understanding the accelerations in Unit 1 and also the visual inspections that we performed in Unit 2. And Mr. Proulx is going to address some of the inspections we performed immediately after the San Simeon earthquake on December 22nd, as well as follow-up inspections, but I did have some other information, relative to that.

MR. DRICKS: Let me add, if I may. I heard their response, and I came away with the same impression that you did, that what I thought they said was, "We measured the acceleration at the top of the containment and at the bottom of the containment of the same reactor, and they were equivalent." And somehow, it seemed to me that you were drawing a conclusion, then, about the behavior of the other containment. Maybe I

misunderstood, but I heard what I thought you heard.

MR. GWYNN: Could Mr. Womack perhaps clarify his answer, for the benefit of the audience.

MR. WOMACK: Thank you. And yes, indeed, what I did say is we looked at the instrument at the bottom of the Unit 1 containment, we looked at the instrument at the top of the Unit 1 containment. That comprises our instrumentation on-site for the containment structures.

As Mr. Jones remarked, both PG&E and the NRC conducted thorough walk-downs of the containments. Our review of the containment walkdown information for Unit 2 revealed no difference in its response, and the systems and equipment housed within the containment, than we saw on Unit 1. But you are correct, I did say that we don't have an instrument on Unit 2.

MS. GROOT: It was my understanding that actually, there is supposed to be some difference in the two units. But let me drop that now and go to my next question.

I expected some report on the spent fuel pools. I have here the report, the January 30 report, the NRC Integrated Inspection Report, which mentions that some sensors in the control room reported sloshing in the spent fuel pools. And that got me to thinking about a whole bunch of things.

You said the buildings behaved as per your modeling, your original model. Now, did the spent fuel pools behave in accordance with the model? And then, of course, I remembered that the spent fuel pools have a lot more spent fuel in them than they originally were supposed to have. So if you had a model, did you update that model?

MR. BECKER: I'll start with that. The design of the plant does model that if we have an earthquake, any tank where there is a water or a fluid, the level is going to move around, just like it does in a swimming pool. If there's an earthquake, the water does move around. And so that is predicted in our design. And in fact, when the earthquake occurred, we did see that in various tanks, and we did see that in the spent fuel pool. Like you said, we did see the water sloshing around, as it's called. That's one of the reasons I talked about the control room walkdowns where there is a walkdown done, levels are checked, and then you come back later and do a second check. That's one of the reasons that we do that, is to see if, over time there really is a change in the reading.

So what you said, did the water in the spent fuel pools slosh; yes, it did. Is that something that was incorporated or included in our design; I believe the

answer is yes, it is.

MS. GROOT: I didn't hear mention of any model, though.

MR. OATLEY: We have some more answers to that, if we could, to finish the answer to the question.

MR. WOMACK: I was just going to add that when you brought up the question that do we have the capability to store more fuel in the spent fuel pools than was incorporated in our original design. When we modified that design, in the mid '80s, as a part of the engineering verifications for that, we accounted for the weight, the added weight of the additional fuel in that structure, and the earthquake-driven interaction that that -- those fuel racks, the fuel could have with the structure. That was thoroughly assessed in our design, was thoroughly reviewed by the NRC, and a part of public hearings, with regard to that modification of the plant, so it was thoroughly developed.

And I guess with regard to the question about modeling of water sloshing, really, that doesn't have to be anything real sophisticated. We know by experience and can predict, based upon the type of input motion, whether a tank or a pool, like the spent fuel pool, whether the water will slosh and how much or how high it will slosh. That really has no effect on what's going on

down at the bottom of the pool where the fuel is stored. That is a surface effect within the pool.

MS. GROOT: Thank you. And if I may make a suggestion in parting, I would suggest a bit of alternative energy for the power pools, as backup to the lost power for the sirens.

MR. GWYNN: Excuse me, ma'am. Mr. Bagchi with the NRC also has some information to provide in response to your question. I'm sorry.

MR. BAGCHI: You asked a very important question that it was initially licensed for a certain amount of spent fuel. Whenever they have to change the capacity, it is a license amendment. A detailed review is performed. I am familiar with the upgrade, and the model was indeed changed to incorporate the weight of additional fuel that's going to be stored there. So it was thoroughly reviewed by the NRC.

MR. DRICKS: Before we continue, we have been meeting now for two and a half hours, and let me just ask the audience, do you want to take a brief five- or ten-minute break and come back and ask some questions, or do you want to keep at it? Okay. Because we have really a second meeting that's planned that's similar to the format in this, but if you want to just keep going, we will just roll along.

This gentleman in the front, I know you've been waiting patiently.

MR. BLOCK: Thank you.

My name is Lou Block. I want to make it clear, I am here representing myself, but I am a registered geologist and geophysicist here in this state, as well as a certified engineering geologist and certified hydrogeologist.

And I did want to thank PG&E for the information on the seismicity of this area, and their geologic work. I think it's been very beneficial to us locally, and it provides some of the best information that we have, not that we don't need more. And the by-product has a real benefit to our community.

In this case, PG&E had evaluated some of the fault activity along the north coast and recognized this activity. That recognition was not carried through by the government agencies, so the probabilistic seismic hazard map of this area that's published by the government agencies, underestimated the type of accelerations that we would see, which was kind of interesting.

I do hope that you'll be able to continue to share this information. I also teach geology and seismology at the local university. And I think it's a

real benefit for us to be able to share that with the students. And if you've got a video of that seismic change in your pools, that would be really nice too. We would love to have that.

One of the things -- and again, if you can provide that on-line or on CDs so we can get the color graphics, that would be helpful.

I would like to request that, if possible, for the seismic data information from your seismographs, which do fill in an area which really does not have adequate instrumentation, could be tied in somehow real-time with the U.S. Geological Survey, again so that it would benefit the overall community as quickly as it does PG&E. Hopefully, there is some way to resolve the fire wall issue or whatever, and let that happen.

And then just a couple questions in our evolving understanding of earthquakes that I was hoping to maybe prompt you to investigate, if you haven't already, and perhaps you have. As a result of the Northridge, Kobe, Denali, and several other earthquakes that I am sure Lloyd has been tromping the ground on or flying over in a helicopter, we've seen some vertical accelerations approaching the 1 g zone and horizontal accelerations approaching the 2 g zone, and maybe a little bit above in some cases. And it's not fair to say

that that's going to happen at the power plant. But it would be, I think, instructive and helpful for folks to understand why this new information that's been developed in the last few years is not something that applies specifically at the power plant, and what is it about the site characteristics.

And then the second aspect of that is that there was always a disconnect between the geologic and seismologic community and the engineering community about how to translate these peak ground accelerations to something for an engineered structure. And I had the opportunity to attend George Housner's symposium at Cal Tech, where he said after 40 years, that he would back off his .4 g as the appropriate acceleration for a structure; that a little more work and cooperation between those geologists and seismologists and engineers had to occur, in order to come up with the appropriate accelerations. And I am hoping that's being used to reevaluate the different faults in this area, what they are capable of, and how that relates to structures. I think that would be very, very useful information.

And then secondly, we have learned a few things with respect to multiple faults linking up to create an earthquake, such as we saw in the Landers earthquake or the Denali earthquakes, where fault segments that

previously had been said, "Well, the earthquake won't be that big, because only that segment will move." But we see multiple segments linking up to form larger earthquakes.

And so in this area, again I am urging understanding, it's not trying to say this should have been done before, but the Los Osos Fault and the northern Cambria Fault may actually be linked by a feature that goes through Estero Bay, and so that's a fault that may have a greater length and may be something worth looking at.

But perhaps even more importantly, the Sur/Nacimiento/Oceanic/Hausna Fault system, which Clarence Hall has identified as the granitic rock Franciscan basement boundary for the basement rocks through this area potentially could link up and form a larger earthquake as well. And I'm not sure anyone has looked at that yet, but Hall has published his information. And we have just had an earthquake on or near that feature, so it seems like it might be worthwhile looking at.

And I appreciate you being here. Thanks very much.

MR. DRICKS: Thank you.

At this point, I am wondering if we might want

to ask David if he wants to give his presentation, because it doesn't appear that we're going to be able to segue into a second meeting.

Would that be all right with you folks, because we had planned on that.

MR. GWYNN: Mr. Shuman, I know, has a question that specifically relates to the topic that we were discussing in the first meeting.

MR. DRICKS: All right, Klaus.

MR. SCHUMANN: Good evening. My name is Klaus Schumann. I am from Paso Robles. I represent the local Green Party. I have some comments first, and then a question.

Why, actually, are we here? Small earthquake, far away from the plant. What is this all about? I think the reason is quite clear. We have a dangerous facility here. Spent fuel pools were mentioned. Each one contained 15 to 20 times the cesium 137 than were released in Chernobyl; 15 to 20 times each. It contaminated, in Chernobyl, 12,400 square miles. The county is 3,300 square miles. That's why we are here, obviously.

I was listening to Mr. Cluff's presentation, and I was struck by some of the words, and I quote, "less than predicted," "probably," "uncertainties," "change in

models," "a large, nearby earthquake would be quite different." I was last summer in Germany, and I walked through my college town, Marburg, and I came across a geophysics department there, and there is a plaque on the wall. A guy named Wagoner was celebrated there. And he came up with the theory of plate tectonics. I am sure all of you are familiar with that. He was considered a nut case first. Then after about 30 to 40 years, I think the scientific community accepted his point of view.

What is my point? My point is seismology is very much a young science, very much in flux. We learn, with every earthquake, new things. The question, the real question is, here, Can we afford to have such a dangerous facility in an earthquake fault zone? Do we have to wait until the next big one hits before we learn enough what the situation here really is?

The NRC often deal with probabilistic risk assessments. I am sure you very familiar with this term, but they are terrible in prediction. For example, Chernobyl, I talked a little bit before, a classic probabilistic risk assessments would have to occur no more than once in six million reactor years. In reality, it occurred after 500.

My question to you is, Will the NRC take further steps towards making sure that there are no

previously undetected thrust faults near and underneath the plant? We from the Green Party brought two of these questions several years ago, actually. You may recall there, at San Onofre. It was very much the same issue at stake. It was in the context of a citizen petition. I think you call it a 2.206 type of petition --

MR. GWYNN: That's correct.

MR. SCHUMANN: -- by Patricia Porchman. And there was an article in the Geology Magazine, I think, in October 2000, which stated that there were blind thrust faults near the plant being discovered recently, and there was a concern that the ground motions there would exceed the design, the earthquake Design Basis there. And I think you decided that it was time for the NRC to get more involved in that. I think you have exactly the same situation here.

In the Tribune on Sunday, several scientists recorded saying that, and I quote here, "While USGS scientists and other geologists have said the temblor happened on the Oceanic Fault, Tinsley and" -- Tinsley is from the USGS, I believe -- "and those doing after-the-fact aerial and field mapping say the shaker may have been triggered by a previously undetected fault."

I think it's your obligation to this community

to check this out, whether there are undetected faults nearby and whether we really can take those risks in this kind of earthquake zone we are living, in particular, in light of piling more and more highly-reactive nuclear waste in storage there.

Thank you so much.

MR. SATORIUS: I'll respond, I agree with the gentlemen, in that the NRC, and more particularly, the licensee, it is their responsibility to analyze any known faults that we are able to determine, it is their responsibility and ours to review their analysis of those faults and the effect that it has on the plant.

MR. GWYNN: I would add, Mr. Schumann, I am sure you are aware Senator Boxer has asked that U.S. Geological Survey increase -- and I think that it's -- given the nature of the situation that this community is in, that it's a reasonable request -- that they consider doing additional mapping in this area. And certainly, if that is done and there are important new findings, then the agency would require that those important new findings be analyzed by the licensee, and our own independent technical staff would look at the results of their analysis and determine whether or not there is something here that would require a modification of the facility.

In fact, there have been situations in the past where earthquake information has caused people to make decisions to permanently shut down facilities. But if you look at the body of information that's already on the record, that is the basis for the decision that this agency made that it's safe to license Diablo Canyon to operate where it is; then unless there is something that comes forward to indicate that that is not an accurate representation of the situation, this plant is licensed.

I anticipate that you could have a quake that would do major damage in the county, and that that plant would continue to operate, not that it would shut down, but that it would continue to operate and provide electrical power to support emergency operations in response to that earthquake. So I don't know if Pacific Gas & Electric has anything to add to what I just said, but we require for any natural phenomenon that that plant not be adversely impacted by any expected natural phenomenon, based on history and geology or other factors.

So let me give you the one good example that I am aware of where a plant has been tested by a natural phenomenon. That was Hurricane Andrew, a Category 5 hurricane, that did major destructive damage in southern Florida in 1992. That Category 5 hurricane struck the

Turkey Point plant head-on. I understand there were something on the order of 250,000 homes that were seriously damaged by that hurricane.

The Turkey Point has four units at their site; two of those are nuclear units that meet our requirements, two are fossil-fired units that were not designed and built to withstand Category 5 hurricane forces. The two nuclear plants sustained minimal damage, and there was no impact on public health and safety at all, whatsoever, from those nuclear plants. There was a major, major disruption in the community as a result of the hurricane that hit that facility.

Now, this is the largest earthquake that I've seen that shook a nuclear power plant and tested the design of the facility, in my knowledge, and we are learning from that experience. And what we've learned to date -- we are not finished -- but what we've learned to date is that the plant sustained no damage and that the impact on the facility was consistent with what was assumed in the design analysis for the plant. So I have a very strong interest, as you do, in understanding whether there are unanalyzed conditions that should have been considered. But right now, I don't have any basis to believe that there are.

MR. DRICKS: Thank you. Did that answer your

question?

Go right ahead, after you introduce yourself.

MS. BECKER: My name is Rochelle Becker, and I am with the San Luis Obispo Mothers For Peace. And I found the interpretation of the history of earthquake discovery and regulation quite fascinating. I think the Mothers For Peace would have a much different interpretation of PG&E's ability to find the earthquake fault to begin with, and retrofit their plant appropriately.

In addition, the inability of the NRC to make sure that PG&E did that, ended up costing rate payers in the state of California over $4 billion, so we would like you to get it right this time.

I do have several questions. First, there was inadequate notice for this meeting. We have been working with several geologists and seismologists. There was an article in the paper on Saturday. The Mothers for Peace received their notice yesterday in the mail. And if you really want public participation, you need to give us more than five days' notice before you hold a public meeting in San Luis Obispo. And Senator Boxer will be told that you gave us no more than five days' notice to do this.

We would also like a copy of the transcript,

and not a summary of this meeting, and all of the overheads.

MR. GWYNN: Our intention, as I discussed at the very outset, is that we will make the transcript publically available as soon as possible after the meeting.

MS. BECKER: I just heard the word "summary" a little while later, and I wanted to make sure that "summary" and "transcript" meant exactly the same thing.

MR. GWYNN: No. The transcript, yes, ma'am.

MS. BECKER: Also, we have a local company who is video recording this for public access television. Because we didn't have adequate notice, a lot of people will be watching this on public access, and we would like the NRC to pay for that public access TV recording today. It's not a lot of money, but it's very important to this community to hear what's going on, and they are here voluntarily because you didn't give anybody notice, and they have not been paid, so we would like the NRC to pay for this videotaped recording so the community can see this.

Also, in PG&E's recent filing with the Public Utilities Commission, they stated that there are several-thousand cracks in their steam generators. And so we are wondering if it's possible to assure the

public, with absolute certainty, that there was no damage or stress to these aging components that occurred during the quake. Is it possible that damage or stress can only be identified if the pipes or wells undergo X-rays or other screening that is not apparent to the naked eye in walkdowns. Has the NRC instituted or commissioned an independent study to determine if the ground motion on the Hosgri Fault is a thrust or reverse -- not reverse slip -- motion, which, according to many geologists and seismic experts, who were unable to attend tonight, could result in greater ground motion? If yes, who has the NRC commissioned to do this independent study? And if not, why not?

If the independent geologic and seismic study of faults being requested by the County of San Luis Obispo Board of Supervisors and Senator Boxer results in the likelihood that the Diablo Canyon plant is not designed to withstand ground acceleration from a 7.5-magnitude thrust earthquake, what actions will the NRC initiate?

Will PG&E's plan to rewrap the pools again, beginning October 4th, with a petition to do that, cause any additional sloshing in these pools? Will the initiation of additional retrofits be required by the NRC, without the time and the cost to the public to force

the NRC to take this action? That is what has happened in the past.

These questions are important not only to this community, but to PG&E's rate payers and to the state of California. PG&E did not adequately investigate faults near the Diablo site before beginning construction. The NRC did not independently verify PG&E's seismic information in support of construction at that site. This resulted in a $2.2 billion additional cost to rate payers. Then the NRC granted PG&E a license to operate Diablo Canyon, only to again be surprised that Unit 1 was retrofitted to Unit 2 specifications, and vice versa. This mistake cost California rate payers another $2.2 billion.

California currently faces a huge deficit, due in large part to the energy industry. This state cannot afford for the NRC to do anything less than a thorough and independent investigation of new seismic information. For the NRC to claim that our community and our state is preempted from addressing safety issues at radioactive facilities and then refuse to hold hearings on the adequacy of seismic design of PG&E's proposed expanded high-level radioactive waste storage facility is irresponsible, and that is exactly what the NRC did.

We would have waited to take this case forward,

as the NRC suggested, to reopen the full licensing proceeding, but on December 22nd, the ground shook, and it scared everyone here. And we didn't know where that earthquake was, and our sirens weren't operating, and we had no power. And we don't trust the NRC to do an independent job. Please restore the trust.

MR. GWYNN: Excuse me, if you don't mind. With respect to the notice that was provided for this meeting, our procedures require us to notice any public meeting at least ten calendar days in advance of the meeting. That notice was posted within the ten calendar days. In addition, we sent a notice to the local media so that they would be aware of that, and I asked Mr. Dricks to call you directly to make sure that you got that information about this meeting well in advance of the date of the meeting. So you know, I apologize that it wasn't as good as it could have been, perhaps. We will try to do better. But I think that the notice was reasonable, under the circumstances.

It was our desire to hold this meeting as quickly as possible, after we completed the second phase of our on-site inspection, so that we could provide some interim feedback to the community. And so you have to balance the need to get the information out, with the need to give people a lot of early notice on the meeting.

And in that balance, this was the date that we landed on. Actually, I would have preferred to have held the meeting earlier, but we did not, because of the need to provide that sufficient early notice for the meeting.

MS. BECKER: Well, there was not early notice. I received a notice on January 16th of the recent review of what was going on, and there was nothing in that January 16th notice that mentioned this hearing. And the newspaper printed it on Saturday, and Mr. Dricks called me on Monday, and that is not ten days. And if you mean ten days, what did you do? Post it on the Federal Register and expect everybody in San Luis Obispo to read the Federal Register that day?

MR. DRICKS: We did post a news release on the 29th, which would have been six days.

MS. BECKER: Well, that's not ten. I mean, in my math, it's not ten. Perhaps it's in the NRC's math, but it's not mine.

MR. GWYNN: Our process, which we try to make sure that people are aware of -- and unfortunately, we haven't succeeded completely, that's why I did apologize for the problem -- is to post that notice on our public website. That is the location where we post notice of all of our meetings.

MS. BECKER: And the public ordinarily goes to

your website just to see if you are going to have a meeting in San Luis Obispo. Give me a break.

MR. GWYNN: For people who have an interest in what we are doing.

MS. BECKER: The Mothers for Peace have been following this case for over 30 years, but we don't check your wonderful website that's so easy to access, to begin with, every day, to find out whether or not you're planning on having a meeting here. Don't explain it away, just don't do it again.

MR. GWYNN: Thank you.

MS. ANDREEN: Thank you. Patty Andreen from Avila Beach. I'm a neighbor, almost next-door neighbors.

My concern, again, as expressed by other speakers, is with the sirens. And I believe I heard something that the County and FEMA administer the siren system; is that correct?

MR. GWYNN: That is correct.

MS. ANDREEN: Okay. Would the NRC license a facility like this without a siren warning system?

MR. GWYNN: No, we would not.

MS. ANDREEN: Okay. And then is it always arranged this way, that it is the County and FEMA that administer it?

MR. GWYNN: That is the normal process that's

used. We've seen that for a lot of communities, the siren system is used for multiple purposes. For example, a plant might be located in a community where there are a lot a chemical facilities, or it might be in a community where there are frequent tornados, other types of phenomena, either natural or man-made, that require alert notification. And so it's typical to see that the local officials are the ones that administer the alert notification system, because they have greater value than just for the nuclear power plant. In fact, for those that are located around chemical facilities, they are used much more frequently for problems at those facilities.

MS. ANDREEN: Thank you. And if I could follow up. Was the system here installed as a result of the construction of the power plant? Does anybody know?

AUDIENCE: Yes.

MS. ANDREEN: Okay. Then, I guess the thing I am struggling with, and I don't have enough background, obviously, just from those two questions, is that if the sirens were required as a condition of the licensing and were installed here because of the construction of the power plant, is there a desire on the part of PG&E to work with the county in making sure that we have the best warning system possible?

MR. OATLEY: We have been working with the County continuously to look at how we can improve on our communication between each other, about how we can notify the population. And, you know, the siren system is built in accordance with pretty much national standards. There was a comment earlier about use of solar power or other renewable sources. And we do use that for some of the sirens. And for daylight hours, it does provide power in remote locations. Of course, nighttime, that won't work too well. But we have worked out a system, obviously, as I mentioned before, with the County, where there are other ways of communicating with the population.

MS. ANDREEN: If I wanted to ask more questions about that, where I wasn't taking up everybody's time, would there be one of you that I could contact to talk to about that?

MR. OATLEY: Yes. We can make someone available to talk to you and then let you know who the County representative would be also.

MS. ANDREEN: Perfect. Thank you very much.

MR. GWYNN: Thank you.

MS. HYMAN: Natalie Hyman. I am really deathly more afraid of you and what you do than any earthquake. And I am one of the people -- and I didn't know other people had the same reaction. But the first thing we did

as we ran out from breaking glass and falling objects in the house, went outside -- we are on a bluff point in Shell Beach -- sat on the ground and timed a minute and a half of rolling motion by the earth. Our first thought was, "We are okay." And our second thought was, "What's happening at Diablo?" And as my husband inelegantly put it, "It's our ass that's downwind."

And so we wanted to find out what happened. We finally did, from relatives who live in Pasadena. That's how we got our information, much later. And then to find out the warning systems didn't work, but that question has already been talked. But there is one I would like to follow up from Mothers For Peace, about the cracks.

Yesterday, we discovered another crack in our basement -- yes, some California houses do have basements -- and we didn't know it was there. And we are discovering continually there is more damage than we realized at first. So when I got first reports that Diablo said, "We are okay," I went, "How do they know?"

We know that not so long ago, you had some potential failures in some of your parts. And the only way you knew it was by magnafluxing it. And you went to the extra effort before you were required to do that, and we appreciate it. But we've had something stressful happen. Everything shook in our house, and I imagine

something may have happened in yours.

What kind of follow-up are you going to have, other than your normal inspections and what you already walked through, on cracks you can't see? Will you magnaflux major parts? Thank you.

MR. GWYNN: Would Pacific Gas & Electric like to respond to that question?

MR. OATLEY: Yes.

MR. WOMACK: Let me start out, you used a term called "magnafluxing." Magnafluxing is a method of nondestructive examination. And it's commonly used in power plants, industrial environments, in order to detect cracking in metallic components. We use, at Diablo, many methods of nondestructive examination. Predominantly that falls within the categories of ultrasonic exam and visual and -- my mind is escaping me -- any current exam, excuse me. It's getting late.

And we do this throughout the plant, on a periodic schedule. The examinations that we did after the earthquake did not give us any indication that we needed to go out and do special inspections at that point this time.

To your point, I can appreciate that in your basement a new crack might have formed. We have a lot of concrete structures, reinforced concrete structures,

actually, at Diablo. And as I mentioned earlier, as a part of what we call, under the Regulation, the Maintenance Rule, 10CFR 50.65, we are required to survey all those structures periodically.

Now, as our civil engineers on our staff went and looked at the plant, they identified nothing abnormal. Now, we have quite a lot of concrete at the plant, so I can't speak absolutely that, you know, some small crack didn't initiate. But believe me, we walked the facility down extensively. The NRC, as well, walked the facility down extensively, looking for exactly those types of indications.

Now, in our upcoming refueling outages, we will do more extensive review, both of the structures -- and, I believe, NRC will come back to Diablo and look independently. And at that point in time, what we call our in-service testing program will go into full swing, and we will look at everything from the steam generators that Ms. Becker referred to earlier, to pipes, welds, both visually and with other forms of nondestructive examination.

And again, I guess I have to go back to a very important point. And I don't at all want to sound cavalier in this regard. We have a facility that was designed, as we depicted in one chart, at some

frequencies for in excess of 2 g's. This event that we had was very, very small, in comparison to the design that we have implemented at Diablo. So I, myself, am not surprised that we have not seen indications of cracking visually. In fact, that's probably one of the earliest and easiest things to see in response to an event like this, so I am personally not surprised.

But to your point, we will, as a part of our license requirements and compliance with national codes and standards, we will be inspecting more thoroughly in the course of the upcoming fueling outages.

MR. JONES: I would like to provide some additional insights and answer as far as the NRC's responsibility. As I indicated, we have both Mr. David Proulx and Terry Jackson, two of our on-site specialists, safety inspectors, who were there. They also independently walked down the facility, looking for any indication of any damage to any components, anything that would tell us that there was movement of components, anything associated with any hangers that would say that structures had moved and therefore, we needed to look further.

We understand the Design Basis of the facility, and we looked at the San Simeon earthquake and its effect on the facility itself. The ground motions of both

horizontal and vertical, as I talked about earlier, were very small, relative to the design of the facility.

But our inspections in that area are not over yet. Mr. Proulx will talk about, in a little bit, is we have additional inspections ongoing to look at the design; the design, as well as the in-service inspection activities. There's a nondestructive inspection of the facility coming up in the refueling outage scheduled for the March time frame. And we also have additional walkdowns that are going to be performed of the facility, in particular of the Containment 1 Unit, during that refueling outage.

We have already independently walked through the facility, including the Unit 2 Containment, and we found no evidence of any damage that would say that there would be a challenge to that design; and therefore, questions involving integrity of the systems and components within Diablo Canyon.

Ms. Becker brought up several questions that we are going to go back and look at in the transcript, because we want to make sure we address those. But one of them dealt with the steam generator tubes, and that was the inspections and the shaking of those tubes themselves. Those will be examined during this upcoming outage.

The NRC, through our independent inspection programs will also look at those examinations and independently review the results of those examinations. Whether or not there is evidence of any damage to those tubes, part of the design speaks to the integrity of those tubes and their ability to continue to operate, is based on the tube integrity throughout the operating cycle, including the effect of the Hosgri earthquake; that is, the ground motions that would be sensed from that.

So we have both the design aspects, we have the independent examinations, through nondestructive examinations, and the NRC will independently follow up and review, through our baseline inspection program, those inspection activities that are ongoing.

MR. SATORIUS: Bill, if I can add a couple other things. It's been our experience when we perform inspections, that typically systems, piping systems, valves and pumps and pumping and the associated hangers, that if they have undergone stresses, such as you see during a seismic event -- and there are other type of activities that take place in the plant, in other plants where we've had similar sort of stressing, although not from seismic, and those are involved with refilling piping systems that have been taken out of service and

drained. And if they are not refilled properly, if you've ever had your house worked on, where the plumber has to re-turn on the water, if he doesn't do it right, it makes the pipes rumble. Those are seismic-like events or stresses that are similar in nature.

It's been our experience, in inspecting these systems, that typically, if you induce stresses strong enough to challenge the integrity of the welds, you see physical deflections of the piping supports, and you see other damage. Our walkdown inspections have revealed none of that type of damage.

To follow up further, on Bill's example with the steam generator tubes, the agency has put into place strict regulations on the monitoring of leakage, when those plants are operating through the steam generator tubes. And it's monitored and required to be monitored very, very carefully on a daily basis. And our inspectors, our safety inspectors that are on-site, review those, those leak rates for any sort of deviation or change, such that we have confidence that gives us any type of advance warning of any problem within those components.

MR. WOMACK: In fact, I was about to add -- thank you, Mark -- we have very sensitive instrumentation that both monitors the reactor, reactor coolant system

for leakage, and also monitors the leakage through the steam generator tubes. It's very capable. We will know immediately if that leakage changes.

So kind of again, as background for my earlier comments, we saw no change of that type, either for our reactor coolant system, or for leakage associated with the steam generators.

MR. BECKER: We talked a lot about walkdowns. I just wanted to add, in the days following the earthquake, we did additional system testing, where we actually -- we test ran equipment, that was above and beyond what was required by our license or by our procedure. But we went out and took some equipment and test ran it, to make sure that there was no problem following the earthquake.

In addition to that, we do extensive equipment testing every day, as a condition of our license. And since the earthquake, we have not had any failures of any of that equipment that could be attributed to the shaking from the earthquake.

MS. HYMAN: May I make a comment on your words "walkdown." It gives the impression of walk-by, "visually, it looks okay." It's just a bad terminology because your words "extensive testing," words like that, really give a better sense of safety.

MR. SATORIUS: That's a good point, and I'll be the first to admit that's almost nuclear jargon. It's a word that we all use. And you are right, it should be clarified. It is not a walk through the park or a walk through the plant. And oftentimes, I know with our inspection procedures, it's oftentimes, it's a hand-over-hand examination of piping. It's a looking underneath. It's using mirrors. It's using flashlights so that you can actually see if there has been deflection or any sort of damage. That's a good point, and we should be mindful of the public and some of the terms we use. Thanks.

MR. OATLEY: Lloyd would like to make one comment.

MR. CLUFF: I would like to make an observation from, I think it was Mary Lee that spoke about the length of shaking, which doesn't surprise me. And I would suggest that perhaps the site conditions of where you live might be conducive to causing the response of where you live. I didn't recall where it was, but sometimes you can have site response that will cause the shaking to be longer, and then you get ground failure from liquefaction, and so forth. And if you were in a water-saturated situation with sand, you could get cracks that could be a hundred miles from the earthquake and

still have damage.

So it's in 1977, I was in Romania in a big earthquake, and the big damage was 250 miles from the earthquake in the Danube, River where ground failed and there was extensive liquefaction and so forth. So maybe you could get one of your local geologists -- Lou was up here a moment ago -- and ask him to take a look at where the site is, and perhaps that could explain why there is a crack. Our power plant is on solid ground.

MS. HARRIS: Good evening. My name is Denise Harris, and I'm at the County of San Luis Obispo Office of Administration and Board of Supervisors. And I just wanted to say thanks to all the public for coming out. I am coming here tonight because I've had the privilege of starting on the day of the earthquake at that office, working on the Emergency Operations Center, with Mr. Ron Alsop and Mr. George Brown.

I'm hearing comment about the sirens not working. One, I didn't know about that; and two, those are the two gentlemen that we need to get in contact with. And if you have that information five minutes -- are you out of Arlington, Texas?

MR. DRICKS: Yes.

MS. HARRIS: If you had that five minutes outside of when this occurred on the 22nd, our Emergency

Operations Center on Kansas Avenue was working and operational. I believe their number was 805-781-4444. I just wish the communication could have been better, I guess. I don't know how the public is not hearing about the sirens not working.

And have you or PG&E spoken with either of these two gentlemen on the procedures of how the public will be notified?

MR. OATLEY: We work extensively with George and Ron with the County's office, and we also work regularly with David Edge, the County Administrator.

The notification to the County is the first responsibility of the licensee, PG&E, in this case. We are required by our license to notify the County within 15 minutes of an event. And I think, as Mr. Becker mentioned, we notified within 12 minutes. I was out at the Emergency Operations Center. I too went out after the event, to work with the County Administrator and folks at EOC.

As far as notification on the sirens, that information is available right at the Watch Commander's office at the Emergency Operations Center. And the County was aware of that immediately, so there was no need for us to communicate that to them. That information now is direct with the County.

As far as the media, we did make notification to the County immediately. We did make a press release in a very short time period. I don't have that in front of me. I know we've been criticized in other public meetings about the media, within ten minutes of the earthquake, stating that Diablo Canyon is okay, and how would we have known that, only within ten minutes. Our press release did say that Diablo continued to operate through the earthquake. It never said that we were okay. We were saying we were doing walkdowns. But some people apparently heard, within an extremely short period of time the status of Diablo Canyon, because we have been criticized about that in other public forums.

MR. SATORIUS: I would just like to clarify one thing. And it's my understanding. I got to our OP center about fifteen minutes, ten or fifteen minutes, about the same time maybe, I think, you did. Maybe you were there a little bit sooner, Pat. But I think we were getting information from the resident inspectors in the control room at about the five-minute point. I think it was a little bit later than that we found out about the sirens. I don't think we knew about the sirens at the five-minute point. It was a little bit later. So maybe there was a -- we weren't clear. We were getting information from the residents on the condition of the

plant at about the five-minute point, but the siren status came a little bit later, at least through the control room to us. Although it was important, we are using those first few minutes to verify the condition of the plant and the safety of the plant.

MS. HARRIS: Thank you. I also want to make a comment that it's been my job to log in the comments on the reply cards of the PG&E mailer that's been going out, about the evacuation zones of the Diablo Canyon Power Plant. There's about 700 records that have come through of people commenting, and they are all concerned about the evacuation of our highway system here, and a few other things. And the data is available if anybody at PG&E wants to get that data back.

Thank you.

MR. DRICKS: Thank you.

MR. GWYNN: I would like to remind the audience that we have some additional presentations that we want to make this evening, if you would like to hear it. But we'll continue to take questions, as long as the questions come forward.

MR. FRANK: My comments will be brief. My name is Fred Frank. I live in Atascadero. I appreciate that you came here. I would appreciate if you would give us more notice. I think if you want public input, it's very

important to notify the public. I learned about this this weekend, a lot of calendar juggling, and I got here. But a lot more people would have been here, had we had better notice.

MR. GWYNN: Let me respond, and I really, really appreciate this feedback. As I indicated to Ms. Becker earlier, we were trying to juggle the desire to get the information out as early as possible, with the giving advance notice of the meeting. And I can assure you that we will have another meeting, and that we will make sure that it's noticed well in advance, in as many ways as we can, so that everybody who has an interest will have an opportunity to attend that meeting.

I anticipate that that meeting will occur in May. I don't know the exact date yet. But as soon as we know those dates, we'll get those published.

MR. FRANK: Thank you.

Most of my questions have been answered, not necessarily to my satisfaction. I would like to follow up on Mrs. Groot's comments on the spent fuel pools. I noticed in your report that in your walk-through, you noticed that the pools appeared to be clear. I would hope that there is a little more inspection that takes place than just simply peering in the pool. And I was wondering, did you receive any changes in the filtrates

that were pulled out of the pool, the spent fuel pools?

I realize it was a rather minor earthquake. But if there were some increases in radioactivity captured in the filtrates, I would like to know, because if we did have a more serious earthquake, that could be a problem.

MR. JONES: As I indicated earlier, we did have both the specialists and the safety inspectors on-site, walking down the facility, and after that, including an extensive observation of systems. In addition to that, we had a regional safety inspector on-site. And those individuals did look at the spent fuel pool for clarity. They looked for any indications of leakage. They looked for any indications that there had been movement of the fuel racks or any indication of the fuel itself.

And based on those direct observations by those individuals -- and I believe we have documented that in the attached inspection report excerpt that is included in the background package -- these were specifically looked at. And that included in the clarity of the system itself.

MR. GWYNN: If there was any damage to the fuel that's stored in the pool, the first indication that you would expect to get is gaseous activity; in other words, radioactivity released from the pool in the form of light

gas that would go up into the atmosphere inside the building. The radiation monitors inside the building would alert the operators --

MR. FRANK: That's what I was asking.

MR. GWYNN: -- and there was nothing like that, absolutely no indication.

The clarity of the water indicates that either the pool is extremely clean or that there wasn't much disturbance of whatever might be sitting on the bottom of the pool.

MR. FRANK: I wouldn't expect us to see very much, considering the earthquake at this site was rather minor. I am more concerned about a more serious earthquake, closer to the plant, and how that is going to affect the spent fuel storage, because, as Mr. Schumann said, it's an extremely dangerous situation out there, and I think we should not take any position that would leave any cause for error. And so we should not take the opinion -- and I understand there is a quite a difference of opinion with respect to the intensity of earthquakes that could occur there. And so I think we should make sure that we are not dealing in opinion here, and that we study this very thoroughly and as soon as possible.

Thank you.

MR. BAGCHI: The Diablo Canyon spent fuel pool

structure is especially robust because it's located on bedrock, partially embedded, and it is made out of very, very thick reinforced concrete walls. And those walls are -- they are lined with stainless steel liner.

MR. FRANK: I am familiar with the structure of the pool. I am more concerned about the assemblies and the assemblies banging together and so forth, and degradation of the fuel rods and this type of thing. So that's my concern about the spent fuel pool. I've got a lot of other concerns as well.

Thank you.

MR. DRICKS: At this time, I would like to beg the indulgence of the audience, the fingers of our stenographer are faltering. We would like to take a brief break for five minutes, and then reconvene, move into a different format. And we will start with David Proulx, the resident inspector, will give you unit description of his activities, and then we will throw it open for additional questions.

(Brief break taken.)

MR. DRICKS: I think we did promise this young lady that we would give her the first chance to ask the next question. She's been waiting patiently, so let's do that.

MS. DUNBAR: My name is Connie Dunbar. I live

in Arroyo Grande. I want to concur with Klaus Schumann that the reason that we are here tonight, that the event, whatever it was, an earthquake, it could have been something else, was within the design specifications and the modeling that you all did. If it had been outside, we might not all be here. And the big picture is that the coincidence of earthquakes and a huge amount of radioactivity is a threat to our community. We live with that threat. We try to forget about it, but it is a threat to our community. And I would like very much if we could find every means possible to lessen that threat. I know you believe that's what you are doing, but then when I hear something as simple as the sirens don't work, think of how I would feel, in terms of trust.

My other point is that this power plant does create a huge amount of stress in our community, and yet only provides approximately between 6 and 10 percent of the electricity that Californians use. For the price of a good used car, I put solars panels on my home that produce a hundred percent of my electricity.

You are talking about billions of dollars that could possibly -- can we think, does PG&E maybe have a plan of how we could produce energy that would be less of a threat to our community?

Mr. Lloyd -- I didn't get his last name --

suggested that almost all design block structures were meant to withstand 2.5 g's. And my question would be, Which ones are not? Can anybody answer that question? Which design block structures in the plant itself are not meant to withstand that?

MR. CLUFF: I'm sorry. I don't still understand your question.

MS. DUNBAR: There was a nice graph, and I'm not the expert in these g's. But the statement was "almost all design block structures are engineered to withstand 2.5 g's." Does that make sense?

And so my question is, Which structures are not designed to withstand that?

MR. WOMACK: I think the slide that Lloyd Cluff was referring to at that point depicted the Hosgri spectrum, which goes as high as a little over 2 1/2 g's. And I think the comment that he made was, in looking at the spectrum -- and he remarked that most of our power plant structures are or respond in the range of 2 to 8 Hz or cycles. I don't believe he said that most of our structures are designed to this spectrum. I think he said most of them fall in this range.

MS. DUNBAR: He did say, "fall in this range."

So what falls outside the range?

MR. WOMACK: I don't know, off the top of my

head. But the structures that fall outside of that range are likewise designed to that requirement, for the appropriate frequencies, so they are designed to that requirement. And again, Lloyd made a generalization to say most of our structures have natural frequencies of response in this area of 2 to 3 Hz.

MR. GWYNN: Now perhaps I'm a little bit confused, because I know that you have some administrative office buildings, for instance, that are located at the site. They are not necessarily a part of the power block structures, but they are on-site. Are they enveloped by these design criteria?

MR. WOMACK: No. Our administrative buildings, our offices, are not designed to these criteria.

MS. DUNBAR: And I wouldn't expect that.

I want to make a comment that I am a little uncomfortable that almost all of the seismic data that people are looking at, the USGS included, is PG&E's data. And Lloyd told us there was not a direct link of that data to USGS, because of fire wall concerns.

PG&E has a billion-dollar application going on for the dry cask storage facility. That's a huge amount on the line. And I don't want to say that they are not being truthful, but they have a huge investment in this earthquake not being something that we take very

seriously. So I am concerned about the credibility of the seismic data not being authenticated from another source.

And then one last comment is that we were just trying to be comforted that if something happened in the steam generator tubes, that there were monitors that would notify everyone that something was happening in those tubes, even if it couldn't be seen in those pipes. And I know that that was one of the concerns at Indian Point, that there was actually a rupture in one of those steam generator tubes that the monitors did not detect.

I want to leave with the comment again that in whatever we say tonight, whatever assurances you try to give us, the coincidence of radioactivity and earthquakes puts our county at risk, at huge risk. We live with this threat all the time. Is there not something we can do differently to generate the power that we need?

Thank you.

MR. DRICKS: If I can respond to one of the points you made just now. At Indian Point, the rupture of the steam generator tube was detected. I think what the licensee said, and the NRC said in press releases, was no radiation associated with the event could be detected. So I think there was a slight confusion there

off-site.

MR. SATORIUS: And another clarification with regard to the NRC examines the capabilities and license of the operators of nuclear power plants, including Diablo Canyon, and we specifically will test them, prior to issuing them a license, on their actions that they would take in the event there would be a failure in one of the tubes of the steam generator. I understand there are thousands of tubes in each steam generator.

MS. DUNBAR: If this plant -- knowing what we know now, if this plant came up for licensing now, would a license be granted?

MR. SATORIUS: I'm not -- if it met the conditions and the NRC requirements, the answer would be yes.

MR. DRICKS: Before we take any more questions --

MS. DONNAGAN: Actually, I've been waiting a really long time. I only have a couple of comments and two questions. I'll be very quick, brief, and I know the other person behind me will as well.

My name is Lorraine Donnagan. I am a professor at Cal Poly, local university, and more importantly, I am a concerned citizen. This is my very first official meeting. And that's why I am here. I am a concerned

citizen, and I am also a mother of two young girls, a wife, and a daughter of both my mother and father. And I live only a couple of miles from Diablo Canyon, and I am wondering where the NRC -- I know that I walked in in the midst of introductions. How many of you live within a crow's -- a couple of you live close.

MR. GWYNN: Let me just make a comment, from my own experience. I used to do the job that Terry and David do now. And, of course, have family, a wide spectrum of ranges, since we are talking with -- ages, since we are talking about spectrums tonight. But when I was doing their job, I felt that it was important for me, as a member of the local community, to live within the emergency planning zone for the facility that I was assigned to inspect, because if I couldn't have confidence that my family was safe, then how could you have that type of confidence?

MS. DONNAGAN: And now, you are no longer living here?

MR. GWYNN: That's because I am inspecting this facility. I have a different responsibility today. But we don't require our people to take that approach. On the other hand, I certainly encourage them. And both of our local inspectors live in the local community and not far from the emergency planning zone for Diablo Canyon.

Because of the size of the -- I should say the distance of the plant from most of the local population center, it's very difficult to find a place to live that's within the ten-mile emergency planning zone of Diablo Canyon.

MS. DONNAGAN: Thank you.

I guess, again, I am coming from a first-timer point of view. I don't see a lot of distinction between this table and this table (indicating). I am not sure which one wags which, and that could be my lack of knowledge, experience. But I can tell you right now, as a concerned citizen, I don't see any distinction. It's all very gray. I see that you're kind of working together, not necessarily policing. And I feel that that's maybe the role of NRC.

So I also have a couple comments about the siren failure and the power failure, et cetera, with that. And your comment, Mr. Oatley, was that you had thought about that, and that really alarmed me that you had thought about that. And I am wondering if that thought was documented in your lessons-learned document that apparently was generated after the earthquake. And if this is a public document, I would love to get my hands on that public document.

MR. OATLEY: This is not a public document.

It's an internal PG&E document. But let me address your concern on the sirens. When I said we thought about it, it has to do with when we first licensed Diablo -- when the NRC first licensed Diablo Canyon, we had to install and test our siren system to prove its effectiveness. And as part of that, we did think about what would happen in the event there was no power to the sirens, and worked with the County of San Luis Obispo to put in place compensatory measures, in the event there was no power to the siren. That's a possibility, because power does get lost. You could have mechanical malfunction of a siren at any time, so we thought about the possibility of a siren not working or not being powered, and that's what I was trying to say.

MS. DONNAGAN: Okay.

MR. SATORIUS: If I could maybe respond to one comment that you made just a little bit earlier.

MS. DONNAGAN: Sure.

MR. SATORIUS: And that was your comment that you had a difficult time discriminating between -- the distinction between the two tables.

MS. DONNAGAN: Yeah.

MR. SATORIUS: And I would offer that -- first of all, I would ask you to take a look at the inspection report that was published on January the 30th, and

excerpts of it are available and were passed out. That's not the whole report. That's only the report talking about the earthquake, because we wanted to focus on that at this meeting. But it's available on our public website, and it's pretty easy to get to. I would take a look at that. You'll see how we don't agree with some of the issues over at that table (indicating), and it's written there for all the public to review and to understand.

Now, on matters like this earthquake matter, where the facts were pretty much, we believe, well-known, and we understand the facts, we've looked at them independently, when we come to similar conclusions, this is what you can see, is that we have come to similar conclusions, based on our own independent verification of some of the inspection activities that our inspectors performed. But I ask you to take a look at the inspection report, because you'll see where we don't agree.

MS. DONNAGAN: Okay. I will do that. Thank you.

And my question is, Did you not measure Unit 2? I get this impression that you measured the top and the bottom of Unit 1, and that you -- I got a couple coughs, when then someone else took over, when it talked about

measuring the digital versus the analog, and then -- and how you took the noise out of the analog, and then the digital worked, and then the digital and the analog worked. That sounds like tweaking to me. And this is, again, me, on the outside looking in. And then, on the measuring devices, I am not understanding the discrepancies between the measuring devices. So if you could clarify that, please.

MR. WOMACK: Yes. And again, what I said earlier is that the instrumentation system to monitor the structural response is installed on the Unit 1 at the base of the Unit 1 containment and at the top of the Unit 1 containment. As Mr. Cluff indicated in other slides, we have sensors in other locations around the plant. And the purpose of these is to really measure the response of the buildings so that we can confirm that the design we made follows the models that analyze their response.

So now to the point, we don't have an instrument at the bottom or at the top of the Unit 2 containment, because it's not necessary in order to verify the response of the facility. What we did say earlier is we walked down both the Unit 1 and the Unit 2 containments, and let me use the right term, we did a thorough visual inspection.

MS. DONNAGAN: The new term.

MR. WOMACK: That is what "walkdown" means in the nuclear business, and conducted that, and found no indications of problems with either containments.

MS. DONNAGAN: Can you address the digital versus the analog measuring devices and why you filtered out noise out of the analog in order to match it with the digital?

MR. WOMACK: We have two recording systems for each location. The audiotape recording system, much like a cassette you'd use in an old cassette player, and a more modern digital system.

MS. DONNAGAN: And the old one is the one that was noisy?

MR. WOMACK: The old one, when we presented the information to the manufacturer of the system, they indicated to us that the recordings were in part faulty because of the age of the tapes and the design of the system. The digital system that we had installed -- and I am not certain when we installed it -- recorded the information for each of the sensors accurately.

MS. DONNAGAN: Okay.

MR. GWYNN: I'd like to just make a brief comment on your comment about the independence of our safety organization. That perhaps -- and I can only say perhaps -- the reason why you don't see that distinct

difference that you might have thought that you might see, is because of the nature of the work that Pacific Gas & Electric typically does at Diablo Canyon. If, in fact, you find a utility-operating facility substantially outside of compliance with your requirements, you'll find us acting in a very different way with that utility. You can talk to the owner and operator of the South Texas project facility, two large, 1250-megawatt electric units that are located about two hours outside of Houston, Texas. Those two units were shut down for over a year while they were responding to safety issues that this agency identified at their facility.

And so, you know, if, in fact, you have a licensee that's in substantial compliance with your requirements, and they're doing a good job of protecting the health and safety of the public in operation of their facility, then you won't see us in a forum, such as this, taking strong regulatory positions with them, because that's not necessary. Does that help?

MS. DONNAGAN: So are you saying that you are taking strong regulatory -- are you saying that that's why you are here?

MR. GWYNN: We are an independent safety agency. We do all of our work using our own employees, doing our own inspections. We evaluate the results of

those inspections. And to the extent that we find compliance with NRC requirements, then we are satisfied.

MR. SHUKLA: I would like to add to Mr. Gwynn's comment. I'm the NRC project manager for Diablo Canyon, responsible for interface between PG&E and NRC headquarters, Washington, D.C.

I agree with you when you say, and it appears that NRC is working together with PG&E. Yes, we are working together, but only to insure public health and safety. Other than that, we don't believe a word they say to us. Okay. We have 3,000 people working with NRC for independent review. We also employ national labs, universities, like yours. Dr. Rueger and his staff has done a very good job of analyzing the San Simeon earthquake, so we do everything independent. And you will not see it, but if you look into more NRC websites, you'll find out that we shut down basically more than two years for the same reasons, it's not safe to operate, so we would not hesitate to shut down a unit if it's not safe. But we are very independent.

MS. DONNAGAN: Okay. Thank you very much.

MR. DRICKS: We'll take one more question, and then we'll change the format. You've been promised an opportunity.

MS. BEZAK: Thank you. My name is Susan Bezak.

I just had a couple of follow-up questions. I am specifically concerned about the containment around, or the lack of containment around the spent fuel. Maybe you could describe the spent fuel structure and units to me a little bit better, because I believe there is nothing that would contain any release of radioactive gases at this point in time; is that correct?

MR. OATLEY: I'll try to answer this, and then Larry Womack will add any data that can help. So let's talk about the construction and structure for the spent fuel building.

MS. BEZAK: Yes.

MR. OATLEY: The pool itself is a steel liner, stainless steel liner. It's surrounded by reinforced concrete that's about 6 feet thick, of concrete. Much of the spent fuel pool is actually below ground and sits on bedrock. The area above the pool is surrounded by a building which contains the atmosphere around the pool. If there was any release of radioactivity within that building, we have installed radiation monitors that would alarm the control room, and we would take action appropriately to route the air through filters, to filter out any radiation prior to it being released, and there would be additional monitors looking at that, to make sure that those releases were within our license

conditions.

So the basic structure of the pool is it's mostly below ground, 6 1/2 feet of concrete reinforced, sitting on bedrock.

MS. BEZAK: How deep are they?

MR. OATLEY: The pools themselves are about 20 feet deep?

MR. WOMACK: More than 40 feet deep. A fuel assembly is a little longer than 12 feet, which leaves approximately 23 to 25 feet of water above the fuel.

MR. OATLEY: So the area at the top of the fuel, which is, say, nominally, 12 to 14 feet, top of the fuel down to the bottom, is actually below ground.

MS. BEZAK: I was just trying to imagine a scenario; as I understand it, I believe there is some areas of the north coast that -- where the ground has shifted as much as one foot, ground elevation. Is that true, Mr. Cluff?

MR. CLUFF: I was with Lou Rosenberg in a helicopter flying over, and he made statements that in some places, some of the cracks were a foot wide and sometimes they had moved vertically. I don't recall exactly how much it was. But that would be minor, compared to real ground movement in an earthquake.

MS. BEZAK: Right. Well, considering those two

things together, would you say that there is any possibility that the spent fuel pools would have reason to be suspect in a worst-case scenario kind of earthquake situation? The reason I am asking is because -- well, maybe I should let you answer that.

MR. CLUFF: Well, the answer is a simple no. And the way the structures are built and imbedded in the rock, even if there was --

MS. BEZAK: I thought they were sitting on rock, not imbedded in rock.

MR. CLUFF: They are sitting on rock, but they are carved out so they are inset in the rock.

MS. BEZAK: I would like to see that diagram sometime.

I still don't understand why there is no containment beyond just a shed roof and filtration system for radioactive gas release. It just doesn't follow, whether it's an earthquake or some other kind of an outside factor resulting in a release of radioactive gases. That, to me, is a serious oversight. And we keep talking about the plant, and the plant has been built and rebuilt and retrofitted to withstand the earthquakes that we are all here talking about; however, in many cases, I think the biggest threat is the radioactive releases coming from the spent fuel pools.

And I would just have to say that, you know, we have to consider that release as a result of some kind of an earthquake activity in that area. And to me, that's just a complete oversight in what we've been talking about tonight.

MR. DRICKS: If I can respond to that, the only way you could get that kind of release is if the water drained out of the pool and was not replaced.

MS. BEZAK: Right.

MR. DRICKS: And the licensee has programs in place that were designed to insure that doesn't happen. In the worst-case scenario, they would pump water into the pool to keep that fuel covered, so that kind of gaseous release of radioactivity, we don't believe, is feasible.

MS. BEZAK: Well, I feel like it's a big oversight in the entire plant's design and overall, you know, configuration of the plant spent fuel pool. There is a big gap there in securing our safety from radioactive contamination.

MR. BAGCHI: Well, the world over, there is nowhere the containment of fuel would be --

MS. BEZAK: Nowhere?

MR. BAGCHI: Nowhere.

MS. BEZAK: That's a shame.

MR. GWYNN: Well, it's based on good engineering science.

MS. BEZAK: Right. And we live with radioactive contamination more and more in our lives, and we live with more and more cancers. And a lot of people don't necessarily like to put those together but, in fact, there is some relationship.

I just had a couple of comments about the sirens. There was some -- I believe Mr. Oatley commented that some of the sirens have a solar backup, but it's only operational during the day. I thought solar was collected and operational beyond daytime, nighttime, when the sun is not shining, so that doesn't sound accurate to me.

MR. OATLEY: I may have been wrong. Let me check.

MS. BEZAK: You do know about solar and how that works, because I was just flabbergasted when you said that.

MR. OATLEY: Could I answer your question for a moment?

MS. BEZAK: You bet.

MR. OATLEY: I've just been corrected. They do have a battery backup. They are operable.

MS. BEZAK: So even if the sun is not shining,

they will be operating. That's good. I am feeling a lot better about that, seriously.

Also, the fact that Diablo Canyon's power produces about 6 to 10 percent of California's power. I don't believe any of that power comes to this county. Is that correct?

MR. OATLEY: That is not correct.

MS. BEZAK: And could you explain that a little more specifically, what comes to this county from Diablo Canyon.

MR. OATLEY: I'd love to. And I would like to correct some misstatements. Diablo Canyon provides 20 percent of the power to the PG&E service territory; sometimes as much as 25 percent of the power. It does provide 10 percent or greater of the power to the state of California. It's connected to the 500 kV system, which is in turn connected to the local area providing power. Power from Diablo is distributed not only locally, but across the whole state and to other states, as necessary.

MS. BEZAK: Where does it get distributed locally?

MR. OATLEY: Through the distribution locally.

MS. BEZAK: Not through, but to, is my question.

MR. OATLEY: To all the residents and businesses in the local area.

MS. BEZAK: All the residents and businesses?

MR. OATLEY: That are connected to the PG&E electric system, that's correct.

MS. BEZAK: What percentage of the local users are PG&E?

MR. RUEGER: Let me say, first of all, you cannot identify exactly where from one power plant the power gets to a local residence, because the system is fully integrated and connected together. So you look at the total sources, to be able to meet the needs of northern and central California that we support. So in essence, the best you could say is that, like the rest of our service territory, about 20 percent of the energy that is utilized in a typical year by the local community, comes from Diablo Canyon.

MS. BEZAK: Well, I was asking about this in all sincerity, because it was my impression that it wasn't used locally. And there was some comment tonight about the power being out, locally, in areas. And my assumption was, it wasn't coming from Diablo, so there wasn't a connection there. I am glad to have that clarified. Thank you.

MR. JONES: I wanted to address one point. It

deals with the emergency sirens. And I wanted to reiterate that the resident inspectors, the safety inspectors we have on-site, reported to the control room and observed the licensee's implementation of their emergency plan in this case for the Notification of Unusual Event. That emergency plan and communication with the local and State officials, there was no -- the emergency sirens were not called upon to actuate. There was no need for those sirens to have actuated.

Now, as a result of that, there were other means, backup means, put in place to notify residents, had it become necessary. So the fact that the emergency sirens, 56 sirens, I believe it was, were not actually available, did not mean that individuals in those areas would not have been notified, because there were backup measures established that are part of that, should the sirens actually go out, to provide notification to personnel. So I kind of got the feeling that people thought that they would not have been notified of the need to evacuate, had the decisions by the State and local officials, been -- or local officials, to initiate evacuations, and that is just not the case.

MS. BEZAK: I respect that. I do have to comment that the idea of evacuation is a joke, in my opinion. And that if there were significant release of

radiation, my property, which lies 3 miles from Diablo Canyon, as the crow flies, would be rendered useless. And I just see, you know, there is really no point in an evacuation if parts of our county are suddenly dosed with radioactivity, much like Chernobyl, which was not expected. It doesn't make sense.

And I have to go back to some of the comments earlier made, that coming to these meetings, it flabbergasts me that we are talking about a small amount of electricity produced, that could be produced in other ways, and we are spending all this incredible money, and people's valuable time, all of your valuable time, talking about this ridiculous stuff. It just doesn't make sense to me.

MR. RUEGER: Let me correct one thing. It is certainly not a small amount of electricity. This is the largest generator in the state of California, us and San Onofre, the two nuclear facilities.

MS. BEZAK: Yes. And in the power shortage, we saved just about that much. It was at least 10 percent, and I can't remember the exact figure, but it was quite remarkable, and it was quite significant, so we can do better. Compared with the threat that we live with, that's what we are talking about here tonight. We are talking about a threat, a significant threat.

MR. RUEGER: That is your own belief. That's not universally held.

MS. BEZAK: That is my own belief.

MR. GWYNN: I'd like to just give a little bit of a response to the concept of applying what happened at Chernobyl to what might happen in the United States. I had the unfortunate opportunity to visit that facility two years after the accident occurred. I was a member of a 19-person delegation from the United States government that went to the former Soviet Union to try to assist their country in improving the safety of their nuclear facilities.

That plant did not have a containment, as U.S. plants have. The design of the reactor core itself was such that it could have a low-level nuclear detonation in the core. U.S. nuclear facilities are designed such that that can't happen. The nature of the fuel moderator -- and I am sorry for the use of the technical term, but the thing that makes the nuclear fission reaction itself work, in the Soviet union, these reactors were used for dual purpose -- to generate heat and power for the local community, and to make plutonium for bombs. We don't do that in the United States.

But because of their desire to generate plutonium, they were using graphite as a moderator. And

that graphite is like the charcoal that you use in your backyard grill. So when they had a low-level nuclear detonation in the core of that reactor, it resulted in a significant fire in that graphite, that burned for a very long period of time, and with no containment.

Then, the radioactive materials that were in the core were distributed about the countryside, and even here in the United States, to a very small extent. That was a very, very serious concern for this country, and we went over to help them to improve the safety of their reactors.

But in the United States, we've had one serious reactor accident at Three Mile Island. You probably have heard about that accident. The nature of the radioactivity release that occurred there was in the form of noble gases. They were radioactive gases, but they are gases that don't interact chemically in nature. They were typically very lightweight gases, which means that they rise straight up, and disperse in the atmosphere.

And if you look at the impact of the local community, other than the fact that people are afraid, and that's unfortunate, but if you look at the impact on the local community as a result of that accident in the United States, where a significant portion of the reactor core was melted, there is virtually no impact on the

land, on the people. And so I just take some exception to the comparison of the Chernobyl accident to something that might happen in the United States, because I don't believe that that is a reasonable comparison. We would not allow those reactors to operate in this country.

MS. BEZAK: I actually was not intimating that Chernobyl can happen here, necessarily. I think I am intimating that something similar, not in the reactor's flaw, but something that is unpredictable, which we are learning about all the time as we go through life. And all of you have to agree to disagree with me that nuclear power is a good source of energy, because that's your job. You are nuclear physicists and probably all support the idea of nuclear power is great.

Thank you for your time, and do take this very seriously, because we live with it every day. Thank you.

MR. GWYNN: Thank you.

MR. DRICKS: I think at this time, we would like to ask our Senior Resident, David Proulx, to talk about some of his inspection activities. And he will give you an overview of the work that we've done so far, and what we plan to do.

MR. SATORIUS: One thing I would add is I would beg the indulgence, Dave's presentation is pretty thorough, but it is relatively quick. The hour is late.

If you could let him get through his presentation, possibly without questions; following that, then we will open the floor back up.

Dave.

MR. PROULX: Okay. Once more, I am David Proulx. I am the Senior Resident Inspector at Diablo Canyon. To my right is Terry Jackson. He also is Resident Inspector at Diablo Canyon. We are NRC employees, but we live in this area, and we are members of this community. We work each day at Diablo Canyon Power Plant. We do independent inspections and verifications that the plant is operating safely on a daily basis.

And in completing our safety mission, we were actually at the plant on December 22nd, when the quake occurred, so not only did the quake incur us a lot of inspection activities, it was also a very personal hardship on us as well.

Now, in the follow-up to the San Simeon earthquake --

MR. GWYNN: Just to clarify what he meant by "a personal hardship." I have to thank the dedication of these public servants because like many of you, their families were located much closer to the earthquake than what the plant was, and their children were afraid. And

they stayed at their posts and did their jobs until we allowed them to go home. And that's the dedication that our people have to protecting your health, in the operation of this station. And so I just wanted to clarify what David meant by that.

Thank you, David and Terry, for doing that for us.

MR. PROULX: Thanks, Pat.

In the NRC's response to the San Simeon quake, I was the lead inspector. The NRC's inspection activities consist of three phases. Phase 1 was the immediate response by we resident inspectors; Phase 2 was the supplemental inspection that occurred about two weeks later, from January 5th to 9th, and included we resident inspectors, with myself as the lead, and a civil engineer from our Arlington office. Now, Phase 3 is our ongoing and future efforts, which include continued inspections of the plant and review of the special reports.

Don't need to get into the design of the plant because that's been talked quite a bit, but we did determine that the San Simeon earthquake resulted in .4 g's of seismic acceleration, which was very small, as compared to the Design Basis of the plant -- .04.

In discussing Phase 1 of our inspection, just as the earthquake struck, one of we resident inspectors

responded directly to the control room. And I immediately contacted the Region 4 office and NRC headquarters to communicate that the earthquake had occurred, and to establish the NRC's monitoring of the Plant, and NRC response.

In our response to the control room, we verified tank levels, insured that PG&E was following their earthquake procedure, initiating the emergency plan in performing their required inspections of the plant.

Within a few hours, we began our own independent inspections of the plant. These were not a quick run around the plant, but actually a thorough inspection of each of the plant areas, that began soon after the earthquake and lasted well into the evening and into the next day. And they included such things as the backup power supplies, the diesel generators, the emergency core cooling systems, auxiliary feed water, the spent fuel pool and its auxiliary systems, and the buildings that house these items. And the types of things we were looking for is supports that had come loose, whether or not there was any differential movement between buildings and between components, and whether or not there was any cracks in the foundations of structures.

Phase 2 of our efforts occurred from January

5th through 9th. The team included we resident inspectors, with myself as a lead, and a region-based civil engineering specialist. Our inspections included more detailed inspections of the plant facility, which included myself and the civil engineer going into the Unit 1 containment and verifying that the cooling systems in the containment were intact -- into the Unit 2 containment; that the seismic ap was maintained, and that there were no other cracks in the foundation this side of the containment.

In addition, we reviewed the licensee's Event Response Team results and the special report that they initiated within 14 days of the earthquake. Our review of this special report revealed that there was additional data that was required to be submitted, and PG&E committed to submitting a supplement to that special report.

Phase 3 includes our ongoing efforts. From now until the refueling outage, we will be continuing to perform continuing inspections of the plant. During the Unit 1 refueling outage, we are going to enter the Unit 1 containment and go into the areas that are uniquely available during the outage. In addition, we will be reviewing the supplemental report, and we have will have a regional specialist come and review the examinations

that the licensee does of wells and steam generator tubes.

And our inspections to date have indicated there was no damage to the facilities in our visual inspections. In our conclusion, the NRC inspection was of three phases. Phases 1 and 2 are complete. And the NRC inspections were prompt, thorough and independent. There was no damage to the facility. PG&E's response was good to the event, though they learned many lessons. The NRC is confident that the plant is safe, following the San Simeon earthquake, based on inspections to date, and that the earthquake was well within the Design Basis of the plant.

Our work is not complete. And as new information is gathered, it will be considered and acted upon. But our inspections to date have given us adequate confidence that Diablo Canyon is safe, following the San Simeon earthquake, but we still have more inspections to do. And when we come up with those results, we will also communicate those to the public.

MR. SATORIUS: Thanks, David.

I think Pat had mentioned earlier that inspection activities will continue through the March outage, where we will look at the other containment building. We anticipate the final result of all of our

inspections will be issued in an inspection report that will be issued near the end of April.

We would look, then, to have a public meeting at some point following that, to communicate to the members of the community the final results of our inspection.

So with that, Victor, I think we are at the point to reopen.

MR. DRICKS: We have -- we'll reopen. I know we have a woman who would like to ask some questions. She's been waiting patiently.

MS. MELLOW: Thank you very much. Gentlemen, please forgive me if I do not have a great deal of confidence in -- regarding the safety of the plant. It's interesting, just this week in our local paper, it says, "Cheating reported on security exercise at the Y2 nuclear weapons plant last summer in Oakridge, Tennessee."

It goes on to say, "Security guards who repelled four simulated terrorist attacks at a Tennessee nuclear weapons plant had been tipped in advance, undermining the encouraging results, the Energy Department's watchdog office said Monday. A broader investigation uncovered evidence of cheating during mock attacks against U.S. nuclear plants over the past two decades." Local paper. This is the Telegram.

MR. GWYNN: Did you state your name for the --

MS. MELLOW: My name is Marian Mellow, M-e-l-l-o-w.

MR. GWYNN: And Marian, I have to admit that the Nuclear Regulatory Commission only regulates the commercial uses of nuclear materials in the United States. And so for those security exercises, we do conduct force-on-force exercises where we test licensees' security forces. Those exercises are done under very strictly-controlled conditions.

What occurred at those facilities that are not regulated by this agency, I can't answer. But I can tell you that the scenarios that our people use, the nature of the exercises that we conduct is such that you won't find that type of cheating on an NRC-administered, force-on-force exercise.

MS. MELLOW: I would certainly hope not.

Another article, again this is from January 30th. It says that, "The next temblor could hit farther south. Geologists say that SLO," San Luis Obispo, "or Atascadero might suffer the brunt. Two Federal geologists believe the county's next severe quake could be centered in San Luis Obispo, Atascadero or elsewhere, closer to the San Andreas Fault. That next one could cause significant, significantly more damage than a

magnitude 6.5 San Simeon earthquake. That quake and subsequent aftershocks likely have relieved underground pressure on the northcoast faults. But pressure on the central coast section of the San Andreas has been building for more than a century.

The Santa Lucia range and the county's noted seven sisters volcanic mountains are stark evidence of past quake activities here. The last major rupture of the San Luis Obispo stretch of the San Andreas Fault was a magnitude 7.9 in 1857. So the area is overdue. It's a rubberband ready to break," one of the geologists reported.

Gentlemen, I have no doubt you are attempting to minimize the risk the Diablo Nuclear Plant poses to the thousands of men, women and children who live here. The truth is, you cannot make an inherently unsafe plant safe. The indisputable facts are these: More devastating quakes will occur, quite possibly much closer and much stronger, and you cannot predict with certainty what results may occur. Equipment and machinery will fail, plant workers will make mistakes, saying nothing of terrorists seeking a target.

Given knowledge of the nearby Hosgri Fault, this nuclear plant would never have been built in its unsafe location. Downwind communities never would have

allowed it. I was mayor of Pismo Beach then. We were never given that fact, and it should have been known. And that plant would not be here, and you wouldn't have had the opportunity to approve it.

Well, we know about that fault now. And to allow that nuclear plant's license to be extended, and even more deadly nuclear waste to be stored at that site, would be criminal disregard for public safety. I ask you to make recommendations regarding future operation of that plant, as if it were your children and your grandchildren who are at risk. Please use your position to help protect public safety, not gamble with it, if you value the lives of the men, women and children who live here.

I ask you, with all sincerity, please recommend closure of that plant before there is a major catastrophe. To even consider expanding its license, to even consider storing more waste, spent fuel in these casks that they propose to build, it's insanity. Public safety should come before profits for PG&E. Thank you.

MS. PALAIA: I'm Joyce Palaia. I live in Avila Beach. I know that the independent dry cask storage facilities will be constructed shortly. Have they undergone seismic studies, and will they be built to withstand a major earthquake?

MR. BAGCHI: It is still under review. Final judgment has not been given by the NRC, but the seismic part of it, I am aware of; that they have been reviewed. And let me remind you that these casks are completely passive. They have very substantial earthquake resistance, much more than the reactor block itself.

MS. PALAIA: Really?

MR. BAGCHI: Yes, ma'am. You ought to look at the nature and the construction of these casks. These casks are required to go through a drop test. And the drop test itself creates 33 g's or more, substantially greater than any earthquake that will be produced here.

MS. PALAIA: So they will probably stay on?

MR. BAGCHI: I'm personally convinced -- this is my personal opinion -- that those casks are very safe.

MS. PALAIA: Safer than Yucca Mountain?

MR. BAGCHI: There is no comparison between these dry casks and Yucca Mountain. These dry casks are licensed for a certain period of time, considerably less than Yucca Mountain.

MS. PALAIA: There is a major concern about when they'll be transported to Yucca Mountain, if ever, transportation, so forth.

Thank you.

MR. KILROY: Good evening. My name is Rick

Kilroy. I live in Morro Bay. I appreciate you all taking the time and staying so late and harboring our comments and criticisms. And one of the observations that I made tonight, listening to Mr. Cluff over there, quite intelligent. I've learned a lot, and also listened to the other geologist. Kind of a lesson. It's been quite enlightening. I feel like I've gotten some real cutting-edge information, stuff that's not in the textbooks, not in the stuff in the models that we've created, that we stand by as engineers.

I'm a marine engineer by trade. And one of the things that he pointed out that I found interesting is his latest information regarding the effects of earthquakes on long distance. For the longest time, I was always afraid of the Hosgri Fault. But I've realized, based upon his information, that we need to consider more damaging earthquakes further away, as far as 220 miles, according to his information. I think this should be taken into account when we are looking at the relicensing of the nuclear facility, and of any new applications, including dry cask nuclear waste.

Thank you.

MR. BAGCHI: May I just point out that San Andreas Fault was talked about for the licensing of Diablo Canyon. A very large earthquake was located at

San Andreas fault at the closest proximity from the site, and that ground motion does not control the earthquake design of the plant. The most controlling earthquake comes from the Hosgri site, Hosgri Fault.

MR. KILROY: That's not been proven.

MR. BAGCHI: Based on our assessment of all the seismic hazards, all the sources that contribute to the seismic ground motion at the site, that is the most concerned --

MR. KILROY: I was just taking into account Mr. Cluff's innovative and latest technology, which I found very intriguing.

Thank you.

MR. SCHUMANN: Good evening, again. Thanks for staying so long tonight. My name is Klaus Schumann from Paso Robles. I addressed you a little earlier, and I wanted to address a few issues which have come up this evening. One is the myth of the pools being underground. That is only partially true. The water level in the pools were at 139.6 feet above sea level. The ground level is 115 feet, so the difference would be about 24 feet, so the majority of the pools are above ground, not below.

The more important thing is, however, that we would have only about one foot of water above the top of

the spent fuel assemblies. That is within the 3 feet the NRC has identified as the critical level for when the water starts boiling. So if you want to keep that in mind when we talk about the pools being underground, that is quite misleading.

The Chernobyl comparison, I agree where the chairperson, if you compare the reactors, this cannot happen in the United States. It's quite obvious and has been well established. The comparison may be more applicable to the spent fuel pools, because the spent fuel pools can catch fire as the water drains or even partially drains, which may be even a more dangerous situation, which has not really been identified by the Nuclear Regulatory Commission as such because with partial drainage, you could get a thermal reaction creating hydrogen, so that may be something else, or if the partial water blocks the air from cooling the spent fuel assemblies, it might take extra long to do something about it.

But in any case, the zirconium fire could be comparable to the graphite fire at Chernobyl. It could last for a long time. And, of course, the amount of radioactivity in the pools is far higher than in the reactors' magnitude, several folds. There is no containment around the spent fuel pools. And the

buildings could, of course, be compromised through an air attack, or something like that. So this would be the more applicable comparison.

I want to also address shortly the issue the gentleman brought up, saying that there is no containment over any of the spent fuel pools in the United States. That is definitely correct, but there is a very good reason for it -- because every one of the pools was designed for a very different purpose than they are used for now.

The design -- Diablo Canyon's pool, the design was built and licensed for about 500 spent fuel assemblies. We have now, I think, about 506, I think, is the exact number. I think it's 1 1/3 reactor cores. So if you get at 193 fuel assemblies in reactor core, 1 1/3 is about 250, by 2 is about 500. So maybe 506. The gentleman over there would probably know better what is the exact number.

In any case, we have now at the present time 1800, roughly, spent fuel assemblies there. We will have, in the year 2006, 2200, so it is more than four times the amount the pools were originally designed for. There is not only a matter of quantity. This is also quality difference. The difference is that there is low density, there is only 250 spent fuel assemblies in the

pools. Temperatures were never that critical that you would have to worry too much about a spent fuel pool fire occurring. This is an extremely important difference.

What you have created, NRC, by licensing is actually two more sources of potential nuclear catastrophe out at Diablo Canyon. When the plant first licensed, we were talking about the reactors. And the reactors would have never been licensed without containment, obviously. There is containment, we get a license. That is what the community was told we would have to worry about. But since reworking and the four-fold, almost five-fold amount of spent fuel assemblies in the pools, you've created two additional sources which the people here were never told about.

And my question specifically to you is, Why are you against the returning those pools to low density, eliminating those two additional sources, which everybody is quite correctly worried about? The cost for the modification is rather marginal. I have heard estimates as little as six-hundredths of a cent of cost to the kilobyte hour. Now, they may be not quite correct, or may be a little bit more than that. Even if it's a penny or two, it's still very, very little cost to returning those pools to the original design. That was how the community was told about how the spent fuel pools would

be designed, when the plant was originally licensed. There is low-density designs to lower the risk of a pool fire nearly to zero.

I want you to think about that and I'd appreciate it if you really give it a thorough analysis on this, because the cost for returning is not that high, given all the other costs, but you would benefit quite substantially.

MR. GWYNN: I would like to make two comments in reply, and I think that you have some very thoughtful comments. I thank you for them.

The first comment in reply is that whether or not a zirconium fire can occur in a spent fuel pool is a matter that is debated amongst various experts. And to the best of my understanding and knowledge at this time, the NRC does not ascribe to the theory that it is a credible accident in a spent fuel pool. My belief is that if the agency believed that that was a credible accident, then there would be action taken to mitigate the potential consequences of such an accident. That's my belief.

The second comment that I would make is that I don't know why you have the impression that we are opposed to restoring the spent fuel pool to its original design density. I'm just not sure where that comment

came from.

MR. SCHUMANN: Well, the NRC has so far refused to talk about it in public sessions. This has been brought up, I think. It is not a new suggestion. This topic has been in front of the NRC for at least 25 years. The problem is, since 9/11, it has come much more into focus again. This is an old problem. But 9/11 has focused the problem again in the mind of the public. And you mentioned the accident; I agree. An accident is very unlikely to cause a spent fuel pool fire. The acts of malice, we are concerned about.

And the NRC has basically stated since 1982 that such an event could not happen in the United States, the 9/11 type of event. We know better now, obviously. So such an event can happen in the United States, and we'd better prepare for it. Because on the one hand you have allowed PG&E to pile up much, much, more waste than the public was told originally what the plant was licensed for, so there are much more risks involved, certainly in terms of quantity.

MR. BAGCHI: Those are license amendments and they are subject to public comments. Every time the capacity is increased, that is reviewed thoroughly by the NRC. Personally, I have been involved in the technical committee's study on zirconium fires, and there are some

risk implications out of that. And it is considered to be well within the NRC commission statement on allowable risk.

MR. SCHUMANN: Yeah. One in 10 million. I think that's the number, if I recall it. The only problem with the probability risk assessments are that they don't include human error, not acts of malice, and those are the two most likely sources. So if I take the thing in 1987, human error contributed to 74 percent of the 2,930 mishaps in that year. So if you exclude human error, you will skew the results, in terms of the probability risk assessment. I think that's quite obvious.

MR. BAGCHI: We did have a human error expert on that committee that wrote the report, and they did consider human error. But I am not an expert in that area, so I cannot comment.

MR. SCHUMANN: But terrorism is definitely not. It has been always very consistently stated by the NRC that this is not something we should have to worry about; and therefore, it was always considered to be in the realm of speculative. And the conclusion the NRC always drew, since it cannot happen in the United States, we don't have to ask the operators to prepare for this event. 9/11 has changed all that; I think we all agree

about that.

And as long as you continue using probabilistic risk assessment, which includes those two aspects, they are no good. It is simply no good. And using it as justification to increase the risk to the population makes no sense to me.

In any case, so I would very much -- actually, I got some hope from your remarks, Mr. Chairman, saying that you may consider in the future, or hopefully with the application of PG&E now, that the spent fuel pools will be returned to the low-density design. I think that would be the best step you could take for assuring more safety margins for the populations here.

And by the way, that is proposed by the consultant of the County, as you may know, for the building permit for the environmental impact report concerning the proposed IFSSI. You know, the consultant for the County has proposed that. And as far as -- I understand has come with some questionable argumentation to know why that could not be done. I think it is quite obvious it can be done. It's a matter of spending the money, wanting to spend some money.

But I think if you want to subject the community to much more increased risk through much more nuclear waste, far more, I think it's nine times more

than the plant was originally licensed for, then I think you have every obligation to guarantee the safety of the residents, as much as one can. And returning it to low-density spent fuel pools would be a very important step towards that. And I would appreciate it. And thank you for considering it.

MR. GWYNN: Thank you.

MR. DRICKS: Thank you, again, Klaus.

Do we have anyone else? The hour is getting late, and I would beg your indulgence. If you've already spoken once, we'll let you go ahead.

MS. MELLOW: It will take about ten seconds.

MR. DRICKS: Okay.

MS. MELLOW: Gentlemen, especially the one that spoke about allowable risk. You know, allowable risk depends on where you live and who is at risk. And I don't believe that you have the right to increase the risk of a nuclear disaster that could kill thousands of people that live here. I think you need to remember that. Thank you.

MR. DRICKS: Do we have anyone else who would like to ask questions or speak, who hasn't? If not, I think I'll turn the floor over to Mark.

MR. SATORIUS: Thanks, Victor. The hour is late. When we came out here, we kind of had it planned

that we would have -- and I guess we need to take this as a lesson learned, when we have these meetings again in the future. If we have two, we need to allow for more time or start them earlier, although it's hard to start them earlier because it gets into the dinner hour and folks don't get home from work.

But our goal was to reach out and communicate with members of the community. And I would like to think that we accomplished that. We may not have been responsive to the way that all members of the community would want us to be responsive. But by us coming out here and speaking, we think we're doing an important activity that will give you information so that you'll leave tonight more informed than when you got here.

I did want to make a couple of comments on the information that we provided to you earlier. There is a January 16th letter in that to Pacific Gas & Electric, that outlines -- we call it a "quick look letter." Essentially, it outlines our inspection activities through what Dave had described as Phase 1, which were the December activities, and Phase 2, which were the early January activities.

We got that letter out early to PG&E, such that it could be put out into the public so you, the members of the community, would understand our inspection

activities that have taken place to date.

The second document we have in there is a formal inspection report that formally outlines our inspection activities through the last calendar quarter of the year 2003. There are only excerpts in there from the cover letter and the findings, and the specifics of the inspection activities we did with respect to the earthquake. That inspection report, in its entirety, would have been about 50 pages. And we just -- we couldn't justify making that many copies and having to pack them out here. So what's called the session number or the number that you can go to the website and get the entire report, if you're interested, is clearly marked by hand on the front of that.

I think I mentioned earlier that it's our intent that as we finish the Phase 3 of the inspection activities, those will be completed and documented in an inspection report that will cover the first quarter of calendar year of 2004, and will be issued the end of April. Following the issuance of that report, it's our intent to come back and visit with the community again, to provide you insights on our inspection activities that -- as we complete the inspections of the earthquake.

I am getting tired, Pat. Do you have anything else?

MR. GWYNN: No, I don't.

I do want to thank you all for bearing with us. We will make an effort to do a better job of letting you know in advance of our schedule for the next meeting. And we do plan to not only issue the transcript of this meeting, but also to perhaps provide some answers to some of the questions that we've heard tonight, as well, in a public way.

And with that, we'll close this meeting. Thank you.

MR. SATORIUS: One last thing. We will be sticking around, to the extent that there are further questions or dialogue you would like to have with us until the room empties out.

(Hearing concluded at 11:11 p.m.)

REPORTER'S CERTIFICATE

I, CAROLYNN ELAINE SPERE, A CERTIFIED SHORTHAND REPORTER IN AND FOR THE STATE OF CALIFORNIA, DO HEREBY CERTIFY:

THAT SAID PROCEEDING WAS TAKEN BEFORE ME AT THE TIME AND PLACE THEREIN SET FORTH AND WAS TAKEN DOWN BY ME IN SHORTHAND AND THEREFORE REDUCED TO COMPUTERIZED TRANSCRIPTION.

I HEREBY CERTIFY THAT THE FOREGOING PROCEEDING IS A FULL, TRUE AND CORRECT TRANSCRIPT OF MY SHORTHAND NOTES SO TAKEN.

DATED AT SAN LUIS OBISPO, CALIFORNIA, THIS 23RD DAY OF FEBRUARY, 2004.

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CAROLYNN ELAINE SPERE
CERTIFIED SHORTHAND REPORTER