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NUCLEAR REGULATORY COMMISSION

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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DISCUSSION ON FULL POWER OPERATING LICENSE

FOR COMANCHE PEAK (UNIT 2)

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PUBLIC MEETING

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Nuclear Regulatory Commission

One White Flint North

Rockville, Maryland

Tuesday

March 16, 1993

The Commission met in open session, pursuant to notice, at 9:30 a.m., the Honorable IVAN SELIN, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

IVAN SELIN, Chairman of the Commission

KENNETH C. ROGERS, Member of the Commission

JAMES R. CURTISS, Member of the Commission

FORREST J. REMICK, Member of the Commission

E. GAIL de PLANQUE, Member of the Commission

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

SAMUEL J. CHILK, Secretary

WILLIAM C. PARLER, General Counsel

JAMES TAYLOR, Executive Director for Operations

THOMAS MURLEY, Director, NRR

JAMES MILHOAN, Region IV Administrator

BRIAN HOLIAN, Comanche Peak Project Mgr, NRR

PATRICK MADDEN, Sr. Fire Protection Engineer, NRR

DR. ASHOK THADANI, Director, Division of Systems Technology, NRR

OWEN THERO, CASE Consultant

BETTY BRINK, Citizens for Fair Utility Regulation, (CFUR)

MICHAEL MARIOTTE, Nuclear Information & Resource Service, NIRS

ERLE NYE, Chairman of the Board & CEO, TU Electric

WES TAYLOR, Executive VP, Production, TU Electric

LANCE TERRY, VP, Nuclear Engineering & Support, TU

JAMES KELLEY, JR., VP, Nuclear Operations, TU Electric

WILLIAM CAHILL, Group VP, TU Electric

P R O C E E D I N G S

(9:30 a.m.)

CHAIRMAN SELIN: Good morning, ladies and gentlemen. This morning, the Commission will hear important information to assist us in reaching a decision on whether to authorize issuance of a full power operating license for the second nuclear unit at the Comanche Peak Steam Electric Station.

The station is located in north central Texas, about 40 miles southwest of Fort Worth, and adjacent to the communities of Glen Rose and Granbury. It is owned by Texas Utilities Electric Company and Texas Municipal Power Agency. TU Electric is the applicant for an NRC full power operating license.

On January 30th of this year, they certified that both their organization and the reactor plant were prepared for operation, and requested a low power operating license. The Director of the Office of Nuclear Reactor Regulation issued such a license, which allows reactor fuel loading and low power reactor physics testing. The license was issued on February 2nd, 1993, that is, the low power license.

Today, the Commission will hear information from several public interest groups, by the applicant TU Electric, and by the NRC staff. I'd like to stress, the

Commission does not intend to vote today and, in fact, would not even be in position to vote until the results of the low power testing was available.

We will consider all of the information which we receive today in making our decision to authorize issuance of a full power operating license.

Before we start, do any of my fellow Commissioners care to make any remarks?

(No response.)

We will hear first from the representatives of either two or three public interest groups, depending on what happens in the next 20 minutes. We have Mr. Thero, from the Citizens Association for Sound Energy; Ms. Brink, for the Citizens for Fair Utility Regulation; and Mr. Mariotte has been invited, from the Nuclear Information and Resource Service.

I know you have lived with this for quite a while and you have quite a bit to say, but nevertheless we must hold you each to ten minutes. I apologize for that in advance, but we will have to stick to the schedule.

I understand you've arranged such that Ms. Brink will be the first speaker. We welcome you here this morning. We were prepared to welcome you yesterday morning but, because of the weather, we did put off the start of the meeting in large part so you could be here

today, and the Commission looks forward to hearing what you have to say, Ms. Brink.

MS. BRINK: Thank you, Chairman Selin. We do appreciate the fact that you postponed the meeting because we hoped that we would get a chance to speak to you in person, and we welcome that you did.

Citizens for Fair Utility Regulation is a volunteer consumer organization based in Fort Worth, and we represent members who live, work and play in the vicinity of the nuclear plant. I live about 30 miles from Comanche Peak, my husband and I, and I have 14 grandchildren who visit me frequently, and I say that to you this morning so you'll understand why I'm concerned about the safety of the plant.

On behalf of the CFUR Board, I want to thank you for letting us talk to you about our concerns about Thermo-Lag. I know you have my prepared statement that I sent in earlier, so I'm just going to briefly, since I only have ten minutes, go over some of the technical concerns we have but, initially, our request to you is just quite simple: We don't want you to license Unit 2 until the criteria that is being proposed by the NRC is in regulatory law, has been accepted, has gone through the process of peer review, citizen comment, and is established in regulatory law.

The NRC documents and admissions now prove that the initial testing done by Thermal Sciences so-called "independent laboratory" was deficient, that the testing itself is under investigation. It's one of many subjects under investigation by the IG's office, by a federal grand jury, and we think that these should be played out, that the results of these investigations should be known before Unit 2 is licensed with Thermo-Lag in place.

One of our concerns has been combustibility, and the NRC staff recognizes that Thermo-Lag is combustible. 10 CFR 50.A requires that noncombustible and heat-resistant materials should be used whenever practical. In all the tests that we know about, Thermo-Lag burns as a combustible, and it meets the criteria of the ASTM's definition of a "combustible material". The NRC admits that it's combustible, and yet it's going to allow -- we understand it will be installed or allowed to be used in these plants, with compensatory measures.

Now, we have concerns about compensatory measures such as fire watches because TU, in 1991, was fined $50,000 for falsified fire watch records and missed fire watches. Those of us who live near the plant do not consider this to provide us with reasonable assurance that fire watches will always be performed as required, nor that they, in and of themselves, can provide the

redundancy necessary for the defense in depth criteria. Only one such missed fire watch patrol is necessary for a fire to breach a deficient fire barrier and cause a failure in the plant's safe shutdown systems.

We think sublimation is an issue. We don't consider that this material truly sublimes. We think it is combustible, it is combusting rather than subliming, and we think the flammability of the material should be of concern to the Commission. We think the Omega Point Laboratory should be a concern, whether or not they are truly qualified under NRC's criteria to test these materials.

We did not know about this memorandum until just recently, but apparently on June 30th, for the NRR, Mr. Kenneth D. Steckler of the National Institute of Standards and Technology, voiced some serious concerns about Omega Point's ability to adequately test Thermo-Lag, and I've got that in my statement.

We think that there are contradictions, and we think that in your answers, Chairman Selin, to Chairman Dingell -- and, by the way, I want to say I thought you were very candid and very open, and we found out a lot of good information from you, and I thought that was helpful -- but it appears that some of the testing that was done to satisfy the installation in unit was really -- did not

meet the criteria of this Generic Letter 86-10, and we're concerned about whether Generic Letter 86-10 is still applicable to Comanche Peak.

We're concerned about the materials coming on-site that were full of voids and staples, and we recognize that that can happen occasionally, but it happened in '89 and we see it happening again now. And we also are concerned about TU's QC/QA oversight of this because they have stated that all the materials received on-site at Comanche Peak have been checked out by their own personnel at Thermal Sciences before they leave to come to Comanche Peak, and they are qualified as "good". And we want to know how these batches got through their own QA/QC people.

I think we're more concerned about the ampacity derating issue than anything. This is an unresolved issue. Within the NRC's own determination, it's an unresolved issue. And we think that if the staff recognizes that ampacity derating has been, in fact, substantially higher than figures originally reported by TSI and used in the cable sizing calculations at Comanche Peak, causing the power cables to exceed the designed temperature rating of the cables, then it must also require that action be taken to correct this.

We don't agree that just adding more layers of Thermo-Lag is the answer to this. That seems to us to

only be a fix that will increase the ampacity derating factors even further. We disagree with the staff's argument that sufficient margin likely exists because cable sizing is based on a full load current plus 25 percent margin. Now, I don't have that in my original documents to you, but we did want you to know that we're concerned about that. A 25-percent margin, we think, is for normal installation of a power cable furnishing power to a motor. Wires and cable are sized to carry a normal current plus 25 percent, according to the National Electric Code. But motors are supplied this way based on an assumption that the cables will be able to dissipate the heat.

Now, if the cables then have an added fire barrier, they will obviously not be able to dissipate the heat. So, that's going to increase their ampacity deratings. We think that hasn't been considered by the staff.

We're concerned about the missed opportunities, and I think that that was quite important in your statement to Chairman Dingell and in your decisions this morning. We think that at one point in 1989, both CFUR and CASE raised the issue of Thermo-Lag and, at that time, we were asking for a stay of the operating license of Unit 1. And we found the report that Thermo-Lag had been

brought on-site that was deficient. A worker has been fired subsequently to this issue, but the NRC apparently only really chastised the plant to you for having handled the worker issue rather than going on and looking into the greater issue of the safety of Thermo-Lag.

Now, I want to also say that you discussed this in terms of Region IV's missed opportunity, but I want to point out, in all fairness, that at that time Comanche Peak was under the oversight of a Washington-based group, and I don't think Region IV really ought to have to carry the burden for that missed opportunity. There were others that we're concerned about.

Those are our basic concerns, and I ask you again, just don't compound this issue, just don't compound the mistakes of the past. I'm so glad that you are able to, this morning, hear from some of us who have to live close to the plant and are citizens who have been involved in this a long time.

So, I know you're not going to vote today but, when you do vote, please consider us and the health and safety of us, rather than the financial health of TU. Thank you.

CHAIRMAN SELIN: May I ask you a question, Ms. Brink?

MS. BRINK: Surely.

CHAIRMAN SELIN: I was very impressed with both the competence and the thoroughness of your written statement and your presentation. I wanted to ask what your view would be if it turned out that the -- I should emphasize that the question isn't whether Thermo-Lag meets the specifications that TSI claimed it did, but whether the installation at Comanche Peak meets the criteria for the fire break. And what I wanted to ask you is, in your opinion, if it turns out that the installation at Comanche Peak meets not only the revised criteria for the standards that the staff is considering, but also meets the old criteria, would your position be any different?

MS. BRINK: Yes, I think it would. Quite frankly, Chairman Selin, I don't think it can meet that criteria but, nonetheless, I think our position would be different if we could be shown that this material could meet the revised as well as the old. I understand some of the revised criteria will hold some of the old criteria in place, that it won't be changed; it's going to be, rather, enhanced. Is that my understanding of the criteria changes?

CHAIRMAN SELIN: There are two fundamental changes to the criteria. The first is a rather technical question: Where do you measure the temperature? Where do you put the thermocouple? In the old criteria, the

thermocouple was put at the back side of the insulation. In other words, if you have the fire on the left, the thermocouples go on the right side. In the revised criteria, the thermocouples would go on the cable, which is what you really care about. That is somewhat of a liberalization because there will be a little bit of decrease of temperature from the back side to the cable, but what you're really interested in is the temperature of the cable and, furthermore, the temperatures on the back side of the insulation are very, very unpredictable, but you get a certain kind of averaging by the time the heat wave gets to the cable.

And the second difference has to do with the fire hose test. But as far as the temperature test goes, the big difference is not in deciding whether the temperature rise is within the 250 degrees that's permitted, but our regulations say that even if the temperature rise is greater than the 250 degrees, although the burden of proof is then on the utility, the utility can come in and show us that a greater temperature rise would not adversely affect the performance of the cable. And the revisions lay out how that is done, rather than whether it's permitted or not.

So, the key differences are where the thermocouple goes, and what kind of a test of putting

high-pressure water on the insulation half-way through a fire would do.

MS. BRINK: What I would be concerned about would be the fact that what we would prefer is that the NRC conduct independent tests of its own, and not accept the test of TU. I don't want to be unduly critical of TU this morning, but we see a pattern, we think there has been a pattern at TU, of not the missed opportunities of the NRC, but of Texas Utilities itself having a pattern of problems with QA/QC.

CHAIRMAN SELIN: We will make sure when the staff comes before us, that they explain quite clearly exactly what they have accepted and what they have done to verify the tests.

Commissioners, do you have any questions for Ms. Brink?

(No response.)

I'll turn to Mr. Thero. Mr. Thero, I read your statement avidly, and I'm impressed both by the thoroughness and the length thereof, and I hope you'll keep to ten minutes in making your oral presentation.

MR. THERO: I was told I could read all 34 pages.

CHAIRMAN SELIN: You can, but the last 24 have to be read silently after you leave the table.

(Laughter.)

MR. THERO: Chairman Selin, it's good to meet you, sir, and good to see you again, Commissioner Curtiss, Commissioner de Planque. Good to see you again, Commissioner Rogers. Good to meet you, Commissioner Remick.

I'm used to following TU Electric, so I'm kind of lost as to what to do here. Here I am first. I guess I'd like to reflect a little bit and, since you have our written statements, and I know you're going to study it, I'd like to reflect a little bit on my feelings of being here.

I'm extremely proud and pleased to be part of this process. I guess only in this country could a citizens group have the impact to an overall very serious and somber, but necessary project such as Comanche Peak.

I'm very proud of Juanita Ellis. I'm very proud of her husband, Jerry Lee. They gave up a lot of their life to take part in what they thought they could contribute to and take part in.

This is Juanita Ellis' almost 20th year of her involvement in activities surrounding Comanche Peak. It's not without a lot of sacrifice on her part and her family's part.

I know that she agonized over this letter

because she tried to represent 20 years of her life in a very few pages. She's a very serious woman, very focused woman. She's taken a lot of heat, as CASE has taken a lot of heat -- a lot of bad publicity, bad press, slanderous statements being made -- and all this time, she never lost focus on what she was to accomplish. She kept us all focused no matter how rough it got.

I'm very proud of TU Electric, proud of Mr. Nye and Mr. Counsil for putting this stipulation and joint agreement settlement together, and making it possible for CASE to participate as actively as we did. It certainly is history setting. I'm proud of Susan Palmer, who helped us make it work.

I'm trying not to make this an Academy Awards acceptance, but I think there's a lot of recognition into a process like this. I don't want to make it sound like it's a love-in because it hasn't been. And I think Commissioner de Planque asked me a question at one of the meetings, about would this process work at other plants and so forth, and I reflected on that, thinking that there aren't a whole lot of utilities around that have the foresight or that could work with us to make something come about as productively as our effort has.

I also said that one thing that I respected about lawyers was their ability to sit across the table

from each other and go at each other and go for the jugular, but never lose sight of the fact that something had to be resolved and solved, and we had that relationship. It wasn't one where you go over for dinner, but it was certainly one where no matter how rough it got, the end result was to resolve the issues.

So, we did have some independence and, contrary to the press, I think that we were an effective check-and-balance. I think that some of our inputs and our perspective of not having the political ties that you would have in working for a utility or working in the NRC, we only had one focus and that was the health and safety of the public, without any cost schedule constraints, without any political ramifications, other than what some people may have thought about us being bought off, so to speak.

So, I wanted to reflect to you just how extremely proud I am to be here and be part of this process.

We would ask you to consider our inputs in this letter, as well as other documents that we've turned out. In the open areas of concern, as you're aware, during the Unit 1 licensing hearings, we asked for a license condition regarding the development and implementation of an effective and comprehensive root cause analysis

program.

The utility went out of their way to work with CASE, with Jack Doyle, the CASE consultant, to develop and take part in a root cause analysis program. We felt that that was extremely key to the ability of the licensee, TU Electric, to understand their problems, to call a spade, a spade, and to go about fixing that.

As you're aware, the Commission didn't accept our motion for a license condition, and we never withdrew that. And we were contemplating doing that same venture again for Unit 2's licensing, but we had several key, very important, very fruitful discussions with the utility. I must say that I was impressed and surprised with the reaction from the utility in recognizing CASE's position. Although we haven't seen the changes that the utility has put before us, we haven't seen the procedures, and we certainly haven't been able to look at implementation, and we will not be able to look at implementation since our time is running out along with my ten minutes.

So, we ask you to watch the implementation, to make sure that issues such as Thermo-Lag and check valves aren't so much fixed as they jump up, but that they are prevented by having an effective root cause analysis program not just after-the-fact, but before-the-fact, to look at the processes and make sure that you wring them

out in a very scientific and constructive manner.

We still have some issues open, Commissioner, on the area of the wrong unit-wrong valve incident, and I understand that we have at least one meeting, if not more, whatever it's going to take, where we will meet face-to-face again with the utility. And I'd like to mention George Edgar's participation in this. He has a way of making sense out of things and putting things into perspective when maybe even we're faltering. So, it's that kind of an interface, very positive, but very independent.

There's no doubt about who's who and what's what. So, we ask you to keep your eyes, as I know the utility will, on the root cause analysis program. We feel strongly about that because, quite frankly, the corrective action program has been less than adequate, from CASE's perspective -- less than adequate in preventing issues from recurring, important issues that we feel we certainly had an expectation that the utility's performance and corrective action would be more succinct and positive than it has been, in preventing recurrence of significant conditions adverse to quality. Without that root cause analysis program, we don't feel they have a chance.

We're concerned, as Mrs. Ellis has put in this letter, about harassment and intimidation. That's been an

area of concern of Mrs. Ellis' since the plant went into operation. We continue to deal with persons from the plant that feel that they have been retaliated against, or intimidated, harassed. Although the utility has the programs in place, and certainly the procedures in place, to limit this, implementing it has been another matter.

Regarding Thermo-Lag and Borg-Warner check valves, there's a lot on the table about that. One thing that we would caution you about, Chairman Selin, is not to back away from Appendix R requirements. It's as important an aspect of the plant, the ability to operate, shut the plant down in a design basis earthquake is very important. I know it's not a requirement. We want you to look at that, to look at the potential for having a fire when your building is shaking, whether it's an earthquake or water hammer or whatever.

We would like you to consider adding the requirement for seismic for the fire suppression equipment, including Thermo-Lag. It's just too important an issue and too much is at stake to back off on the requirements of Appendix R. It should be strengthened and not limited.

Thermo-Lag and Borg-Warner check valves is a blight, blight on the industry that could have, and should have, been prevented. It was a regulatory breakdown from

the start. It was a breakdown in TU Electric's QA program. It was a breakdown in the vendor's QA program. And that breakdown and the incidence of Thermo-Lag and check valves, we don't feel is nearly as important as putting the processes and programs in place that prevent this from happening in the future.

There's no doubt that TU Electric has the capability, the technical expertise, and the desire to fix things once they happen. We want that same dedication to prevention.

CHAIRMAN SELIN: I have to cut you off, Mr. Thero, your ten minutes are up.

MR. THERO: Okay.

CHAIRMAN SELIN: First of all, I'm sure Mrs. Ellis realizes this, but we did not hesitate to put CASE on the agenda when we received your letter. The arrangement between CASE and Texas Utilities is really quite an outstanding one. I'm not party to the history and to the remarks that you've made but, from the Commission's point of view, it's a very positive and really quite a unique arrangement, quite a credit to CASE and I might say to Texas Utilities as well.

We will talk to the staff when they come up, about the relationship between seismic and Appendix R. I can assure you there's no intention to weaken the fire

safety standards. Fire is still the largest contributor, or one of the largest contributors, to the risk remaining in power plants. Although the Thermo-Lag is only one small part of that, it continues to be a major source of interest.

Do any Commissioners have any questions for Mr. Thero?

COMMISSIONER ROGERS: Yes, just one point. I thought your report was a very interesting one, very detailed. I thought it was very illuminating.

You've talked about the root cause analysis, and that's terribly important for everything that we do, but I was particularly interested in whether you could very briefly say a little bit more on your concern with NRC staff's response mechanism being adequate, or not being adequate, to handle the harassment and intimidation issues. Do you have any specific suggestions there, or do you have any -- you've mentioned that the utility has a program in place, but it has to be implemented -- but I'm talking about NRC now.

MR. THERO: I think you have to be sensitive. Your inspectors are there, and they can sense -- that plant's a living plant, and when you walk in there you can sense if things are going right and things are going wrong. And you can look at what's going on, the

turnovers, the ability to meet schedules, how things are going, the numbers of ONE Forms, the deficiency reports, the numbers of problems, and try to deal with what's at the bottom of it.

And what we found is that there's a lot of pressure and a lot of interaction between the lower management, the superintendent area has a commitment to cost and schedule that things be met at the expense of, and maybe the things are so subtle that they're doing, you know, but we are concerned that the NRC does not appear to be as sensitive to that.

You did send a message with the Thermo-Lag, but that was a battle. It took a great deal of effort on CASE's part to bring all this to the front and to make sure that you understood "See Johnny run" English as to what happened before -- we feel before you took action and fined the utility for that. We think that you need to send messages that both the workplace, especially in the nuclear power industry, will not tolerate, from the NRC's viewpoint. That has to be as important to you as meeting any tech spec operating condition.

It's an awareness. It's a message. You need to constantly put forth the personal contact between your inspectors and the workforce, not just your inspectors and the middle or upper management people. It's more

involvement and more awareness. I think you need more sensitivity to that issue. I don't know if that broached answering your question.

COMMISSIONER ROGERS: All right. Fine. Thank you.

CHAIRMAN SELIN: Thank you, Mr. Thero.

Mr. Mariotte, we welcome you. The operative phrase that you missed by being a few minutes late is, you will be limited to ten minutes.

MR. MARIOTTE: Okay. I apologize for being late. The roads still aren't quite as clear as I thought they were.

Thank you for the opportunity to speak here today. As you know, I'm Michael Mariotte. I'm Executive Director of Nuclear Information and Resource Service. You have my prepared statement, I assume that will be in the record, so I will just summarize briefly.

I think it's particularly appropriate that NIRS is speaking here today, since we've represented intervenors at literally dozens of plants, at this point, and because this is really the last licensing action for a private utility probably -- well, certainly this century and, quite possibly, ever.

I should note that I've never understood why you folks insist on granting full power operating licenses

before plants undergo low power tests. It's our understanding that Comanche Peak still hasn't gone critical yet, and we don't understand why --

CHAIRMAN SELIN: We're not going to do that, Mr. Mariotte. We're not voting today, and we won't vote --

MR. MARIOTTE: I understand you're probably not voting today, but --

CHAIRMAN SELIN: We will not vote until we have the results of the low power tests.

MR. MARIOTTE: Well, great. That's a change from --

CHAIRMAN SELIN: You can't get cause and effect, but you can get correlation. You made the point and we agreed, so --

MR. MARIOTTE: That's a change from some past Commissions.

COMMISSIONER CURTISS: Let me add to that, because it depends on which past Commission you're talking about. I may or may not have been a member of it.

The process that we follow is to ensure that all of the issues to be resolved prior to full power operation are, in fact, resolved. The issues that need to be resolved here at the Commission level will be, and you can have my own personal assurance, and I'm sure of the entire Commission. At the same time, the process has been, in

the past, and I think will continue to be, if there are issues that need to be closed out in terms of steps that have to be taken, punch lists or what have you, prior to full power operation, our people at the site and in the regions understand, and I'm sure will confirm, that it's their responsibility to ensure that all such issues will be resolved prior to full power operation. That doesn't necessarily need to precede issuance of the license and, in fact, the license and the decision, I'm sure, will be contingent upon resolving all those issues.

So, the previous practice has been that, and I think it's a defensible one and one, frankly, that I suspect will continue here.

MR. MARIOTTE: I wasn't able to attend all of the Dingell Committee's hearings, so I didn't hear you say this, Dr. Selin, but I understand that you did, that Comanche Peak would not be licensed with fire watches that, in fact, it would be licensed meeting fire barrier criteria, and it's our belief that Comanche Peak still does not meet fire barrier criteria. It certainly does not meet the existing criteria. It's our belief it does not even meet the proposed criteria, or the criteria in the October 19th letter, which are, I think, essentially the same as the proposed criteria.

As I said in my statement, we have some serious

legal problems with the approach you're using by relying on these criteria. We are already in federal court with you over the Part 52 issue in which you adopted a final rule without public comment, and we felt the comment was necessary. This is substantively the same issue. You are using criteria which you have pledged to submit for public comment, and that has not been done, and yet you're going ahead and doing it.

We have a legal problem with that. And I know your staff is interested in whether we're going to act on that, and we have not decided at this point.

But you've seen in my statement how we believe that Thermo-Lag does not meet the proposed criteria. I'd just point out a couple of things. The megger tests. Your proposed criteria state quite clearly that megger tests have to be conducted during the fire endurance test. This was not done at Comanche Peak, according to the memos we've seen. In fact, the group doing the tests refuse to do that. And just to read the licensee, Texas Utilities believes that the worst case insulation resistance value would exist at the end of the test when the cables are at their maximum temperatures rather than midway through the tests.

Now, your own proposed criteria state just the opposite, to provide reasonable assurance that the cables

would have functioned during and after the fire exposure, megger tests need to be performed before the fire tests and at multiple time intervals during the fire exposure. Texas Utilities seems to want it both ways.

I was also kind of surprised when I finally sat down and read Comanche Peak SSER 26, to find that there are 180 deviations, 180 configurations in that plant that have not been tested. The NRC staff decided to sample six of those. Three of them could not pass on their own. They required some form of compensatory measures. I don't know, maybe some of those have been solved in the interim since that was released, and some haven't. I doubt if the other 174 cases have been sampled or corrected at this point.

And, you know, a 50-percent success rate -- you know, at the hearings, we kept hearing about regulation by audit and how that doesn't always work, and it seems to me that that's exactly what is happening in this case, by allowing these large number of deviations and a small test sample that, in fact, it did not have a very good success rate.

Owen mentioned the seismic issue, we had in our petitions to you on this, expressed a concern that Thermo-Lag, in a seismic event, would break off into large chunks and sever the cable trays. We accept the NRC staff

response that we are wrong in that, but we're not comforted by the NRC staff's response in which it says, no, it won't break into large chunks, it was going to crumble into a powder. We fail to see how it is going to protect against a fire if it's crumbled into a powder.

We're also upset by the response to our petitions on the toxicity issue because we presented to each of you the results of tests conducted at Southwest Research Labs, a nationally recognized testing laboratory, that, in fact, indicated that the combustion of Thermo-Lag produces large amounts of toxic gases, particularly hydrogen cyanide.

We got back the response from the NRC staff saying that our tests at NIST show that it's no more toxic than a Douglas Fir. We thought that was a somewhat flippant response. We don't know how toxic a Douglas Fir is. And we also don't understand -- the issue is not how toxic your tests found, the issue is what's the discrepancy. These were real tests we gave you. You may well have seen them before. But we don't understand that there's been no answer as to why the discrepancy between the tests that show a high amount of toxic gases and a test that show a low amount. Does it mean at some point Thermal Science changed the composition of the material? That would be a very serious problem. Does it mean that

their quality assurance is such that they are giving you two different quality sheets for testing in the intervening years. That would be a very serious problem. The problem may not be so serious, but we don't believe it's been addressed, and we believe it should be addressed before any further validation of Thermo-Lag takes place.

And then, of course, the material can't meet the existing criteria which, in our view, is why the criteria is geing changed. It can't pass the hose stream test. And it's not just NIRS that thinks the hose stream test is a good idea. I mean, 3-M seems to think it's a good idea. PromoTech seems to think it's a good idea. Most of the other manufacturers in this area seem to think it's a good idea. And I note with some dismay, I just heard yesterday, in fact, that your staff attended an ASTM meeting this past week -- maybe it was a task force -- and really attempted to browbeat them into changing their test standards to allow no hose stream testing whatsoever, no fog nozzle, no full hose stream.

It's my understanding that this effort will, although it did, in fact, succeed in passing this task force, my understanding is it ultimately will be unsuccessful, but I think that the whole approach -- you know, these ASTM tests aren't just used for the nuclear industry, they are used for all types of different

industries. And I really think that is work, on behalf of Thermal Science, it's really above and beyond the call of duty.

CHAIRMAN SELIN: I'm sorry, will you repeat the last sentence?

MR. MARIOTTE: I said I think that's work on behalf of Thermal Science that's really above and beyond the call of duty, but I don't see any other beneficiary of that type of activity. And, again, in our petitions, we have tried to be careful of the word "favoritism", but when we see things like that, you know, that's the word that comes to mind. And I don't understand it because you guys don't have any interest in Thermal Science. I mean, you don't -- and I don't understand why this Commission and your staff have gone to such great lengths.

I mean, I think of other types of regulators, say, FAA, and if they were confronted with a similar problem, what they would do, and I really have to question whether they would take this kind of approach. I think they would take the stuff out of the planes if it were in a comparable type situation. And I sometimes get just flabbergasted. I think maybe you just talk to the industry so much and to the public so little -- and not necessarily mean that I'm the public, but the real public out there -- that maybe you don't understand just how

flabbergasted the people I talk to every day are when they see these types of things.

I'm not naive enough to think that you're going to deny Comanche Peak 2 a license. And I noted in there that when the folks -- when they were looking into whether they should intervene in a Louisiana Energy Services project, they did a little research and they talked to Region IV and asked if there had ever been an application denied by the NRC, you know, of a facility of any type that had gone all the way through the process, and they found out that that, in fact, has never happened.

So, you know, you're going to license it, but what I'd ask you to do is license it later. I mean, resolve this problem --

CHAIRMAN SELIN: Your ten minutes are up, Mr. Mariotte.

MR. MARIOTTE: Okay -- before you license it and, if I could just add that I do want to thank you for the opportunity to speak here today.

CHAIRMAN SELIN: I'd like to make -- you've made some very serious statements which we will make sure the staff answers either today or before the record is closed, about the tests, as far as the general public and our objectives.

First, I'm married to the general public. My

children are the general -- I mean, we do talk to the general public. To the best of my knowledge, none of my family works for the utilities, nor do my friends.

The issue isn't whether Thermal Science is getting away with something or not. There's a whole set of events that are taking place that determine whether Thermal Science has correctly touted or described their product and, if not, what set of measures. The issue is whether the utilities, with the installations that they have -- in particular, Comanche Peak 2 -- can operate safely or not, and the reason we don't just tell people to tear things out is that where they stand now is a question of whether the configuration -- of course, there are many issues in licensing other than Thermo-Lag --

MR. MARIOTTE: Sure.

CHAIRMAN SELIN: -- but whether the configuration is safe -- not so much whether Thermal Science has met their specification, but whether the configuration is safe. And to answer your question, I realize it could be considered a rhetorical question, but our interests are not salvaging Texas Utilities or Thermal Sciences, but we are faced with a configuration, their claims that it meets certain tests, and the question is, does the configuration meet the tests, not does Thermal Science's Thermo-Lag meet its claims. And tearing

something out and replacing it if the configuration meets the test is not something we would require.

You have raised good questions, Ms. Brink has raised questions, about whether additional layers of Thermo-Lag in order to meet the specification for the delay time, whether that will impact ampacity, those are all questions which have to be addressed. But our question is, there's a configuration there, does it meet the standards or not, rather than how did it get to that point and who may have --

MR. MARIOTTE: I mean, I think I'm arguing that it doesn't -- you know, in our analysis, it doesn't pass the test.

CHAIRMAN SELIN: That's a valid question.

MR. MARIOTTE: -- and we have some serious doubts because of combustibility and all that, that it ever can.

CHAIRMAN SELIN: I'm not objecting to that, I'm responding to the next question about why we allow this to happen. I mean, I could be flip and say there are a lot more airplane crashes than there are reactor incidents in a year, but I won't say that. Well, I could have said it if I had chosen. It's not a question of objectives or motives, it's a question of the facts that are before us. I will make sure that the questions you've put will, in

fact, be addressed by the staff when they come up.

Commissioners, any questions for Mr. Mariotte?

(No response.)

Well, we thank all three of you for appearing before us today, and the next set of people to come up are the Texas Utilities team. Thank you very much.

MS. BRINK: Thank you.

(Whereupon, the panel stepped back from the table and the next panel came forward.)

CHAIRMAN SELIN: Mr. Nye, I predict you will be in the middle, if your team would like to take it's place.

MR. NYE: A position of entrusted to me.

CHAIRMAN SELIN: We were thinking with respect to left and right, not with respect to front and back.

MR. NYE: Yes, sir, I understand.

CHAIRMAN SELIN: Mr. Nye, the floor is yours.

MR. NYE: Thank you, Mr. Chairman, Commissioners. My name is Erle Nye. I'm Chairman and Chief Executive of TU Electric, the owner of the Comanche Peak Steam Electric Station. With me today are Wes Taylor, Executive Vice President of the Company; Mr. Bill Cahill, Group Vice President of the company; Lance Terry, Vice President for Nuclear Engineering and Support; and Jim Kelley, Vice President for Nuclear Operations. Also present in this room are Mr. Bill Counsil, formerly Vice

Chairman of the company, and Mr. Roger Walker, Manager of Regulatory Affairs.

During his eight years with the company, Bill Counsil materially and instrumentally helped to complete this plant. He helped to establish the current operating staff and procedures that we have, and also was quite instrumental in developing a unique settlement with CASE, which you've heard described here already today.

As you may be aware, Bill has recently retired from TU Electric, and has accepted the position of Managing Director and Chief Executive of the Washington Public Power Supply System. Because of his background and knowledge of Comanche Peak, Bill has agreed to continue to be available to TU Electric should his abilities be helpful in the future.

TU Electric is the principal subsidiary of Texas Utilities Company, an investor-owned holding company. The company serves approximately 6.5 million people across the northern part of Texas. TU Electric has about 2200 megawatts of generating capacity, and has the largest kilowatt-hour sales of any single operating electric utility in the country. Given its size, the company has substantial resources to devote to the safe and reliable operation of the Comanche Peak station.

The plant is a significant asset of this

company, and we will continue to dedicate the resources necessary for its safe and reliable operation. Our goal is to be recognized as one of the best operating plants in the industry, and we are committed to providing the resources necessary to achieve that goal.

In April of 1990, the Commission approved the issuance of the operating license for Comanche Peak Unit Number 1. The entire Comanche Peak team gained considerable experience in the safe and reliable operation of a nuclear facility since that time. Unit 1 is now well into its third fuel cycle. It has shown steady improvement over time, and overall we believe it has had a good operating history.

Construction of Comanche Peak Unit Number 2 is complete. On February 2nd, we received our operating license authorizing low power testing and, since that time, we have demonstrated our readiness to commence power ascension and full power operation.

On February 7th, we completed loading fuel, and we expect that Unit 2 will achieve criticality perhaps sometime next week. We expect to conclude our low power testing program and be fully ready to progress to full power operation by the end of this month.

The Comanche Peak team has been guided by conservative management philosophy. We recognize that

nuclear plants require a different management philosophy than fossil plants. It is clear that direct senior management involvement is crucial to ensure the safe and reliable operation of a nuclear unit. I personally devote a substantial portion of my time to matters involving Comanche Peak. Wes Taylor, to my knowledge, is at the site regularly, and is personally involved in all significant decisions affecting Comanche Peak.

We constantly stress to employees the need for attention to detail. Meticulous attention to detail greatly reduces the probability of human error, or equipment malfunction, and facilitates prompt identification and correction of any errors that might occur.

We try to take a conservative approach in our decisions regarding Comanche Peak, whether they involve construction, testing, operation, or maintenance. A conservative approach obviously has benefits from the standpoint of safety and, in the long run, we believe a conservative approach will result in reliable and cost-effective operation as well.

We're always searching for opportunities to improve. We want to improve our performance at every opportunity. We believe critical self-assessments are an essential ingredient to effective management. As a

result, we conduct frequent self-assessments to identify and correct weaknesses as well as to obtain improvements in other areas. We also evaluate industry experience to identify lessons learned and potential improvements.

We work hard to try to keep abreast of industry developments, and seek to maintain a strong leadership position in industry activities. An example, Jerry Fehring, the Chairman and Chief Executive, Texas Utilities Company, is on the Board of the Institute of Nuclear Power Operators, and is a member of the Nuclear Power Oversight Committee. I am on the Executive Committee and the Board of Directors for NUMARC as well as the Electric Power Research Institute. Wes Taylor is on the Utility Management Board of the Advanced Reactor Corporation and the Research Advisory Committee of EPRI.

During this presentation, Wes Taylor will discuss TU Electric's nuclear organization and the performance of Unit 1, along with insights that we have gained from over two years of full power operation.

Next, Lance Terry will address the design and construction of Unit 2 as well as TU Electric's programs for overviewing Unit 2.

Finally, with your permission, Jim Kelley will discuss our readiness for operation of Unit 2 and our power ascension program. I will then conclude the

presentation, after which we will be pleased to answer any questions you may have.

I would now like to turn the program to Wes Taylor, who will discuss our nuclear organization and our Unit 1 experience.

MR. WES TAYLOR: Thank you, Erle. It is TU Electric's goal to achieve excellence in the operation of Comanche Peak. Two of the key factors which will help us to reach that goal are, first, the excellent dedicated individuals that we have on our nuclear team and, second, is our ability to learn from and act upon our experience in the operation of Unit 1.

Bill Cahill is the Group Vice President for TU Electric's nuclear organization. Bill has almost 40 years of experience in the nuclear industry, including executive management positions at Consolidated Edison and at Gulf States Utilities. Comanche Peak Unit 2 is the sixth nuclear unit for which Bill has had initial licensing responsibilities.

There are four key individuals who report to Mr. Cahill, and today you will be hearing from two of these. Lance Terry is the Vice President who is responsible for engineering and technical support at Comanche Peak. Lance has more than 24 years of experience in the nuclear industry. Lance spent 12 years in the Navy nuclear power

program, after which he joined Stone and Webster where he was the QA project manager before coming to TU Electric.

Jim Kelley is the Vice President who is responsible for all areas of Comanche Peak operation and maintenance and security. Jim has over 25 years of nuclear experience, and has responsibility as plant manager for Comanche Peak since the commencement of Unit 1 operation. Jim previously served as superintendent at Mill Stone Unit 2 at Northeast Utilities, with responsibilities for operation, maintenance, and on-site engineering. And, incidentally, Jim was licensed as a senior reactor operator at Mill Stone 2.

Roger Walker, who is our Manager of Regulatory Affairs, and Mike Blevins, our Director of Nuclear Overview, also report to Bill Cahill. Roger has more than 30 years of nuclear experience including many years as an inspector and manager in various NRC regional offices. Mike has 15 years of nuclear experience and was Manager of Nuclear Operations Support before being assigned to his current position as Director of Nuclear Overview. All together, the 27 senior managers and supervisors at Comanche Peak have an average of 19 years of nuclear experience.

Following receipt of the full power operating license in April of 1990, Comanche Peak Unit 1 performed

very well during power ascension testing. Furthermore, overall performance of Unit 1 during commercial operation has been good. Whenever significant events have occurred due to either equipment failures or personnel error, we have established multi-disciplined teams to perform in depth evaluations using state-of-the-art root cause analysis techniques, and we have taken extensive actions to correct problems and to prevent their recurrence. As a result, the performance was improved during the second cycle of operations.

The approach to Unit 2 operation will build on the success that we have had to date with Unit 1. To achieve safe as well as efficient operation, we must always retain a questioning attitude. This entails self-checking of one's own work and being alert for unusual conditions in other areas.

Additionally, TU Electric has emphasized management involvement in all aspects of Comanche Peak's operation, and we have worked at ensuring effective communication throughout the organization. Officers and managers for Comanche Peak, including Mr. Cahill, are located at the site, and regularly participate in plan-of-the-day meetings. Additionally, we have increased supervisor and manager participation in field work activity.

Finally, as Erle mentioned, effective self-assessments have been essential. We have found that creating multi-discipline teams provides an effective way to conduct evaluations. The reports produced by these teams include an identification of root causes as well as suggestions for corrective and preventive actions and for improving performance.

For example, a personnel error task team was established when the level of personnel errors exceeded our expectations. The team made recommendations for improvement which were successfully implemented and resulted in a 50 percent reduction both in the number and the significance of personnel errors at Comanche Peak.

In summary, the management team for Comanche Peak has extensive commercial nuclear experience. The team is dedicated to the safe and reliable operation of a two-unit plant.

In the Summer of 1988, TU Electric entered into an agreement with the Citizens Association for Sound Energy which has been referenced here this morning. And we would simply like to say that we have worked with CASE under the terms of that agreement, and we feel like it has been both a beneficial and constructive relationship.

I would now like to call on Lance Terry, who will describe the approach for design, construction, and

overview activities of Unit 2.

MR. TERRY: Thank you, Wes. About the time that Unit 1 was completed and entering commercial operation, TU Electric assembled an integrated Unit 2 project management team to effectively and systematically complete the design and construction activities for Unit 2. The team was led by management from TU Electric. Design activities were performed by four design contractors -- Bechtel, Stone and Webster, Impell, and Westinghouse. Construction activities were performed by Brown and Root, and quality assurance activities were performed by TU Electric, with quality control activities performed by Stone and Webster and Brown and Root.

The Comanche Peak management team conducted a comprehensive program to validate the design and construction of Comanche Peak Unit 2. In implementing this program, the team took full advantage of the validation activities completed for Unit 1. In performing design activities for Unit 2, particular attention was paid to ensure consistent operation of the two units. As a result, Unit 1 design modifications were reviewed for inclusion in the Unit 2 design. Additionally, a number of improvements were identified during the completion of Unit 2 which either have been or will be incorporated into the Unit 1 design.

Based upon our Unit 1 experience, we recognize the value of defining a common set of acceptance criteria for engineering construction and quality control. This led to implementation of integrated installation and inspection procedures and integrated training of engineering, construction and quality control personnel to those procedures.

The results of the lessons learned were invaluable in completing Unit 2 in an efficient manner, with a high level of quality performance.

TU Electric completed two complementary, independent self-assessment programs to verify the adequacy of the design and construction activities for Unit 2. These self-assessments were modeled after the Nuclear Regulatory Commission's independent design assessment and construction appraisal team inspections. The results of both assessments were satisfactory, and corrective and preventive actions were taken for identified findings.

The NRC has recently identified a number of concerns regarding the use of Thermo-Lag fire barrier materials in nuclear plants. Thermo-Lag is used at Comanche Peak Unit 2 to meet the requirements to comply with the auxiliary power and control systems, Branch Technical Position 9.5-1, Appendix A, to separate

redundant safety-related systems from each other so that both are not subject to damage from a single fire hazard.

To resolve the NRC concerns, TU Electric proactively contracted a nationally recognized test laboratory to conduct independent, full scale fire endurance tests of Thermo-Lag raceway assemblies. The test items utilized stock material applied by site personnel, using site installation procedures, in accordance with our TU Electric quality program. That program has been consistently applied to the procurement and installation of Thermo-Lag. The test items were representative of the configurations used in Unit 2.

The tests were undertaken to determine whether Thermo-Lag was an effective fire barrier when properly configured. NRC staff personnel observed the testing, and they also confirmed that the test samples were representative of Unit 2 installation. All test results were shared with the Nuclear Regulatory Commission and with the industry.

The results of the first two series of tests showed that Thermo-Lag material worked, but some upgrades in Thermo-Lag installation were required. After those tests and prior to conducting acceptance tests, agreement was reached with the Nuclear Regulatory Commission on the acceptance criteria to be applied to the test.

A third series of tests was then conducted to confirm the adequacy of the upgrades in Thermo-Lag configuration. The results from the third set of tests demonstrated that the upgraded Thermo-Lag, as it is installed in Unit 2, will perform its design function as a fire barrier.

The test results met the October 29th, 1992 acceptance criteria, which clarified and is consistent with the existing requirements of Generic Letter 86-10. These acceptance criteria included the use of a fog nozzle or performance of hose stream testing. This test method was already identified as acceptable in the Standard Review Plan, Section 9.5.1, for qualifying fire barrier penetration seals in the same test method with the alternative of using a fog nozzle was applied to exposed fire barrier systems. The fog nozzle does provide a post-fire test of the structure integrity of the fire barrier, and it is the host stream method used to fight a fire in the plant.

Thermo-Lag has been installed in Unit 2 in accordance with our installation procedures, using the upgraded configurations that were tested. In Supplemental Safety Evaluation Report 26 for Comanche Peak Unit 2, the Thermo-Lag fire barrier program was accepted for Unit 2, with the conclusion that the installations meet the

staff's guidelines.

SSER 26, however, identified a need for confirmatory tests on Thermo-Lag for 36-inch cable trays, conduct of ampacity derating tests, and further upgrade of several specific applications. TU Electric has completed the upgrade of the specific applications, and has performed the additional tests. The results of those tests demonstrate that the Thermo-Lag installation for the 36-inch cable tray is satisfactory, and the Thermo-Lag adequately cures within seven days after application.

The ampacity derating test results show that the cable design is conservative. TU Electric has declared Unit 2 Thermo-Lag operable, and compensatory fire watches for Thermo-Lag are no longer in place.

Prior to requesting issuance --

CHAIRMAN SELIN: Just a moment, Mr. Terry. Would you be so kind as to describe what changes you've made in the applications and in the installations compared to the TSI standard? I realize that there is a large number of them, but can you --

MR. TERRY: I will summarize them briefly. For the small conduit -- and small conduit is 2-inch and less in size -- we determined from our early testing that we needed to add more Thermo-Lag because it all sublimed away. We added a quarter-inch overlay above and beyond

the nominal one-half inch thickness for small conduit sections 2 inches and less.

For large cable tray, we determined that the seams needed to be reinforced to withstand the structural integrity test during the fire. We conservatively elected to upgrade the seams on all Thermo-Lag cable trays by reinforcing with stitching and/or additional stress skin over the seam with trial grade on top of that.

In addition to the large cable tray, we determined that for the box connection, such as junction boxes and lateral bin boxes, that we should reinforce the seams and the attachment points with additional stress skin. That's the modifications that were made.

CHAIRMAN SELIN: And how many different configurations are there? How many different independent tests do you believe have to be made in order to have reasonable assurance that these fixes have been made and that the configuration is adequate?

MR. TERRY: We have tested the full range of our conduits, all the way from three-quarter inch up to 2-inch, with the upgrades; we have tested up five inches without the upgrade, so we have tested the full configuration of conduits. We have tested the full configuration of cable trays, 12 inches, 30 inches, and 36 inches now, both with and without T-connection on the 30-

inch. We have tested free air drops. We have tested junction boxes. We have tested lateral boxes. So, we have tested all the major configurations which we have in the plant.

CHAIRMAN SELIN: If you would just go a little further into this question of junctions between, say, boxes and cable or penetrations or -- I can see where the cable and the trays would fall into standard configurations pretty simply, but I don't have a good physical picture of how many different kinds of connections there are that have to be protected by passive barriers.

MR. TERRY: The main upgrade that we've made in the connection is where you have a box which has additional weight from the normal conduit or the cable tray, is to reinforce where it joins by putting a stress skin wrap around the outside of the box, bringing it up and then wrapping it around the conduit or the section, if it was coming to a penetration in the wall, wrapping it around that penetration, to give it additional structural rigidity, and then by banding around the outside to assure ourselves that we can, in fact, get a good connection. And that, combined with the amount of overlap that we have on those, provides us with a good structural interface.

CHAIRMAN SELIN: How many configurations?

MR. TERRY: There are a number of different configurations there. Those configurations, some of those are the ones that were addressed in the deviations from the actual tested. And in those deviations, what we did was relate which part of the test that we used to qualify that particular transition. And those were reviewed in the field as well as reviewed on paper by the Nuclear Regulatory Commission staff, and they chose what they considered to be the worst ones to look at. And on 13 of those specifically, we did upgrade with a second layer of Thermo-Lag to provide more equivalent to the junction box test that we did to satisfy the testing criteria.

CHAIRMAN SELIN: Okay. Please continue, Mr. Terry.

MR. TERRY: Prior to requesting issuance of the lower power operating license for Unit 2, TU Electric conducted a number of self-assessments of our readiness for fuel loading. These self-assessments were above and beyond the normal quality assurance audit and evaluations conducted by the Nuclear Overview Department.

Each department conducted a review of its own activities to ensure that the activities needed for fuel loading had been completed. TU Electric's Nuclear Overview Department then initiated an operational readiness assessment by the independent safety engineering

group. This assessment reviewed a broad spectrum of areas of plant operations, using Nuclear Regulatory Commission inspection modules, Institute of Nuclear Power Operation good practices, previous areas of NRC concern, and industry guidelines.

We have also been performing, and will continue to perform, extensive shutdown risk analyses of our configuration during outages, to ensure that system or component unavailability during the outage will not impact our shutdown margin for the reactor and our ability to keep the reactor cool.

We believe that our analyses in this area put us in the forefront of the industry. We will continue to perform independent self-assessments prior to and during power ascension. Members from the safety engineering and plant analysis group have completed a review of the initial startup schedule, and determined that planned activities will not adversely impact Unit 1 operation.

Of particular note, we are planning to perform self-assessments during power ascension testing to confirm our readiness for full power operation. Jim Kelley will discuss this self-assessment in more detail.

Throughout the power ascension program, safety engineering will conduct the initial startup surveillance program, providing a comprehensive overview of the plant

activities associated with power ascension. Two-man surveillance teams are providing coverage seven days a week, focusing primarily on monitoring of achievement of test objectives and compliance with operating procedures.

In addition, quality assurance and quality control assessment will analyze quality control trend information, and conduct an audit after achieving 5 percent power.

Finally, a team will evaluate applicable industry operating experience reports and deficiency document trend data, to determine if any issues have arisen which could impact the safe transition to two-unit full power operation.

Jim Kelley will now discuss our operational readiness and power ascension test program.

MR. KELLEY: First, I will discuss the operating staffing levels for two-unit operation. There are sufficient licensed operators to satisfy the technical specification requirements. In fact, it is our operating practice to assign more operators to each shift than are required by technical specifications.

We have sufficient operators to man six shifts. However, during the startup of Unit 2, we plan to employ a five-shirt rotation. By utilizing fewer shifts, we will have more experience in the control room during periods of

intensive test activities.

As was done during the Unit 1 startup, we have assigned experienced senior reactor operators from Duke Power to be advisors to the shift supervisors. The advisors are on a rotation which will provide continuous coverage during this period. They were chosen since they have recent control room experience on dual or loop Westinghouse stations.

They will advise the shift supervisor in their day-to-day activities, with special emphasis on situations which develop due to running two units.

There are currently 69 licensed operators on our staff, 66 of whom have dual unit licenses, of which 45 are assigned to the operating shifts. These individuals have significant operational experience in Unit 2, including the challenging startup period. Due to small number of differences between the two units, this experience will be invaluable during the Unit 2 startup.

In total, these 69 operators have an average of ten years' nuclear experience, with an average of five years at Comanche Peak.

COMMISSIONER CURTISS: All of your 66 operators with dual unit licenses, have hot experience?

MR. KELLEY: The operators that have the licenses, that are on the shift, have hot experience on

Unit 1.

COMMISSIONER CURTISS: So, all of your five shifts ROs and SROs --

MR. KELLEY: Have hot experience, yes, Commissioner.

COMMISSIONER CURTISS: Okay. Thank you.

MR. KELLEY: We have continuously enhanced our operator training program. In 1989, a special licensed operator requalification cycle was inserted to adjust to the new performance-based examination criteria; also, of course, to prepare candidates for NRC pilot exams on fundamentals was initiated. These as well as Comanche Peak's other training courses are INPO accredited. In addition, a plant-specific simulator was recently updated to incorporate Unit 1 operational data.

We believe that this emphasis on training has paid off. We have had recent success in our hot license program, our NRC administered requalification program, and the dual unit license examinations.

We have also taken a proactive approach to maintenance. A comprehensive preventive maintenance program is established. Another portion of the program is predictive maintenance. State-of-the-art equipment and techniques, including thermography, acoustic monitoring, and oil analysis are used in order to predict potential

failures. These programs are utilized on both safety-related and nonsafety-related systems. To date, the maintenance program has been effective.

For example, for Unit 1, our objective for safety-related system availability which are consistent with INPO's top quartile have been met. Additionally, tight controls over our maintenance backlog have been maintained, and most of our nonoutage-related corrective maintenance items have typically been less than three months old.

Another measure we utilize to determine the effectiveness of the program is the ratio of preventive-to-corrective maintenance, and that ratio has typically met our objective of about 50-50.

COMMISSIONER CURTISS: In terms of your maintenance backlog, how big is it now and, if you worked it off beginning today, how much time would that entail?

MR. KELLEY: Our total corrective maintenance backlog is about 950 items for both Unit 1 and Unit 2. The breakdown is about 550 to 600 on Unit 1 in common, and about 350 on Unit 2. We can accomplish approximately 200 work orders a week, so it would be about a month or four to five weeks backlog to work off if we were unrestrained.

Of that 950, about 650 of those items are ready to work, the plan has been completed, and they are in our

scheduling cycle to be included in our 13-week rolling schedule.

COMMISSIONER CURTISS: Okay. And where do you stand on temporary modifications?

MR. KELLEY: Temporary modifications on both units are running right now about 30, about 25 on Unit 1 and about 5 on Unit 2. We've been regularly holding it between 30 and 40, and that includes the 13 temporary modifications we have on the data acknowledging system which we will be completing the end of this year and getting that out.

Our experience during preoperational testing and startup testing of Unit 2 has been favorable. Preoperational testing has been successfully completed. Although we did experience some equipment problems, they were corrected, and the subsequent testing passed.

During preoperational test, our operations personnel performed well. They reacted to all the plant conditions, and there were relatively few significant personal errors.

We have learned from our errors, and are continuing to incorporate the lessons learned into our plant procedures and processes.

Of particular importance to us, the implementation of the preoperational program for Unit 2

did not adversely affect the safe overlap operation of Unit 1.

As a result of our experience on Unit 1, improvements have been made in the Unit 2 equipment. For example, we made modifications to our feedwater regulating valves on both units, to preclude valve failures and subsequent reactor trips. We also modified our switch yard to preclude unnecessary diesel starts on both units.

In addition, a performance enhancement program was implemented on Unit 1 during 1992. This program has resulted in improved personnel performance. Since these personnel will also be assigned Unit 2 responsibilities, our efforts in personnel error reduction will benefit both units.

In completing construction of Unit 2, we wanted to ensure that the transition from a construction environment to an operating atmosphere was successfully completed. To help accomplish this goal, an operations preparation period was conducted immediately prior to the issuance of the Unit 2 low power operating license.

During this period, we achieved three primary goals. First, all plant systems and areas were put under operational control. Second, we ensured that our operating procedures were being properly implemented. And, finally, our personnel experience and atmosphere is

similar to dual unit operation.

The precritical activity started with the receipt of the low power license in early February. Fuel loading proceeded smoothly, and progress was steady, cautious and professional. No problems were encountered during the fuel loading sequence, and no significant delays occurred. Fuel load was completed five days after operating license issuance.

On February 11, 1993, we tensioned the head closure studs and entered the cold shutdown mode. After the Unit 2 fuel was successfully loaded, followup testing and preparations for heatup were begun. Reactor vessel assembly and cold control rod testing were accomplished in a timely manner. After completion of the required testing and emergent repairs, reactor heatup began on March 6th.

As was discussed earlier, we are currently scheduled to complete preparations and achieve Unit 2 reactor criticality next week. We anticipate that low power physics testing will be completed, and that we will be ready for power ascension by the end of March.

Our power ascension test program consists of four major elements: power ascension testing until a 50-percent plateau is reached; a self-assessment of personnel and programs at that 50-percent plateau; power ascension until we reach 75 percent, and then subsequently 100

percent.

Our program is consistent with other startup test programs and complies with Chapter 14 of the Final Safety Analysis Report. The first phase will consist of a secondary plant startup and grooming up to 50 percent power. At the end of this plateau, we will perform a 10-percent load swing to verify plant response into a transient, and a reactor trip with a simultaneous loss of off-site power from 30 percent. After reactor startup, we will conduct a plant shutdown from outside the control room.

The other testing plateaus will be similar to the 50-percent plateau, with appropriate nuclear calmetrics and flux mappings and additional plant grooming. The 100-percent plateau will be completed with a 50-percent load swing and a 100-percent load rejection, with subsequent reactor trip.

At the 50-percent testing plateau, we will conduct an in depth formal review of our performance up to that time, and review test data. Performance objectives for all major functional areas, including operations, maintenance, radiation protection and chemistry, have been developed and performance will be assessed at this point. Recommendations for corrective actions will be prepared for weaknesses or problem areas, and will be presented to

the station operations review committee.

The committee will summarize its evaluation of the self-assessment results, recommend further corrective actions if necessary, and comment on the advisability of continuing with the remainder of the power ascension program.

After the committee recommends power operation above 50-percent power, we will proceed to the next phase of testing.

I would like now to call on Erle Nye, who will conclude for TU Electric.

COMMISSIONER CURTISS: When is your Unit 1, your next Unit 1 outage scheduled?

MR. KELLEY: It's scheduled for September of this year.

COMMISSIONER CURTISS: Okay.

COMMISSIONER REMICK: Several questions before proceeding. On your chart on shift staffing, you indicate that one of the three unit supervisors whose SRO license may be designated as required shift technical advisor -- I thought about that wording. It means the alternative would be to have somebody who is not an SRO, I guess. What is your philosophy on your SRO, is it a stand-alone, or is it licensed, or is a second SRO on-shift? What type of philosophy do you use?

MR. KELLEY: Our basic philosophy and practice to this point has been to use a senior reactor operator degreed individual as our STA. We have the capability of using nonlicensed personnel if we do not have sufficient licensed operators to do that. Because of the time delay in achieving new licensed operators, at times we may have to use that option.

At present, my recollection is, of the five shifts that we have presently on-site, we are using degreed licensed operators on all five shifts, but we will take that other option of using nondegreed, but trained -- nonlicensed but trained degreed individuals. And primarily those folks will be the individuals who are in the line for the license class, and that they will come on-shift for a period of time to develop a better appreciation for what's going on in the shift before they go to classes. These degreed individuals can be utilized for the STA, with the appropriate training, if we have a need.

COMMISSIONER REMICK: The fact that you have the alternative of using an unlicensed person must mean that you use the STA as a stand-alone STA then?

MR. KELLEY: We use the STA -- if he is degreed and licensed, we will use that individual as possibly one of our unit supervisors on one of the two shifts, on one

of the two units. We have procedures set up if there is a situation on the one unit that would require that individual to step back, that he would be relieved of his responsibilities by another licensed operator so he could perform his STA functions. We have reviewed the recent information that the Commission has put out on that, and we are evaluating to make sure that we have that situation covered so that he doesn't get distracted from his STA duties.

COMMISSIONER REMICK: Okay. You indicated that you have the five 12-hour shifts. How do you find your operators accepting that arrangement rather than 8-hour shifts, perhaps six shifts?

MR. KELLEY: Before we went on to the -- first, on the 12-hour shifts, before we implemented the 12-hour shifts at Comanche Peak, we had a vote of all the licensed operators who were on-shift, and over 90 -- I think it was about 93 percent of the operators wanted to go on the 12-hour shifts. They prefer that arrangement over the 8-hour shift rotation.

We also discussed the five-shift rotation for this year, and we fully intend to go back to six shifts at the end of this year. And the operators understood the fact that -- they would prefer to have more resources available on each shift, so they understood that,

appreciated that, and supported that, and they do understand that we will go back to six shifts at the end of this year.

MR. WES TAYLOR: Commissioner Remick, if I may, one clarification. When we're in a six-shift mode, we also will be on 12-hour shifts as opposed to 8.

COMMISSIONER REMICK: Oh, you will.

MR. WES TAYLOR: So, the only change was from six to five, not from 8- to 12-hour.

COMMISSIONER REMICK: I see. Okay. And on the other slide where you indicated you had 66 dual unit operators, I think you said that 45 of those are assigned to operating shifts. That means that 21 must not be. Are those 21, do they hold active license or inactive license?

MR. KELLEY: The majority of the ones that are not on operating shift hold inactive licenses.

COMMISSIONER REMICK: I'm sorry, inactive?

MR. KELLEY: Inactive license, yes.

COMMISSIONER REMICK: Inactive license. Were those licenses active at one time? I assume they were.

MR. KELLEY: A portion of them were, however, for some of our typical staff people like the operations manager and the shift operations manager and some of the people in the support group, they have never been active. For the individuals that were on-shift, they were active.

When they do come off-shift and have no reasonable expectation of going back on-shift, is when we change it from an active to an inactive license.

COMMISSIONER REMICK: Okay. So, how many of the 45 have active license that are assigned to shifts, how many of the ones not assigned to shift then have active license?

MR. KELLEY: I would estimate about four or five.

COMMISSIONER REMICK: Four or five.

MR. KELLEY: Yes, sir.

COMMISSIONER REMICK: And something I read in the staff's SER, I saw -- and also on the proposed license -- that you're requesting an exemption to criticality monitor in spent fuel pool, and I was wondering what's the philosophy. I saw the staff's argument that the design of the storage facilities and the procedures prevent the chance, but I was somewhat surprised. Is this just an area monitor above the pools, and what's the philosophy behind not wanting to continue to have a criticality monitor?

MR. WES TAYLOR: This is yours, Jim, go ahead.

MR. KELLEY: The actual -- I guess the calculations indicated that some of the Westinghouse analyses were not accurate. We have asked for the

exemption because of the slowness of that situation developing, and our analysis indicate that we would have sufficient time, we have sufficient alarms to indicate that operator manual action is required, and not automatic action. So, that's a basic difference we're looking for.

We will have the same monitoring capability, but the fact is that we will have a capability to take a manual corrective action versus operator corrective action.

COMMISSIONER REMICK: So, it's not a question of eliminating the monitor, it's a question of whether it's automatic action or manual action?

MR. KELLEY: That is my recollection of what this situation is. I haven't looked at that in a number of time.

MR. TERRY: Is the question on the Boron dilution mitigation system, or on the spent fuel pool?

COMMISSIONER REMICK: This was one, I think, on the spent fuel pool called criticality monitor, and you asked for an exemption for that, and you apparently have it in Unit 1, according to information.

MR. KELLEY: What Roger just mentioned was that my information was correct, that we're really going from an automatic to a manual operation, and that the event develops slow enough that that would be acceptable. And

we have sufficient monitoring. I know of no move right now to delete any monitoring.

COMMISSIONER REMICK: I see. Okay. And before we go on to Mr. Nye, Mr. Chairman, I had one other question I wanted to ask Mr. Terry, and that was Mr. Mariotte mentioned the megger tests, and I was wondering what the rationale behind the difference in the megger tests, if you could explain that.

MR. TERRY: In the test setup that Comanche Peak had been committed to all along, we've measured continuity of the circuit during the testing. It is not possible to measure the continuity and do the megger check at the same time.

In addition to that, with the testing equipment that we use and the data collection system that we use with all the thermocouples, it's very sensitive, and if you try to put a megger on that system, you'd probably blow all the thermocouples.

The NRC staff did give us an option in lieu of doing the megger during the test, to demonstrate after the test that our cable -- if we needed to, that our cable was qualified to the temperature profile that we measured. We did not have to fall back on that, as that's only a measure of functionality if you needed to get to that, but there was an option to do that, and our LOCA testing, loss

of coolant accident testing, that we had done had already demonstrated, in our opinion, the temperatures that we expected to see during the test. Therefore, we elected not to do the megger during the test.

COMMISSIONER REMICK: And the continuity test you refer to, this is of the actual conductors themselves?

MR. TERRY: We actually measured -- in all the tests except for the last test that we did, the 36-inch test, we measured that we were able to maintain continuity of the circuit during the fire test, and then did the megger check after the fire test was over.

COMMISSIONER REMICK: Thank you.

COMMISSIONER ROGERS: But you couldn't interrupt that continuity measurement and perform a megger test?

MR. TERRY: You could not do the two concurrently, no.

COMMISSIONER ROGERS: Well, not concurrently, but I mean you couldn't -- I can understand that. I mean, you can't measure insulation -- you can't do the megger test and also do continuity check at the same time, but would it be possible to open the circuit and do the megger test and close it again during the fire test, or there's just not enough time to do that?

MR. TERRY: When we did the megger checks after the test was completed, it took us approximately an hour

to complete them. The test is only an hour long, so we felt that it was not very practical to try to do the megger test during the fire test.

CHAIRMAN SELIN: Mr. Nye?

MR. NYE: Mr. Chairman, members of the Commission, TU recognizes and accepts the significant responsibility of the company's startup of a new unit. I want to restate our strong commitment to safety and quality, and to the pursuit of excellence in our nuclear operations.

Our activities, we believe, have demonstrated that we can and do satisfy these commitments, and that we are fully capable of operating our nuclear plant to meet the highest levels of safety performance.

We believe that over the coming decades, Comanche Peak Unit 2 will provide a reliable source of safe and economical power that is important to our customers. We will assure you that we will proceed cautiously and deliberately through the power ascension test program, and we expect to be ready to commence power ascension testing, as I said before, before the end of this month, and we would, of course, request that the NRC grant a license prior to that time.

If I may be permitted, I would like to acknowledge the kind and thoughtful comments of Owen

Thero. If I may also concur in his comments and observations regarding Mrs. Ellis' commitment and her sacrifice, and also to assure him and to assure you that we will pursue those matters about which we have mutual concerns, to a successful conclusion.

That would conclude our comments. We would be pleased to answer any questions that you may have.

CHAIRMAN SELIN: Commissioner Curtiss has a question.

COMMISSIONER CURTISS: Would you, on that very point, describe what the status of the stipulation is, what procedurally will happen from here on out in terms of the framework that was established, and I think a very progressive one, by your and CASE's efforts? Tell me, from here on out, what the posture of that will be?

MR. NYE: If I may, Commissioner, perhaps I might call on Bill Counsil, since he was the instigator of all this.

MR. COUNSIL: The five years of the stipulation expires on July -- correct me, please, if I'm wrong -- July 13th of this year. Until that time, Mrs. Ellis is continuing to serve on the Operations Review Committee of TU, and Owen is her alternate to that committee. And I might add that even though there are certain things that did expire the beginning of this year, as far as the

stipulation is concerned, if Mrs. Ellis calls either myself, or Wes, or whomever, Susan Palmer, with a concern, we do investigate the concerns just as we used to on the old stipulation, and give her an answer. And that's the status as of this date.

COMMISSIONER CURTISS: Thank you.

CHAIRMAN SELIN: Are there anymore questions for the TU people?

COMMISSIONER ROGERS: Yes.

CHAIRMAN SELIN: Commissioner Rogers?

COMMISSIONER ROGERS: I have a couple. The attitude, the management attitude, that you expressed in your remarks, Mr. Nye, was very commendable with respect to self-analysis and a quest for problems and identifying them, and solving them.

I'm a little bit troubled, though, in this sense. The root cause analysis question that CASE pursued at great length with you, went through a number of iterations and, clearly, at the outset, you had a very different perception of what was required for a good root cause analysis program than ultimately evolved through your joint work with CASE, but clearly CASE's criticism prodded you into re-examining some of those issues.

And I guess the question I have, and it's really just a general one, and I'm not sure that you can give me

a satisfactory, only time may do that, but clearly you were starting from a different point of view than CASE expressed, with respect to what was a quality root cause analysis program.

I read the CASE report with great interest on the history of that, and it seemed to me that it was an evolving understanding of what this really meant. It looked as if, at the end, CASE felt that you had at least come to a common agreement as to what a good program was, but it still had to be demonstrated that was it fully carried out in the future.

I guess my question is, what's the substitute for that questioning attitude that is different from your own perception in the future? Obviously, CASE brought something very important to this process and causing you to re-evaluate your own position as to what a first class quality root cause analysis program is. What approach are you going to take to test your own corporate thinking on these matters in the future, not just root cause analysis, but perhaps other issues that may be equally important.

MR. NYE: Yes. If I may treat the specific and then move to the general question. It seems to me that -- and I think perhaps Owen might agree with me -- I believe we have today, in terms of root cause analysis, I believe we have a state-of-the-art program at Comanche Peak. I

think both Owen and I would agree that we're anxious to see that it's implemented in a fashion that befits the quality of the program itself.

It has been an evolving matter, and I believe Owen might agree with me on this, that at the outset we had some views about root cause analysis as did they. We set about, I think, in a rather open fashion, to work at that time with Jack Doyle, who was their consultant, and Jack, I think, in his own right, set about to learn more about root cause analysis and to bring what information he could to our program.

We implemented a program at that time. Owen came along, and I think through his own studies and through his own efforts, which were considerable, helped us to enhance that program from that time. And, thus, our root cause analysis is, I think, outstanding. I think it has improved over time because of the participation of CASE both through Jack as well as Owen.

I think the key to that was the recognition of always the opportunity to do better. We believe that if we are to be as successful as we want to be -- if, in fact, we are to be perhaps "the" best nuclear operating unit in this country, operating plant, or certainly one of the best, that we've got to inculcate, we've got to demonstrate within our own capabilities, the ability to

generate these concerns, these ideas, these concepts, and to fulfill a pursuit of those through to suitable resolution.

We are utilizing an outside body of what I would regard as industry experts, as an advisory group that meets with me and with Wes Taylor on a regular basis. We try to use those folks who have the long demonstrated experience in the nuclear industry, and have been on all sides of these issues. We currently have a body, a board, I believe, of three current members, and we would like to continue that.

We do believe that we have to be able to demonstrate that we can regenerate our own ideas within our own confines, and hopefully we've come a long way in that regard.

COMMISSIONER ROGERS: Well, I'd certainly encourage you to make maximum use of your critics.

MR. NYE: Yes. Yes.

COMMISSIONER ROGERS: Unfortunately, we all learn that it is our critics that sometimes force us to make critical judgements about our own behavior that we're just really not quite capable of arriving at, and it just happens to be the way we are because we are people, I guess.

Let me turn to another subject, and that is the

Thermo-Lag issue and the testing. One of the issues that I've been a little bit troubled with is the question of the nozzle test. And the reason is not that you will fight a fire in the plant with a fog nozzle or not, but that the other kind of nozzle, the one that delivers a higher impact stream to the Thermo-Lag or whatever, performs another function. That was a point that was brought out in the testimony of -- the 3-M testimony at Congressman Dingell's hearing -- that I didn't quite appreciate at the time, that the point is not so much whether a -- I've forgotten what the term is, it's the other kind of nozzle that delivers a more solid stream --

COMMISSIONER REMICK: Playpipe.

COMMISSIONER ROGERS: Playpipe -- it doesn't really seem to fit right -- but a playpipe nozzle -- it's not the question of whether a playpipe nozzle will be actually used in the plant or not, but it acts as a surrogate for an impact on the protected material, or the protecting material, and to what extent have you examined the actual possibilities wherever you're using this material, where you haven't actually subjected it to a playpipe nozzle test, but only a fog nozzle test, as to what the possibilities are of impacts during a fire that would be equivalent to what a playpipe nozzle impact would be, in the actual situation?

MR. TERRY: Let me address several comments to what you said. We understand the purpose of the structural integrity test which the playpipe nozzle played in the original ASTM E-119 requirement, which was cited it as a guideline for the raceway fire barrier. We understand that that was for structural firewall, as you indicated in your testimony before the Congressional Oversight Committee.

We feel that it had a purpose there, and the Industry Code Committee feels that it has a purpose in that structural firewall, in demonstrating structural integrity after the fire test. Where we have the raceways, in general, is high in the overhead so that they're not going to have a lot of things falling on them. They will see minimal structural integrity.

We do feel the NRC staff had precedent for the penetration seals to use a fog nozzle. We feel that it was appropriate that they go back to the fog nozzle for the fire barrier since it's going to see a minimum structural test and, therefore, we feel that that's an appropriate test.

As was referred to by Mr. Mariotte in the Code Committee meeting which they held last week, the Code, which Mr. Licht heads up that subcommittee, did, in fact, have two options that they were considering for the

firehose test for raceway fire barrier, not for the structural wall which E-119 really is. For the raceway fire barrier, they were considering either allowing the fire nozzle or not even doing a test and, as was indicated, they did, in fact, recommend, and they will recommend to the full committee, that they not even do a hose stream test for raceway fire barrier of any kind.

COMMISSIONER ROGERS: Thank you.

COMMISSIONER REMICK: Could you elaborate on structural firewall that the test was designed for, the meaning of that?

MR. TERRY: Well, the structural firewall could take on several applications. It could be a cinder-type wall, it could be a wall constructed of gypsum board, it could be any type structural wall that was put to separate one fire boundary from another fire boundary. And in that application, I believe the code personnel were concerned that in the midst of a fire, after the fire was going, that they didn't want to hit that with a solid hose stream and create a breach in that wall which might allow the fire to spread, and that's probably very appropriate for that. We didn't feel, and apparently the staff did not feel, it was the same appropriateness for a fire barrier for a raceway.

COMMISSIONER REMICK: So, structural firewall

does not necessarily mean load bearing. It's a wall separating different areas.

MR. TERRY: It does not necessarily mean load bearing.

COMMISSIONER REMICK: It does not. Okay. Thank you.

CHAIRMAN SELIN: Commissioner de Planque?

COMMISSIONER de PLANQUE: Yes. Just one comment again, about Thermo-Lag testing. Mrs. Brink brought up the issue of the qualifications of the Omega Point Laboratory. Would you care to comment on the status of them as a nationally recognized testing lab?

MR. TERRY: Yes, it was our opinion when we started working with Omega Point Lab, and it still is our opinion, that they are a nationally recognized test laboratory for fire testing. They have done fire testing for others. They are being considered for doing fire testing for the NUMARC testing. I'm not saying they have it, but they are being considered. And the NRC staff did witness a test down there. They saw the capabilities of Omega Point Lab, and they were satisfied with the tests that were run, also.

COMMISSIONER de PLANQUE: Thank you.

CHAIRMAN SELIN: Okay. Thank you very much, folks. Could we get the staff to come up.

(Whereupon, the panel stepped back from the table, and the staff panel came forward.)

CHAIRMAN SELIN: Good morning, Mr. Taylor. In your remarks this morning, we'd like to hear really discussions on at least two topics. One is your view of the safety analysis and where the Comanche Peak 2 stands, and the second is a discussion of the staff's specific actions that they've taken in respect to the fire barrier testing, specific questions that came up in the testimony of the public interest groups, your answers to the same questions that were put to the Texas Utility people on the standards. I'm sure there will be some specific questions the Commission would like to put to you after that, but if you would address at least those two separate lines. First, your view as the process of arbiters, and then the second, the results of the referring that you have done.

MR. JAMES TAYLOR: Yes, sir. The staff will cover both those issues in our status briefing this morning. I will also note we are not recommending a vote on issuance of a license at this time. Following satisfactory testing at low power, we will review all the issues and make a recommendation to the Commission at that time.

I'll note at the table with me, Dr. Murley, Director of NRR; and Jim Milhoan, Regional Administrator

of Region IV; Mr. Brian Holian, who is the Senior Project Manager for Comanche Peak; Pat Madden, Senior Fire Protection Engineer; and Ashok Thadani, from NRR. I would also like to note that the Senior Resident Inspector for Comanche Peak Unit 2, David Graves, is in the audience.

I will now ask Dr. Murley to continue the formal status briefing.

DR. MURLEY: Thank you, Jim. We will move briskly through the discussion of the licensing construction and operations to get to the Thermo-Lag issues. But, first, as a brief background to our presentation, I should mention that Comanche Peak site has had a troubled construction program in the early 1980s.

We had essentially stopped construction by the mid-1980s. At that time, the utility regrouped and prepared a corrective action plan in early 1987 and, since that time, a large part of the staff's effort has been on assessing that corrective action plan and how well the utility was carrying it out.

As you know, we issued the operating license about three years ago for Unit 1. The Comanche Peak site has probably had the greatest level of inspection by NRC of any site in the United States, somewhere in the neighborhood of 100,000 hours of on-site inspection, and it continues at the rate of more than twice the average

for any site in the United States.

So, with that background, I would like to ask Brian Holian to begin -- he's the Project Manager -- to discuss the licensing, and then he'll turn it over to Jim Milhoan.

MR. HOLIAN: The staff slides may include some information that's already been covered by TU Electric, and the staff will briefly touch on those areas to get to the main areas that Dr. Murley mentioned.

TU Electric will become the sole owner of Comanche Peak upon completion of the purchase of a 6 percent interest from Texas Municipal Authority, and that will be completed in August of this year. This provision is reflected in the license.

TU Electric has briefly described the site. The only two aspects that I might add are the safe shutdown in Palment, which is a dammed off portion of the Squaw Creek Reservoir. It is sized to provide a 30-day supply of water for decay heat. It was reanalyzed for two unit heat loads, with most recent meteorological data in Supplemental Safety Evaluation 26.

The site also contains a site-specific simulator which effectively models both units. Although the plants are essentially mirror units, there are a few design differences. The most significant differences, from the

operator's standpoint, are a result of the newer model steam generators. Due to differences in the design of the steam generator internals, the operators have slightly different measuring bands and slightly different safeguards actuation subpoints.

Two of the other significant differences are basically operator transparent. The first one is, Unit 2 uses an optimized fuel, which is basically a thinner rod diameter, and also Unit 2 has a newer plant computer which is being installed on Unit 1 during this next refueling outage.

The unit differences are maintained by the licensee as an active program. Differences are deleted as design changes are incorporated and, as mentioned by TU Electric, the operators are dual unit licensed, and the staff has verified training on unit differences.

CHAIRMAN SELIN: It's interesting you didn't mention differences in the fire barriers between the two, these augmentation of passive barriers haven't been retrofit into Unit 1.

MR. HOLIAN: Right. That's part of an ongoing design difference. The testing still to be done on Unit 1 will still decide what retrofits will be done on Unit 1. So, that testing program is still ongoing for Unit 1.

Next slide. (Slide)

Most of the licensing highlights have been discussed by TU Electric. They mentioned the joint stipulation in 1988. I'd just like to highlight the Supplemental Safety Evaluation Reports that were performed in this time frame. Twenty-six Supplemental Safety Evaluation Reports have been issued on the Comanche Peak station. One through 24 address both units, and were issued in the time frame from 1974 to 1990, when Unit 1 received its full power license. Supplements 25 and 26 concentrated on Unit 2 issues, and they were issued in September of '92 and with the low power license in February, respectively.

One of the primaries the staff concentrated on verifying was that the corrective action program which was primarily SSERs 13 through 20, verified that the lessons learned from that were effectively implemented on Unit 2. This review was primarily done in a three-pronged approach, as you can see on the three bullets there.

The configuration management inspection was a 12-member headquarters team, with representatives from the Region, the Department of Energy, and NRC contractors, and it concentrated on the program evaluations on-site.

The design attribute inspection was a region-led inspection that focused on evaluating the technical justifications documenting the disposition of certain

attributes from the licensee's post-construction hardware validation program. Mr. Milhoan will expand on the staff conclusions from these two specific inspections in his remarks.

The validation efforts review, the third prong of that verification, was headquarters-led, and it coupled a review of those areas where the Unit 2 approach differed from existing documentation, and it coupled that with an on-site review of the programs and documentation.

What basically happened was, Supplemental Safety Evaluations 13 through 20, which documented the corrective action program, were re-reviewed and compared with the Unit 2 design activities. The staff concluded that a thorough assessment was performed, and the corrective action program was properly implemented on Unit 2.

(Slide)

On the next slide, we go over some aspects of the license. The license contains the typical license conditions: fire protection safeguards. A unique license condition was imposed on Comanche Peak during the reviews for the Unit 1 license, which is maintained in the Unit 2 license. The licensee is required to control activities for mineral exploration within the exclusion zone, and that's because separate parties can own the subsurface mineral rights.

License exemptions are standard exemptions for alternative containment airlock testing, and exclusion criticality monitors in the fuel handling area, that you brought up, Commissioner. Both of these exemptions are in the Unit 1 license, and in several recently licensed plants and both are being considered currently as possible rule changes.

COMMISSIONER REMICK: Could you elaborate on the criticality monitoring?

MR. HOLIAN: Yes. Criticality monitoring, from 57.24 was an issue primarily in the regs historically for fuel fabrication. It's in there also for nuclear storage at reactor sites. The monitoring is a criticality monitoring, not radiation monitoring that they are exempted from. It's criticality monitoring in storage locations, and in SSER 22, the utility described to the staff the procedural controls that are in place, for the spacing and the distancing and controls of storage of fuel as it's received on-site and as it's put in the storage pool.

COMMISSIONER REMICK: You say it's criticality monitoring. I agree. But aren't they quite often just an area radiation monitor that would detect if criticality occurred? If I recall, I don't even think they are neutron monitors, I think they are just the ones from

where gamma area monitors that were used to case criticality. I guess I don't quite understand -- I understand they're safe rack designs and all that, but I guess I don't understand the problem. If I am correct, it's nothing more than an area radiation monitor. Why it's a big issue of maintaining it, other than the applicant did indicate that it was not a question of the monitor being there, it was a question of whether there was an automatic activation upon alarm, or just an alarm with manual action. Is that characterization of the situation correct? I'm a little confused at the moment.

MR. HOLIAN: The history, I believe, is besides the area radiation monitors which are still maintained in fuel areas, that the criticality monitor, in my memory of the history of it, was a submerged -- also submerged neutron activator. That's in my history.

COMMISSIONER REMICK: It was a neutron detector in the pool?

MR. HOLIAN: That's my best knowledge. Some plants have used a submerged, as I researched it.

COMMISSIONER REMICK: I won't belabor it now. I would appreciate the staff, if you might get back to me.

DR. MURLEY: I think we'll get back -- it has a long history. It is in most licenses.

COMMISSIONER REMICK: Fine. Yeah, please.

MR. HOLIAN: All the post-Three Mile Island required items are completed for Unit 2. One action in particular is the verification of the safety parameter display system data, and that will be completed following a required 30-day burn-in at operations above mode 4.

The safety primary display system design has been verified, and the open item on verification of the data is documented in the regional inspection report, and they are open items list and will be addressed in a future inspection report.

An operational readiness inspection assessment team inspection was conducted in January of this year. This was a ten-member team which included representatives from other regions and the ACRS staff. It was headed by the NRR Special Inspection Branch. The team concluded that organizations and programs are in place, and are adequate to support Unit 2 startup and dual unit operation.

Some of the strengths that were highlighted in that inspection included shift operator knowledge, shift staffing, site management oversight, and the incorporation of lessons learned in various programs reviewed on-site.

Weaknesses were identified in three primary areas: system configuration control, procedural inadequacies and adherences, and several examples of weak

implementation of the corrective action program. These weaknesses were discussed with TU Electric at the exit meeting and again by letter in January of 1993, prior to issuance of a low power license. Region IV verified that corrective actions, as specified in the licensee's response, were adequately implemented prior to issuance of a low power license.

With that, I'd like to turn it over to Mr. Milhoan for the regional oversight inspection.

MR. MILHOAN: Good morning, Commissioners, Mr. Chairman. I plan to cover the results of the inspection program with respect to the completion of construction of Unit 2, Unit 1 operational experience, Unit 2 operational readiness assessment, and Unit 2 licensed operations.

In the audience from Region IV today, in addition to David Graves, the Senior Resident Inspector, is Pat Gwynn, the Deputy Director of Region IV Division of Reactor Projects. Pat was also the Chairman of the NRC Comanche Peak Oversight Panel, an internal panel composed of senior representatives of both the Office of Nuclear Reactor Regulation and Region IV. Also in the audience is Larry Yendell, the Project Section Chief in Region IV for Comanche Peak.

As was previously indicated, the construction permit for Comanche Peak was issued in December, 1974.

Construction of Unit 2 was suspended by TU Electric in April of 1988, to allow the utility to focus its full attention to the completion, licensing and initial operation of Unit 1.

In June of 1990, TU Electric restarted design and engineering activities in support of Unit 2 completion. Physical construction was subsequently restarted in January of 1991. Prior to the restart of construction of Unit 2, the Comanche Peak Oversight Panel reviewed the inspection history and status for Unit 2, to determine which inspections would need to be reperformed prior to licensing of Unit 2.

This review resulted in the initiation of the master inspection plan for Unit 2 construction pre-operational testing. With the exception of inspections related to earthwork and civil structures, construction inspections were performed either in whole or in part. The pre-operational and startup testing programs were resumed without taking any credit for past inspections.

As-built inspections have found the facility construction substantially complete and in conformance with regulatory requirements. Next slide, please, slide 8. (Slide)

Prior to discussing Unit 2, I'd like to briefly discuss Unit 1 operational experience. Unit 1 received a

full power license on April 17th of 1990, and began commercial operations on August 13th of 1990. Overall, Unit 1 experience has been good, with excellent management involvement in all functional areas. Management's approach to resolution of identified problems continue to be a significant strength. Our inspections have shown a consistent systematic approach to ensuring that lessons learned from Unit 1 operations are translated to Unit 2.

Our reviews of operating staffing have shown that TU Electric has an ample operating staff, with a significant amount of operating experience in Unit 1. The improvement in operational experience has been observed since the augmentation of staff with field support supervisors to provide oversight of and direction to auxiliary operators. Operators have continually demonstrated excellent ability to respond to transients.

Although we have seen a number of operator errors and some inattention to detail over the past year, our recent reviews have determined that the licensee's personnel reduction program has been generally effective and operating shifts have a heightened awareness of procedural compliance and attention to detail.

In addition, we have observed that plant staff has exhibited an increased sense of ownership for Unit 2 activities compared to that seen prior to low power

licensing.

Next slide, please. (Slide)

In our efforts to determine the readiness of Unit 2 for licensed operations, the NRC has conducted a number of major inspections in addition to our normal inspection program. These inspections are listed on the slide in chronological order. For example, the configuration management inspection conducted, concluded that the licensee had implemented general effective programs to ensure the quality of design, construction, testing, and control of work activities. The design attributes verification inspection evaluated the translation of Unit 1 reverification requirements to Unit 2 as committed to in the Comanche Peak corrective action program, and concluded the licensee's process was effective.

The subject of fire protection inspections and specifically the Thermo-Lag fire barriers will be discussed later. An in depth inspection of issues related to use of Borg-Warner International Products check valves was completed for Unit 2 in January of 1993, and concluded the effective valves were acceptable for their intended use.

Our inspectors have confirmed that a recent surveillance test failure of a Borg-Warner check valve in

the auxiliary feedwater system has been corrected. We are, however, continuing to review work control practices that may have led to the failure of this valve.

The independent operational readiness assessment team inspection discussed previously, identified weaknesses in the area of configuration in trial procedure compliance and accuracy, and timely implementation of corrective actions were specified for specific identified problems. Our followup inspections have confirmed that the licensee has adequately addressed these issues.

Overall, based on the results of our inspections to date, we continue to be satisfied that TU Electric is capable of safely operating Comanche Peak 2 at low power.

Slide 10, please. (Slide)

COMMISSIONER REMICK: Jim, on the question of configuration management, is the design computerized in this case?

MR. MILHOAN: In this case, the area configuration management that was the weakness in the operational readiness assessment team, dealt with valve positioning and, in that regard, the licensee has gone back and conducted reverification of all systems in the plant, in addition to looking at the procedure for more positive verification, or positive control, of valve positions during --

COMMISSIONER REMICK: But is there a design on the computer for ease of configuration management? Do we happen to know that?

MR. MILHOAN: I don't have the answer to that question.

MR. JAMES TAYLOR: We'll get that.

COMMISSIONER REMICK: Okay.

MR. MILHOAN: With respect to licensed operations, TU Electric received a low power license on February the 2nd. The NRC resident inspectors augmented by regional staff, an NRR representative provided around-the-clock coverage of fuel loading which was completed on February the 7th. The inspectors consider the licensee's fuel loading performance to be good, and noted activities were performed in a controlled, deliberate manner with a clear emphasis on attention to detail and safety.

At this time, there are only four open allegations pertaining to Comanche Peak facility being followed by the Region IV inspection staff. These allegations deal with fire seals in Unit 1, the activities of startup engineers, the impact of licensee's competitive action plan, and the background screening of an individual who is no longer working at the site. The Region IV Allegation Review Panel met on March the 11th, and reconfirmed that none of these allegations have an impact

on full power licensing of the unit.

Region IV's review of Unit 2 activities which have occurred since issuance of a low power license, has determined that the licensee continues to demonstrate the capability to operate the plant safely at low power.

We intend to conduct augmented inspections, including round-the-clock shift coverage during initial criticality and during portions of the low power testing program. We also plan to conduct a special inspection to review TU Electric's own assessment of its readiness to operate above 5 percent power, and to review operational performance during dual unit critical operations. This concludes my prepared remarks.

DR. MURLEY: Thank you. Pat Madden is a Senior Fire Protection Engineer with the staff, and he will discuss the fire protection.

MR. MADDEN: Good morning.

CHAIRMAN SELIN: Good morning, Mr. Madden.

MR. MADDEN: We expended a lot of resources on Comanche Peak with regard to fire protection. Initially, we performed a team inspection in November of '92, and we verified the implementation of the fire protection program. In this verification, we evaluated the fire prevention measures, inspected the adequacy of the plant fire protection features, evaluated the ability of the

plant to be able to shutdown with a fire in either the cable spreading room or the control room, and evaluated the performance of the plant fire brigade.

During this inspection and a subsequent followup inspection in January of '93, we found that fire protection program at Comanche Peak to meet 10 CFR 50.48. In addition to a followup inspection, we performed a review of the application of Thermo-Lag, and the thrust of the rest of my presentation will be on Thermo-Lag.

Staff specifically looked into the criteria used for testing, plant-specific testing. We did an in depth review of the test reports, and we also did a fairly good look at the inspection of in-plant applications.

May I have the next slide, please. (Slide)

With respect to the criteria, in May of 1992, the applicant indicated to the NRC that they were going to conduct a comprehensive fire endurance testing program on the Thermo-Lag barrier systems. Initial testing was performed in June and August, and the staff had concerns with the applicant's fire test methodology. The basis of this methodology was based on the ANI Bulletin 5, and some of the concerns associated with ANI Bulletin 5 were that the application or the measuring of internal fire barrier temperatures, and that was on cables similar to the raceway metal surfaces.

The criteria also allowed the barrier burn-through condition to occur. It also allowed cable damage, and it also allowed the barrier to be breached by a hose stream, and that hose stream was a solid or the playpipe type hose stream.

CHAIRMAN SELIN: The ANI criteria are not part of our generic letter, is it?

MR. MADDEN: No, sir, that's correct. And I'll get into the aspects of the generic letter. In addition, the ANI criteria, the functional pass of that criteria was related to circuit integrity tests, and if the circuit integrity was maintained throughout the test, the barrier performance was considered satisfactory.

Based on our concern, the staff went back and had discussions with the applicant. In October of '92 they revised their test methodology. This revision included measuring external conduit in cable tray rail surface temperatures. It also looked at that there could be no barrier burn-through conditions that could exist, and it also indicated -- the revision also included conditions that the barrier could not be breached by a hose stream.

The TU criteria under this revision was found to be technically correct, and that criteria was evaluated against proposed criteria as we have it now, in the

Generic Letter 86-10 acceptance criteria, otherwise, NPA 251.

Functionality is the internal temperature was exceeded and based on visual inspection of the cables, if cable damage did occur, under this criteria, the applicant would have to consider those conditions, and they would have to demonstrate functionality. This demonstration of functionality would be considered a deviation. This deviation condition would have to be submitted to the NRC and approved by the staff if that were elected to be performed. The applicant did not request the deviation under these provisions. The criteria in their test program did pass satisfactorily all the internal temperature rise limits imposed on the barrier system.

CHAIRMAN SELIN: I'm a little confused. There was testimony earlier about 180 deviations there as described --

MR. MADDEN: Okay. The terminology "deviation" has been -- I would prefer to use 180 variances to the test configuration in lieu of deviation.

CHAIRMAN SELIN: Deviation is a very specific word. It says that the temperature rises more than 250 degrees as measured, et cetera. And, therefore, one has to show that the circuit can continue to function.

MR. MADDEN: Right.

CHAIRMAN SELIN: In other words, the generic test has not been passed and, therefore, you have to take a look at site-specific questions. And you're saying that in the Comanche Peak 2 SSER 26 test, there were no deviations?

MR. MADDEN: There's no deviations to the criteria.

CHAIRMAN SELIN: So, in every case in which a test was considered for licensing, the temperature rise was less than 250 degrees --

MR. MADDEN: Yes, sir.

CHAIRMAN SELIN: -- as measured by the thermocouples in the right place, et cetera.

MR. MADDEN: 250 degrees plus ambient, yes, sir.

CHAIRMAN SELIN: But the differential was less than 250.

MR. MADDEN: Right. Yes, sir. To go on to plant-specific testing --

CHAIRMAN SELIN: Let me go back. You don't have to do megger tests and continuity tests, et cetera, if it rises less than 250 degrees, is that --

MR. MADDEN: That's correct, sir.

CHAIRMAN SELIN: So, all the question about whether the megger test was done correctly or not is irrelevant as far as the letter of the --

MR. MADDEN: The criteria, yes, sir.

CHAIRMAN SELIN: Okay.

MR. MADDEN: Even though they did do meggering, and the meggering was --

CHAIRMAN SELIN: Well, I mean, we're interested in knowing the insulation is okay and the cable goes through, but as far as the letter of the test, the letter of the GL 86-10, we don't require that.

MR. MADDEN: That's correct.

CHAIRMAN SELIN: Thank you.

MR. MADDEN: With respect to plant-specific testing, TU performed 17 schemes. Ten of those schemes were applicable to Unit 2, and of those --

CHAIRMAN SELIN: I'm sorry, 17 were --

MR. MADDEN: Seventeen total tests, schemes that they tested, and ten of those were specific to Unit 2. The remaining seven were dealt with techniques for retrofitting Unit 1. Eight of the ten schemes were considered completely satisfactory.

Conditions bounded by these tests were, as TU indicated, three-quarter inch conduit to five-inch conduit diameters, 12- to 36-inch wide cable trays, junction boxes, and LDB boxes, in addition --

CHAIRMAN SELIN: What's LDB?

MR. MADDEN: LDB is just lateral-done, lateral-

done in the conduit case, and air drops, transitions from conduits to cable trays, where the cable actually exits the conduit and is then routed into a cable tray.

With respect to the hose stream test, TU did use the fog stream. Initially, they did use the standard playpipe. The standard playpipe did damage the fire barrier material.

TU, under the revised criteria, used the fog stream method, and some of those reasons were explained to you. What I would like to do is go into and explain to you a little bit more of the rationale of why the staff elected to use a fog stream.

The ASTM standard, or the American Society for Testing Materials, as a part of their testing methods for determining the fire endurance of various types of building constructions, adopted the standard playpipe hose stream test in 1933.

Currently, ASTM -- their testing methods focus on building columns, walls, partitions, and floor construction. They do not have a testing standard for raceway fire barrier systems at this time, and there is a committee that is working on that.

In total, the host stream test was to impose cooling, impact and erosion effects on building construction that was being evaluated. The weaknesses in

building systems after being subjected to the hose stream test, they fall into basically three categories, and I name them: Thermal failures, which is brittle failures; structural building component failures, i.e., the collapse of a wall leading to the collapse or partial collapse of the structure; and erosion failures, the washing out of grout, for example, in the concrete.

Focusing on these type of failures and focusing on raceway fire barrier systems, the staff, as a part of the acceptance criteria development, examined the applicability of these ASTM standard hose stream test on these barriers.

The consensus during this examination identified a need for some type of hose stream testing. The staff elected to adopt what was already approved by the Standard Review Plan in position 5(a), Guidelines for Fire Protection for Nuclear Power Plants. This SRP position established the fire endurance and hose stream testing acceptance criteria for other nonstructural fire resistant barrier components, for example, penetration seals, and allowed the use of a fog stream nozzle for that test.

The staff's rationale for continuing to use the fog stream on these type of fire barriers was, from a structural aspect, we could understand that walls, fire doors, dampers, or structural building components whose

failure could either contribute to the structural failure of the building or fire growth within the building, and we still deem that those warrant the standard hose stream type tests.

Fire resistive construction techniques used in the design of nuclear power facilities prevent such structural failures. We don't expect the building to collapse. In addition, the combustible loads in nuclear power plants are generally low compared to commercial structures. And under actual in-plant fire conditions, structural collapse, like I said before, is unlikely.

Fire barrier systems used to separate safe shutdown functions within the same fire area are not considered in aiding the prevention of structural building collapse. Therefore, directional loads, as stimulated by standard hose stream tests, imposed on these barriers by falling objects during a fire is not expected.

Firefighting activities, however, resulting from manual suppression or otherwise brigade activities, can cause some level of barrier impact. And the point that needs to be made is manual firefighting suppression activities in the area of energized electrical equipment demand the use of fog nozzles.

The fog nozzle test method, as stipulated by the Standard Review Plan, pressure and flow, simulates in-

plant fire suppression techniques which would be employed by the fire brigade. They actually model the same techniques that would be used.

Cooling effects, the next point --

CHAIRMAN SELIN: I'd like to stop you a minute.

MR. MADDEN: Okay.

CHAIRMAN SELIN: You make a very convincing discussion about why we should have not required the playpipe from the beginning, but there is an argument -- and I'm a little vague as to the branch review plan and where this plays on this -- but there is an argument that says these are all plausible and, therefore, one has a pretty good case, prima facie and acceptable case, that says these are the criteria that we should use in making such tests and, therefore, it's reasonable to go out and publish these and get other people's comments.

But there still is the question of how can we apply this new criterion to an existing situation before we've gotten comments from the general public before we make the fog nozzle our standard piece. It's not clear to me what the weight of the Standard Review -- the branch review plan is in saying that this is nothing new, it's something that we could have or we did in the past. It's not so much a technical argument as we've heard one side of the situation, we haven't heard the other, but once we

go and license the plant, it's a little late to go out for opinions and decide whether to substitute the fog nozzle for the playpipe. What's your view on that?

MR. MADDEN: Well, I look at the proposed criteria as being developed concurrently with the criteria that was adopted by TU Electric. Currently, I look at the proposed criteria as -- right now, it's only been applied to one plant. If it's applied to another plant, it becomes generic, and I would agree with you that that application would have to go out for public comment before it would be applied to a second plant.

And currently we are in the process of submitting this proposed criteria to the CRGR and implementing it -- well, not implementing it, but issuing it for public comment.

CHAIRMAN SELIN: Is that the end of your answer?

MR. MADDEN: Yes, sir.

CHAIRMAN SELIN: What's the role of the standard -- what's the proper for standard --

MR. MADDEN: Standard Review Plan?

CHAIRMAN SELIN: Does that have anything to do with whether this is an acceptable criterion for Comanche Peak 2 or not?

MR. MADDEN: The Standard Review Plan was used as review guidance for Comanche Peak Unit 2.

CHAIRMAN SELIN: Is that -- in your opinion, and Dr. Murley's opinion, and General Counsel's opinion, does that give any further weight on accepting this criterion for this application before it's been generically accepted?

DR. MURLEY: Well, before we can change the Standard Review Plan, that amounts to a change in staff position on a safety issue, and we would have to go through backfit analysis and --

CHAIRMAN SELIN: As I understand, you're saying the Standard Review Plan sort of supports the use of the fog nozzle.

MR. MADDEN: Yes, it does, for penetration --

CHAIRMAN SELIN: Is the Standard Review Plan applicable to this situation? I would have to say it isn't.

DR. MURLEY: Yes.

CHAIRMAN SELIN: So, why do we have to go out for comment on switching from a playpipe nozzle to a fog nozzle, in the first place, if the Standard Review Plan supports the use of a fog nozzle?

DR. MURLEY: Well, the criteria are -- that we've agreed with on Comanche Peak 2, are somewhat different than we have been using in the past, isn't that correct, and so that does -- if we were to change that

generically and, therefore, make it explicit in the Standard Review Plan, that represents a change in staff position for multiple plants, then we would have to follow our procedures.

CHAIRMAN SELIN: What does the Standard Review Plan permit us to do without going out for comment?

MR. MADDEN: Well, right now, the Standard Review Plan focuses on the testing and penetration seals, fire barrier seals.

CHAIRMAN SELIN: You're saying that the logic behind the Standard Review Plan is appropriate in this specific case, to Comanche Peak 2 and, therefore, can be applied without comment?

MR. MADDEN: Yes.

CHAIRMAN SELIN: What's so specific about Comanche Peak 2, why not Comanche Peak 3, or Wattsbarr, or some other place? I mean, it still seems to me that there's a gap to be demonstrated that one can take a plan that was written for a penetration and say that without getting public comment we can apply that to a situation where in the past we think we were requiring a playpipe hose, and you have very good technical arguments that say we never should have done that in the first place but, procedurally, we are in a situation of extrapolating to this case. Is that correct?

MR. MADDEN: That's correct.

CHAIRMAN SELIN: Dr. Thadani, do you care to add anything to that?

DR. THADANI: No, in fact, the Standard Review Plan does allow application of fog nozzle. What we are doing explicitly does not say that for raceway barriers that's what you ought to do. It's adapting that standard, applying it to another, let's say, application, and that's the distinction. But we believe technically, it's appropriate but, however, for wide application because it is a new interpretation, we do need to go out and solicit public comment.

CHAIRMAN SELIN: Okay. I don't need to ask the same question further. I want you to know I'm uneasy on this point. I think this is a point that needs really some considerable review to see just if, in fact, we're going to go out for public comment on a process that will already have been applied to the only plant that we have under consideration for licensing.

Commissioner Remick?

COMMISSIONER REMICK: Just a followup, is there anything that mandates that we get public comment on a change of branch technical position, or a revision of SRP?

DR. MURLEY: Yes. Our internal procedures require it.

COMMISSIONER REMICK: Your internal procedures.

DR. MURLEY: Yes.

COMMISSIONER REMICK: Is there any legal requirement?

MR. PARLER: None that I know of, Commissioner Remick. I don't think that there are any. As far as legal requirements in this area, there would be a legal requirement if the rule itself were changed, if the standards in the rule were changed. As I understand it, of the rather intensive scrutiny of the last several weeks, those standards are not being changed. Therefore, if there is any need for public comment, it would be a policy call or an internal procedural call, and not a legal requirement under the APA, as I understand the situation.

COMMISSIONER REMICK: Thank you.

CHAIRMAN SELIN: Are there any other -- you said that all other configurations pass without deviation. So, the difference is between the old criteria and the new criteria, other than the placing of thermocouples and the fog nozzle, are really irrelevant, that the temperature rise was within the delta 250 degrees, and that would have been true in the old criteria or the criteria that are going out for discussion?

MR. MADDEN: That's correct.

CHAIRMAN SELIN: So, really, the only question in terms of old versus new criteria is the fog nozzle?

MR. MADDEN: That's correct, and the placement of thermocouples.

CHAIRMAN SELIN: Right.

MR. MADDEN: That's correct.

CHAIRMAN SELIN: Okay. You're up to fire tests on your chart at this point? You're still going to talk about combustibility and ampacity?

MR. MADDEN: Well, the one final point that I wanted to make about the hose stream test is, I heard some words that we strong-armed the Committee to change the requirements --

CHAIRMAN SELIN: Browbeat was the correct word.

MR. MADDEN: Browbeat was the correct word. Well, I guess I'm the browbeater. I was at that -- I am on that committee, and during March 10, 1993, there is about 17 or 18 other individuals on that committee that are made up of industry, not only our industry but the manufacturing industry, the conduit industry, local building code official industry, and I can't see that I personally could persuade all of those people to drop the hose stream test.

CHAIRMAN SELIN: I took it as a compliment myself.

(Laughter.)

MR. MADDEN: Okay. But, anyway, I would like to make a point that what TU indicated to you was correct, it did come down to a vote, and actually there was four choices. The first choice was no hose stream test; the second was the standard playpipe test; the third was a test that was similar to what is in our proposed criteria, the fog stream or standard playpipe that have duration fire endurance; and the fourth choice was just the fog stream. And when it came down to choice by all 18 members at present, at that committee meeting, due to the fact that this barrier system is not a structural barrier system for building integrity, it was elected to drop the hose stream test.

CHAIRMAN SELIN: But if we had six plants up for licensing and you dropped it and all six plants, you would say that we really shouldn't do that according to our internal procedures, until the criteria have been commented on.

DR. MURLEY: Well, he's talking about a standard.

MR. MADDEN: I'm talking about a standard.

DR. MURLEY: If that standard is adopted, then we have to go through our own internal processes to incorporate that change into ours. It's a lengthy

process, but we would do it, yes.

MR. MADDEN: But you see a difference between applying the criteria in a specific case versus getting the standard changed?

DR. MURLEY: Yes, in a specific licensing case, we can by --

CHAIRMAN SELIN: By engineering judgment.

DR. MURLEY: -- use engineering judgment and take exceptions from time to time, yes. But once we put it into our internal guidance documents like a Standard Review Plan, we have to go through a formal process.

CHAIRMAN SELIN: It would be okay, as I understood the answer, not necessarily in agreement with it.

MR. MADDEN: Test report review. The staff reviewed the test reports the applicant identified as being satisfactory. Integral to this review is the evaluation and analysis of the internal temperature conditions, the assessment of the conditions of the barrier after the fire endurance and hose stream test, an assessment of the condition of the cables, and the evaluation of any test anomalies.

In addition, we spent a lot of time as far as inspection of in-plant applications. We verified installed configurations were constructed using the same

construction attributes applied to the fire barrier test specimens during the test. The review of the fire test, we actually reviewed the fire test on-site, and we identified the design and construction attributes, and some of those attributes were material thicknesses, the number of layers, mechanical fasteners, spacing, overlays on small conduit, the reinforcement joints and seams, and some stitching on wide trays.

CHAIRMAN SELIN: You did both the review on-site to see that the test configurations were, in fact, representative of the actual, and you reviewed or witnessed the tests that were done at the Omega Laboratories?

MR. MADDEN: That's correct.

CHAIRMAN SELIN: I should make it very clear that there was some discussion by the public interest groups about whether Omega was or was not an independent laboratory. I mean, the key thing is we witnessed the test and the configurations of the furnaces, et cetera, are up to your standard.

MR. MADDEN: That's correct, and I can comment on the Omega Point --

CHAIRMAN SELIN: It's not necessary. I mean, if you witnessed the test and et cetera, that dominates any other question about the --

MR. MADDEN: Yes, sir, we witnessed the tests.

CHAIRMAN SELIN: I don't want to leave this as an implied criticism of Omega, but you have ordered or in fact reviewed the tests yourself?

MR. MADDEN: Yes.

In addition, during the in-plant inspections, we performed a review of the design and installation procedures and sampled typical design details, and verified that the test of design and construction attributes were incorporated into those aspects also.

One other point that we looked at which we thought was pretty important, was the QA/QC procedures in the records associated with certain installed configurations, and we verified that the QA/QC process verified that the assemblies were constructed using fire tested design and construction attributes.

We also evaluated the adequacy of the training provided to the installers, and one point that I wanted to make sure was that the training was performance-based before these guys were let loose into the plant to actually put the stuff on the raceway. We did verify that they had mockups, that the installers had to go through mockup training prior to any application in the field.

With respect to looking at the whole process, we went through the plant. We chose seven what I call

"unique barrier configurations", and we reviewed those seven configurations from what I call cradle-to-grave. We looked at from how they were tested, what tests were applied, all the way through the installation product to the finished product, and we could verify that those were installed in accordance with their test program.

We also looked at what I want to call variances or the old term deviation. We actually looked at 27 conditions and some of those examples oaf variances were interferences that have to be protected as a part of the fire barrier system in some way, for example, like a support may be too close for an adjacent piece of equipment. So, they would enclose that right along with the conduit that needed to be protected. Various types of support hanger plats. There's different designs and configurations, which they couldn't test all of them, but the test attributes were brought forward, same enhancements used, et cetera, and applied to those various configurations.

One other aspect that we looked at was cure time. All the fire test specimens during the test were cured for 30 days. We had some concerns initially at 30 days, that fire watches would have to be in place for 30 days after the installation of these barrier systems. The applicant, on March 4, '93, conducted a 36-inch wide tray

with a seven-day cure time. The seven-day cure time concerning the plant-specific construction techniques used for these barriers represents a minimum cure time required to establish applicability, and therefore no fire watches associated with cure time will have to be in place.

Combustibility. One part of combustibility that the staff looked at, the NRC right now does not require fire barrier systems to be constructed of noncombustible material. Appendix R, Section 3(g), however, requires that radiant energy heat shields inside containment be noncombustible. Section 3(g) of Appendix R also allows redundancy shutdown trains be separated by 20 feet of horizontal space separation providing the intervening space between these shutdown trays is free from combustibles.

Some licensees have created combustible-free zones between redundant safe shutdown trains by applying fire resistant materials around combustibles between the trains. One point to make here is that Thermo-Lag fire resistant material, when it is tested in accordance with ASTM E-136 is considered to be combustible. This was recognized and this information was passed on to the industry in Information Notice 92-82, Results of Thermo-Lag 330-1 combustibility testing.

One thing we did verify as a part of the testing

process is that the applicant did not use Thermo-Lag as aa radiant energy heat shield inside containment, and that there were no combustible-free zones constructed out of this material in Unit 2, and that was verified.

CHAIRMAN SELIN: Before you get off this, in your engineering judgment, a phrase of which I'm not enormously fond, what's the impact of the fact that there is a barrier which is combustible? What does that mean, that at low temperatures it sublimes and at high temperatures it combusts, or that it just never sublimes, that it combusts?

MR. MADDEN: Well, no. Part of the sublimation process is, yes, that it does off-gas, and that off-gas does burn, and it has to --

CHAIRMAN SELIN: So, the material goes from solid to gas, it sublimes, but the sublimation product itself is combustible?

MR. MADDEN: The sublimation product itself is -- yes, it is combustible.

CHAIRMAN SELIN: What's the practical impact? I mean, under what kind of fires would the gas combust?

MR. MADDEN: Okay. It would be a fairly significant fire. The ignition temperature, the actual ignition temperature of the material is well over 1,000 degrees up. So, the actual exposure to that material has

to be -- if you look at the standard time/temperature curve, for example, in the first five minutes, you're up to somewhere around 1200 degrees. So, all that process in the standard test occurs quite quickly, but in practical situations or in-plant practical situations, these barriers are installed generally where sprinklers are installed, so we don't expect that the ceiling temperatures to ever get to the point that the material would actually go through combustion.

CHAIRMAN SELIN: Are you saying that the solid material would burn rather than sublime if it were exposed to a temperature above 1,000 degrees?

MR. MADDEN: Yes.

CHAIRMAN SELIN: So, it's not just the gabs sublimation product that would burn in solid. At low temperatures, it sublimes, and at high temperatures, it burns?

MR. MADDEN: Yes. Actually, it's the off-gasing of the sublimation process that burns. As it develops its char layer, the char layer then turns into the insulation material that actually protects the cable inside the raceway. So, it's the off-gasing that burns.

CHAIRMAN SELIN: So that you get both a char layer and a fire?

MR. MADDEN: Right. The char layer develops,

and as that char layer develops, that creates a secondary insulation process.

CHAIRMAN SELIN: One of the two criteria is that -- are there sprinklers everyplace that Comanche Peak uses this barrier?

MR. MADDEN: Yes.

CHAIRMAN SELIN: So, it's always the one-hour with sprinklers situation?

MR. MADDEN: Yes.

CHAIRMAN SELIN: Is there any plausible scenario by which the temperature could get above 1,000 degrees before the sprinklers would go on?

MR. MADDEN: No.

CHAIRMAN SELIN: And if you did get both the char layer and the burning of the off-gas, would -- I just can't picture what would happen.

MR. MADDEN: Well, it's just -- let's take, for example, if this material happened to be in a tray stack -- you know, the center tray of a tray stack after it would be wrapped. And the cables associated around it would be burning in addition. The flame on the material is very lazy and slow and, as it off-gases, that flame will ignite, and then the flame kind of subsides.

CHAIRMAN SELIN: It won't have a deleterious effect on the passive barrier itself?

MR. MADDEN: No.

DR. THADANI: It's basically -- if I may, Mr. Chairman, in the thermal process, it absorbs energy to change state. It has to be fairly close to constant temperature. And that's really what matters because you're looking at the other side where the cables are located, and you have --

CHAIRMAN SELIN: So, it's not raising the heat nor is it dissipating the insulation qualities any faster than --

DR. THADANI: That's right.

COMMISSIONER REMICK: If I understood, Mr. Madden, you're saying that even the fact that it is combustible, it's not being used in Comanche Peak 2 in violation of the regulation.

MR. MADDEN: That's correct.

COMMISSIONER REMICK: It's not being used there.

MR. MADDEN: That's correct. Quality: With respect to quality, we reviewed the receipt inspection process, and as TU indicated, this receipt inspection process deals with thickness measurements weighing in the inspection for defects, and that that inspection process is done at the manufacturing facility prior to shipment. In addition, the utility also performs a receipt inspection of the material when it arrives on-site, to

make sure it wasn't damaged while it was in shipment.

QC surveillance techniques were used to monitor the installation of fire barrier system in the plant throughout the installation, and QA performed audits of the QC installation process.

With respect to ampacity, the applicant used -- in SSER, it was identified the applicant used the interim ampacity degrading factors, 31 percent for single cable tray, 20 percent for single conduit enclosed in a box design, 7.5 percent for a single conduit enclosed in a conduit pre-shape. Ampacity, in our opinion, is derated -- or ampacity derating is an aging concern, and it's a long-term concern. The applicant has subsequently performed some ampacity derating tests, and their numbers indicate that 9.1 percent derating for small conduits, and 31.4 percent derating for cable trays.

If you look back at their calculated design derate margin, the applicant used a 38 percent derating factor for cable trays and 14 percent for conduit. The testing and their assumed derating factors all fall underneath those margins at this point. So, we have some assurance that ampacity is being handled properly by the applicant.

CHAIRMAN SELIN: Do any of the cables carry high current as a routine?

MR. MADDEN: As a routine, not that I know of.

CHAIRMAN SELIN: They are all either intermittent, or being shut down, or spread among two or three references.

MR. MADDEN: That's correct.

COMMISSIONER ROGERS: And what would be the normal design of the cable capacity for an application here with respect to the actual expected current? In other words, the actual expected current to be delivered in normal operation is something. You pick a cable that's got a rating significantly higher than that, in general. And then there's this derating, ampacity derating. How do they all relate to each other?

DR. THADANI: Perhaps Mr. Gill can answer that question.

MR. GILL: I'm Paul Gill, from the Electrical Branch. The normal process would be to look at the load, and then look at, for example, for motors, a 25 percent margin. Compare that to the given ampacity derating published by the ICEA, and then select the right size cable. Say, for example, if you came up with this calculated number of 20 amps and the conductor that you would find had 25, so you would pick a 25 amp conductor. You would always pick the larger size, so there's always some margin in cables that are designed for normal loads,

even for loads that are nonwater loads.

COMMISSIONER ROGERS: Right. Of course. And how does the ampacity derating in this expected use, relate to the actual -- in other words, if you take your cable capacity and derate it, the one that's actually chosen for the application and derate it by the ampacity derating factor, how does that current relate to the actual expected current in normal use?

MR. GILL: Well, let me go through an example, and perhaps that might explain. If I understand your question correctly, for example, if I'm selecting a cable for a cable tray or a conduit with a Thermo-Lag material on it, I would have to go back to the ICEA published tables and apply the selected derating factor to those tables to come up with a cable size that would be then installed in this configuration.

COMMISSIONER ROGERS: Right.

MR. GILL: So, I not only have then the original margin that I have in my normal design plus the derating factor that I will use for the Thermo-Lag material. So, the current for the cable would always retain the original margin in that configuration.

COMMISSIONER ROGERS: Well, I was just trying to get at just what typical numbers and percentages would be here. I mean, what you're telling me is what the end

result is, and what I was trying to see is if you have a particular current need for an application, then you pick a cable that exceeds that by some amount, that's a standard size cable -- these things are modular, everything is not continuous -- so you pick a cable, and then -- but you have to then recognize that you've got this derating, ampacity derating factor, and where does that take you when you apply that back down to that particular cable? Does it take you back to exactly the current that you intend to deliver, or does it come in below that? In other words, do you have any margin left after you've done the derating?

MR. GILL: Oh, yes, certainly. As I said, the original margin would still be retained because you originally come up with a current that you need. Now you're looking at additional derating margins so that you can select now the proper size for this configuration.

CHAIRMAN SELIN: Let's take a specific case. You need to carry 20 amperes. You would normally, if it were not to be wrapped in insulation, you'd say let's take 25 ampere cable.

MR. GILL: Or for 20 amps, you would go to the ICEA table and you would pick, for example, number 12. That would be typical for a 20 amp circuit.

CHAIRMAN SELIN: Which is rated for what?

MR. GILL: Which would be good for 25 amp, depending on the insulation type, so it may vary.

CHAIRMAN SELIN: Okay. Then you'd go and take a look at the Thermo-Lag, and it says, well, you'd have to figure for an ampacity derating of 31 percent, so you take 25 and you divide it by .7 and you get about 36 amperes.

MR. GILL: That's right.

CHAIRMAN SELIN: So, you basically would take 36 ampere cable.

MR. GILL: That's right. You would not go to the ICEA table and look for a cable that has an ampacity of 36. Should you not find a particular size cable at that rating, you would take the next higher one.

COMMISSIONER ROGERS: Right. Of course.

MR. GILL: So, you may pick a cable that had a 40 amp rating on it.

COMMISSIONER ROGERS: Well, what I'm trying to get at is what was really done here. In other words, how much margin was originally built in through the choice of cable, and then how does the ampacity derating factor -- what does that do to that with respect to taking that down to a certain current capacity that you would not want to exceed, and how does that relate to the actual expected current demand?

MR. GILL: Let's take the example of TU design.

By calculation, they have verified, or at least told us that in the cable tray configurations they have 38 percent margin. Now, the derating factors that have been obtained from this test of 31.4, so they have an additional margin based on the calculations between what is installed to what is actually their need.

MR. HOLIAN: And add one clarification on that point, is that the 38 percent margin that they documented to us in a letter was their most critical calculation based on the most critical cable tray. So, that would be the most limiting margin. They'd have some numbers that might be higher.

DR. MURLEY: Our understanding, Commissioner, is that this is exactly the process that was gone through at Comanche Peak 2. We will verify that and get back with you with the specifics.

COMMISSIONER ROGERS: Yeah, I'd like to see what those -- what the specific numbers really work out to be.

DR. MURLEY: Yes.

COMMISSIONER ROGERS: I haven't see those anywhere, and I really would like to see them.

MR. JAMES TAYLOR: We'll get back to you.

MR. MADDEN: With regard to the last one, the seismic, we did look at the seismic aspects of Thermo-Lag at Comanche Peak. We determined that the weights of the

Thermo-Lag fire barrier material were properly considered in the seismic application problem. The raceway supports affected by the additional weight of Thermo-Lag fire barrier materials are able to withstand the postulated seismic loadings. Thermo-Lag fire barrier material as installed in the plant will not have, or will not damage or affect other seismic Category I features under an SSE condition.

In addition, one other point that I'd like to make is that the individual plant examinations of internal events which is ongoing at various plants, one aspect of that is to look at the vulnerabilities of these plants related to fires caused by earthquakes, and hopefully that this would be considered under the IPEEE.

CHAIRMAN SELIN: So, you won't depend on a rather mechanistic approach, you'd got directly and posit different types of seismic events and assume that they caused a fire, and see if there's adequate protection against it?

MR. HOLIAN: The IPE will evaluate those components that are in that and see if they can cause a fire that could directly impact.

CHAIRMAN SELIN: Is the IPE part of the licensing of Comanche Peak 2? Now, this is the generic, down the road statement?

DR. THADANI: Each plant is required -- actually, it has been requested to conduct an individual plant examination of internal events as well as external events.

CHAIRMAN SELIN: The analysis that you just described is not a prerequisite in your mind, to licensing?

MR. MADDEN: No, it's not.

DR. THADANI: It's not required by our regulations.

CHAIRMAN SELIN: One of the witnesses earlier said something about Appendix R doesn't really -- I forget the exact phrase, but doesn't look at seismic with respect to fire. You heard what was said. Do you understand what the statement was?

MR. MADDEN: That is correct. Appendix R is not designed to be -- or the fire protection features associated with Appendix R are not designed to be seismic.

CHAIRMAN SELIN: But, nevertheless, the Comanche Peak 2 configuration, in your opinion, could withstand a design base earthquake and still carry out its function?

MR. HOLIAN: Not entirely carry out its function, but it wouldn't cause damage to other safety-related components by falling off the cable trays, for example, and striking --

CHAIRMAN SELIN: What would it do? I mean, what --

DR. THADANI: If I may attempt to respond, there are two parts to the issue. If you have an earthquake with acceleration of, say, an SSE, say, a shutdown earthquake, the expectation here is that, in fact, while the barriers may crumble, but the safety function still would be performed. The question comes in that if you have an earthquake that causes fire as well, now what happens?

CHAIRMAN SELIN: When you say the safety would still be performed --

DR. THADANI: In other words, you have an earthquake --

CHAIRMAN SELIN: An absence of fire.

DR. THADANI: An absence of fire. That's the key.

CHAIRMAN SELIN: Okay.

DR. THADANI: Now, if you have a fire, then there is a question there. Would the system perform?

CHAIRMAN SELIN: In other words, could you pulse the insulation with an earthquake and still have it be able to provide its passive barrier function.

DR. THADANI: Indeed, that's the issue. And it's not --

CHAIRMAN SELIN: Our requirements don't --

DR. THADANI: That's correct. We do not require that, however, that is explicitly a part of this examination that Pat described that the applicant is supposed to carry out.

MR. BABCHI: May I please address this question. My name is Goutam Babchi. I'm Chief of Engineering in Geosciences Branch, Office of Nuclear Reactor Regulation.

To my knowledge, the Appendix R equipment, which is the fire suppression system, is not required to be seismic Category I. However, in each plant that I have looked at, they do meet uniform building code requirements. The Comanche Peak SSE value is very low. And there have been some studies made by the industry, and something that I have reviewed personally indicate that engineered facilities without given the consideration of any earthquake design, can withstand earthquakes that are significantly higher than the SSE value for this plant.

CHAIRMAN SELIN: Okay. So, number one, it is brought to believe that there would be some residual, maybe considerable residual, fire barrier capacity in Comanche Peak 2 and, number three, one of these days when they get around to doing their IPE, we think we'll have an answer.

DR. THADANI: That's exactly right.

CHAIRMAN SELIN: Okay.

MR. MADDEN: So, in conclusion, the staff concludes that the Thermo-Lag fire barrier systems installed at Comanche Peak about --

CHAIRMAN SELIN: I'm sorry -- and the fourth point is that in the case of an earthquake, at least the Thermo-Lag won't -- we won't be sorry it was there. It won't cause damage to other systems.

DR. THADANI: That's correct.

MR. MADDEN: That's correct.

COMMISSIONER REMICK: And I could add one other thing, and that is to this application there is fire suppression system also which, of course, may or may not work, but it's there.

MR. MADDEN: Yes. One aspect of the plant design, though, that the standpipe system will be available for manual firefighting capability in the event of an SSE.

In conclusion, the staff concludes that the Thermo-Lag fire barrier systems installed at Comanche Peak are bounded by the plant-specific fire test schemes as to materials, methods of assembly, dimensions, and configurations.

In addition, the staff concludes that these fire barrier systems meet the guidelines of the branch held

position 951, Section C(5), General Plant Guidelines, and the staff found them acceptable.

MR. JAMES TAYLOR: Mr. Chairman, I have one correction. It's the IPE, really triple E, the IPE for external events, and that will be done.

DR. MURLEY: Just for completeness and to be responsive, Mr. Mariotte brought up a question on toxicity. We had answered that in I believe it was a response to one of their petitions. And the point we were making is not that it doesn't give off certain toxic materials, most fires do, but that it's no worse than Douglas Fir, which happens to be a common building material, and that's the point we were making.

CHAIRMAN SELIN: I was trying to think how much Douglas Fir you'd find in a power plant. I don't think that was --

DR. MURLEY: No, that's not the point. The point is that it's a common building material. Most fires --

CHAIRMAN SELIN: Is it toxic compared to other materials that would be in power plants?

DR. MURLEY: No.

MR. MADDEN: For example, if you were to evaluate, let's say, just PVC cable jacketing, that has an LC-50 value of 26. Now, LC-50 means lethal concentration.

To lower the number, the worse the material is. Thermo-Lag material is 53, if you rate it.

CHAIRMAN SELIN: So, compared to other sources of toxic gases that firefighters would have to encounter --

MR. MADDEN: It's no worse.

CHAIRMAN SELIN: -- it's not bad.

MR. MADDEN: That's right.

DR. MURLEY: The staff conclusion then, overall, with regard to Comanche Peak 2 today is that the operations prior to and under the low power license have been satisfactory. The staff will continue to closely monitor the operations and particularly the initial critical operations, and following confirmation of satisfactory operations at low power, the staff will make a recommendation at that time to the Commission regarding issuance of a full power license.

CHAIRMAN SELIN: Dr. Murley, I'd like to ask your professional opinion. There's been a lot of attention to the passive barriers because of the obvious public events, but they are not a particularly large contributor to risk. Is there anything else in the evaluation that is held up to the kind of light that we put the passive barriers to, that would cause any hesitation or shuddering or embarrassment on either your

part or the licensee's part?

DR. MURLEY: I don't believe so.

CHAIRMAN SELIN: Mr. Madden?

MR. MADDEN: No, sir.

CHAIRMAN SELIN: Mr. Holian?

MR. HOLIAN: No, sir.

CHAIRMAN SELIN: Commissioners, do you have questions for the staff? Commissioner Rogers?

COMMISSIONER ROGERS: No.

CHAIRMAN SELIN: Commissioner Curtiss?

COMMISSIONER CURTISS: I just have two or three quick questions. Did the licensee determine the root cause of the Borg-Warner check valve failure in the aux feed systems? Has that been determined yet?

MR. MILHOAN: The latest failure of the surveillance test, that has not. We're still looking at that issue. That's a work control issue. The failure of that valve, it appeared, was the result of a putting in -- a key way into the valves to provide a positive orientation when you repair one of these valves. They put in a number of these in the valves. In this particular case, this is one -- they appeared, in doing this, to reorient the valve to where it didn't seat. All the other instances were proper. They have corrected that. They have backflowed the check valve. It's a positive

surveillance test now. We are following up on why that occurred. That has not been determined on the work control practices that led to that particular --

COMMISSIONER CURTISS: Will that be determined before you make your recommendation?

MR. HOLIAN: Yes.

MR. MILHOAN: It will before I discuss it with --

COMMISSIONER CURTISS: Okay. Just out of curiosity, is the licensee on its schedule for compliance with GL 89-10 MOVs?

MR. MILHOAN: Yes, they are. This week, in fact, we are conducting the Phase 2 MOV inspection at the site. We should have more data at the end of the week.

COMMISSIONER CURTISS: All right. Is the IPE in yet?

MR. HOLIAN: Yes, the IPE is in.

COMMISSIONER CURTISS: And were there any design deficiencies or outliers that cropped up in their review?

MR. HOLIAN: No, there weren't. It was applicable to both units. The core damage frequency, there were no single improvements that were deemed that could improve the core damage frequency, which was about 5 times 10 to the minus-5th.

COMMISSIONER CURTISS: Okay. That's all I have.

CHAIRMAN SELIN: Commissioner Remick?

COMMISSIONER REMICK: Texas Utility Electric indicated that they declared the Thermo-Lag material operational. Does the staff agree with that? Have you had a chance to confirm -- do you agree with that?

MR. MADDEN: Staff agrees.

COMMISSIONER REMICK: Staff agrees. Okay. Mr. Holian, I think in your presentation you said it was a mirror design. I trust the control room is not mirror image design, though, is that correct?

MR. HOLIAN: The control room is situated where Unit 1 and Unit 2 are in the same area. Mirror design just means it's a flip-flop. You enter in the center, and to the right --

COMMISSIONER REMICK: The control room is a flip-flop?

MR. HOLIAN: Yes.

COMMISSIONER REMICK: No problem with licensing operators for dual unit with mirror image control rooms?

MR. HOLIAN: No, they take a dual unit exam.

DR. MURLEY: We'll confirm that.

MR. WES TAYLOR: Commissioner Remick, the control is not a mirror image, it just presents the same image that operators see in --

COMMISSIONER REMICK: Okay, that's what I was

hoping. Okay. All right. Mr. Madden, I assume you're one of our degreed fire protection engineers?

MR. MADDEN: Yes.

COMMISSIONER REMICK: Congratulations.

(Laughter.)

COMMISSIONER REMICK: Where did you -- could you just explain a little bit about your education as a fire protection engineer?

MR. MADDEN: I got a Bachelor of Science Degree from Oklahoma State University, in fire protection safety engineering technology.

COMMISSIONER REMICK: I see.

DR. THADANI: Don't be so shy. He's done a lot more, as a matter of fact.

MR. MADDEN: Well, okay. Some of my background is I worked for Bechtel Power Corporation as a senior fire protection engineer for eight years, as a career firefighter in Howard County, Maryland for four years. I was an instructor with the University of Maryland and teaching fire protection or fire suppression techniques to local volunteer fire departments. I've got a degree in fire protection engineering, was an inspector in Region II, and was principally responsible for conducting the Appendix R inspections within Region II. I was a fire protection engineer for sometime in Region II, I was

promoted out of that. I was a resident inspector for a period of time out at the Brunswick facility. I was a senior project engineer in Region II, and now I'm the senior fire protection engineer at headquarters.

COMMISSIONER REMICK: I sincerely say congratulations.

MR. MADDEN: Thank you.

COMMISSIONER REMICK: If I were to classify fires of two types, one, let's say, exposure fires and electrical fires -- I don't know if that's a proper characterization. Based on any data we have, or your experience, or your judgment, what would be the most common type of fire in a nuclear power plant?

MR. MADDEN: The common type, I would think, right now would be -- the common type of events that I have looked at are electrical in origin. You'll have either motor smoke or cable that may self-heat and give off smoke. It may not get to the flame and combustion point. Currently, we've been pretty successful at controlling combustibles and controlling ignition sources, so we haven't seen too many fires with respect to transient combustibles inside the power plant.

COMMISSIONER REMICK: Any data on what percentage might be electrical versus the so-called exposure? Do we have any data on that?

MR. MADDEN: No, sir.

COMMISSIONER REMICK: Okay. The materials like Thermo-Lag, which are they applicable to?

MR. MADDEN: Well, Thermo-Lag, first of all, the majority of Thermo-Lag installations are associated with electrical components. So, these individuals are trained anywhere -- the fire brigade, for example, anywhere that there's excessive electrical currents, and the fact that they're going into an environment that they don't know that that electricity has been isolated, they are trained to use fog stream techniques.

COMMISSIONER REMICK: But if material like Thermo-Lag to prevent electrical fires, or prevent conductors from other fires?

MR. MADDEN: No, it's to protect the components inside from other fires.

COMMISSIONER REMICK: From other fires. Okay. Thank you. That's all I have.

CHAIRMAN SELIN: Commissioner de Planque?

COMMISSIONER de PLANQUE: Yes. I'd just like to make clear that the situation with respect to the status of the testing laboratory. When we talk about a nationally recognized testing laboratory, I assume we're talking about certification, someone like NIST under the NAVLOC program. Is that what we're talking about?

MR. MADDEN: Well, actually we look at the experience of a laboratory to do fire endurance testing. That term has been loosely used, or used very loosely, and I don't know if I really go along with the term of nationally recognized testing laboratory. I think what you need to do is evaluate the capabilities of the laboratory to perform those certain specific type of tests.

For example, if you have a laboratory that all they do is witness tests that were done at some other facility, I do not consider them to be experts in the area of fire testing. If you look at UL, for example, Underwriters Laboratories, which they have a whole series of furnaces, they have a whole staff that is nothing but experts in the area of fire endurance testing, I would definitely say that those people are qualified to do tests.

COMMISSIONER de PLANQUE: But is there -- I'm just trying to understand. Is there a certification test for laboratories in the fire protection area?

MR. MADDEN: No, sir -- no, ma'am -- I'm sorry.

COMMISSIONER de PLANQUE: That's okay, it's happened before. Don't worry about it.

MR. MADDEN: I stepped on my tongue that time.

COMMISSIONER de PLANQUE: The bottom line here

is that NRC personnel have witnessed these tests?

MR. MADDEN: Yes.

COMMISSIONER de PLANQUE: That you are convinced the tests were conducted in accordance with our requirements?

MR. MADDEN: Yes.

COMMISSIONER de PLANQUE: And that the configurations that were tested indeed represent what's being used in the plant?

MR. MADDEN: Absolutely.

COMMISSIONER de PLANQUE: Okay. Thank you.

CHAIRMAN SELIN: Anything else?

COMMISSIONER de PLANQUE: That's it.

CHAIRMAN SELIN: Okay. The Commission would like to thank everybody for a very informative briefing. An SRM will be sent to the staff with any questions that the Commission will have. This will happen quite quickly. This information, namely, the briefing and the answers, will be taken into account in making our decision when the time comes, whether to authorize the Director of NRR to issue a full power operating license to Comanche Peak Unit 2. Before making that decision, the Commission expects to receive notification from the staff whether or not the reactor initial criticality has been completed successfully, and whether the staff has confirmed that the

applicant has conducted satisfactory operations under the low power license. That latter information will not be available under the most optimistic circumstances until the end of the month, so we'll be looking to get both our answers and the results of the low power work around the end of March and, of course, there will be no vote taken before that. We wouldn't even expect a recommendation on full power operation before that.

Thank you very much. I'm sorry it's been such a long morning, but we're a little out of shape on -- out of practice on licensing power plants.

(Whereupon, at 12:36 p.m., the meeting was adjourned.)

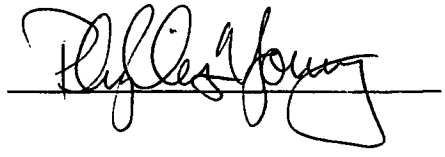
CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the United States Nuclear Regulatory Commission entitled:

TITLE OF MEETING: Discussion on Full Power Operating License for Comanche Peak (Unit 2)
PLACE OF MEETING: Rockville, Maryland

DATE OF MEETING: March 16, 1993

were transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.



Reporter's name: Phyllis Young

3/15/93 - revised

SCHEDULING NOTES

Title: Discussion on Full Power Operating License for Comanche Peak (Unit 2)

Scheduled: 9:30 a.m., Tuesday, March 16, 1993 (PUBLIC)

Duration: Approx 2 hrs

Participants:

Citizens for Fair Utility Regulation (CFUR)

- Betty Brink

Nuclear Information and Resource Service (NIRS)

- Michael Mariotte

Citizens Association for Sound Energy (CASE)

- Owen Thero

Texas Utilities Electric Company

- Erle Nye
  Chairman of the Board and
  Chief Executive

- Wes Taylor
  Executive Vice President, Production

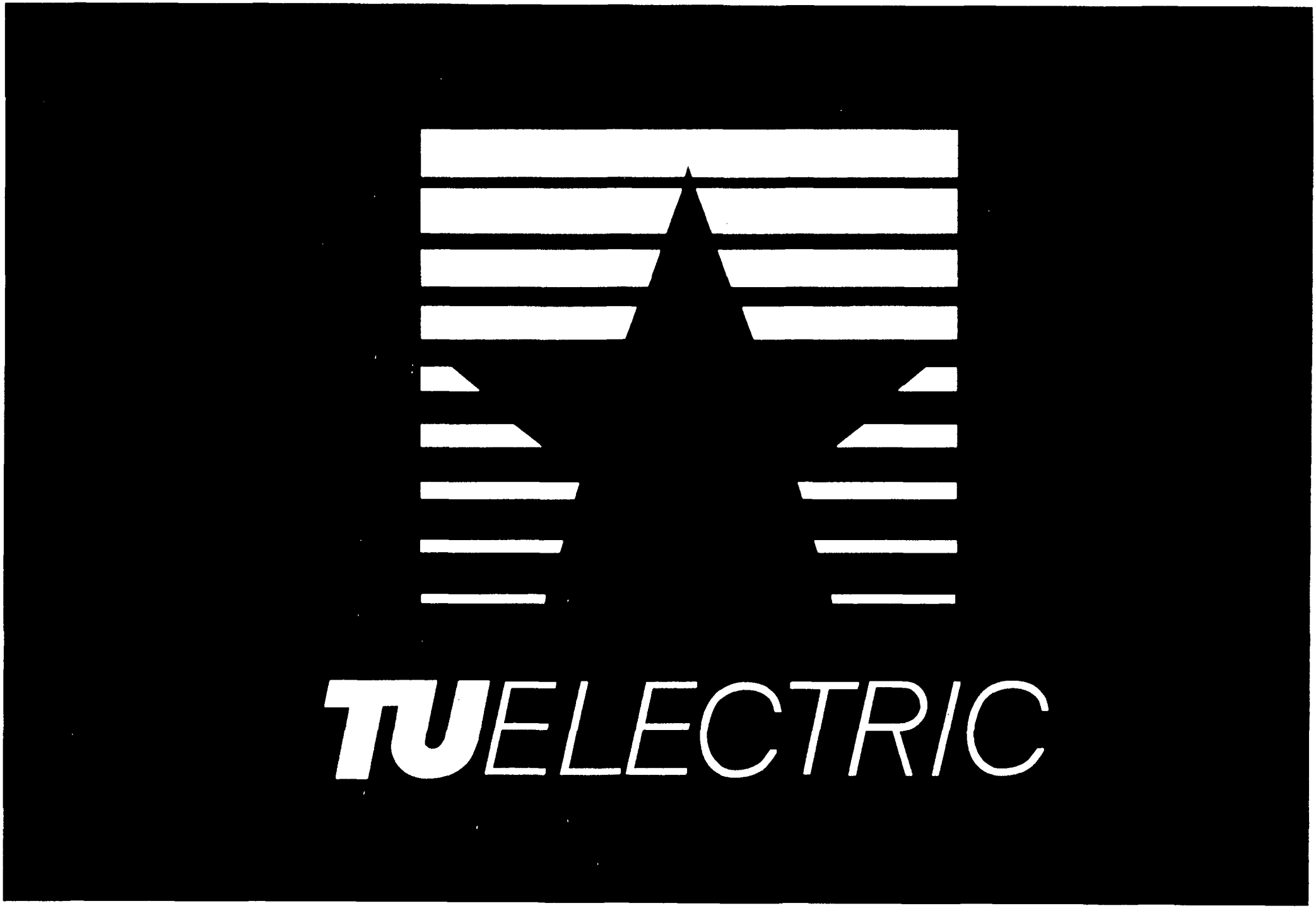
- Lance Terry
  Vice President of Nuclear Engineering
  and Support

- James Kelley, Jr.
  Vice President of Nuclear Operations

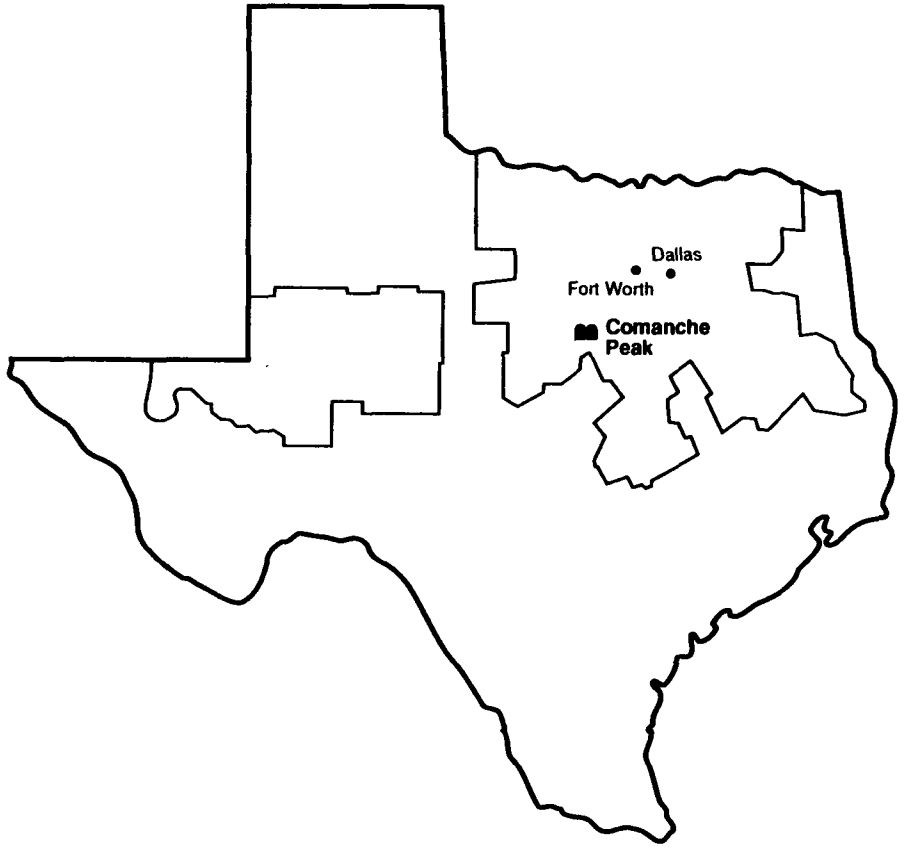
- William Cahill
  Group Vice President - Nuclear Production

NRC

- J. Taylor, EDO
- T. Murley, NRR
- B. Holian, NRR
- J. Milhoan, Region IV
- P. Madden, NRR


TU ELECTRIC

TEXAS UTILITIES COMPANY SYSTEM



COMANCHE PEAK UNIT 1

- Full Power OL in 4/90
- Now in Third Cycle
- Good Operating History

COMANCHE PEAK UNIT 2

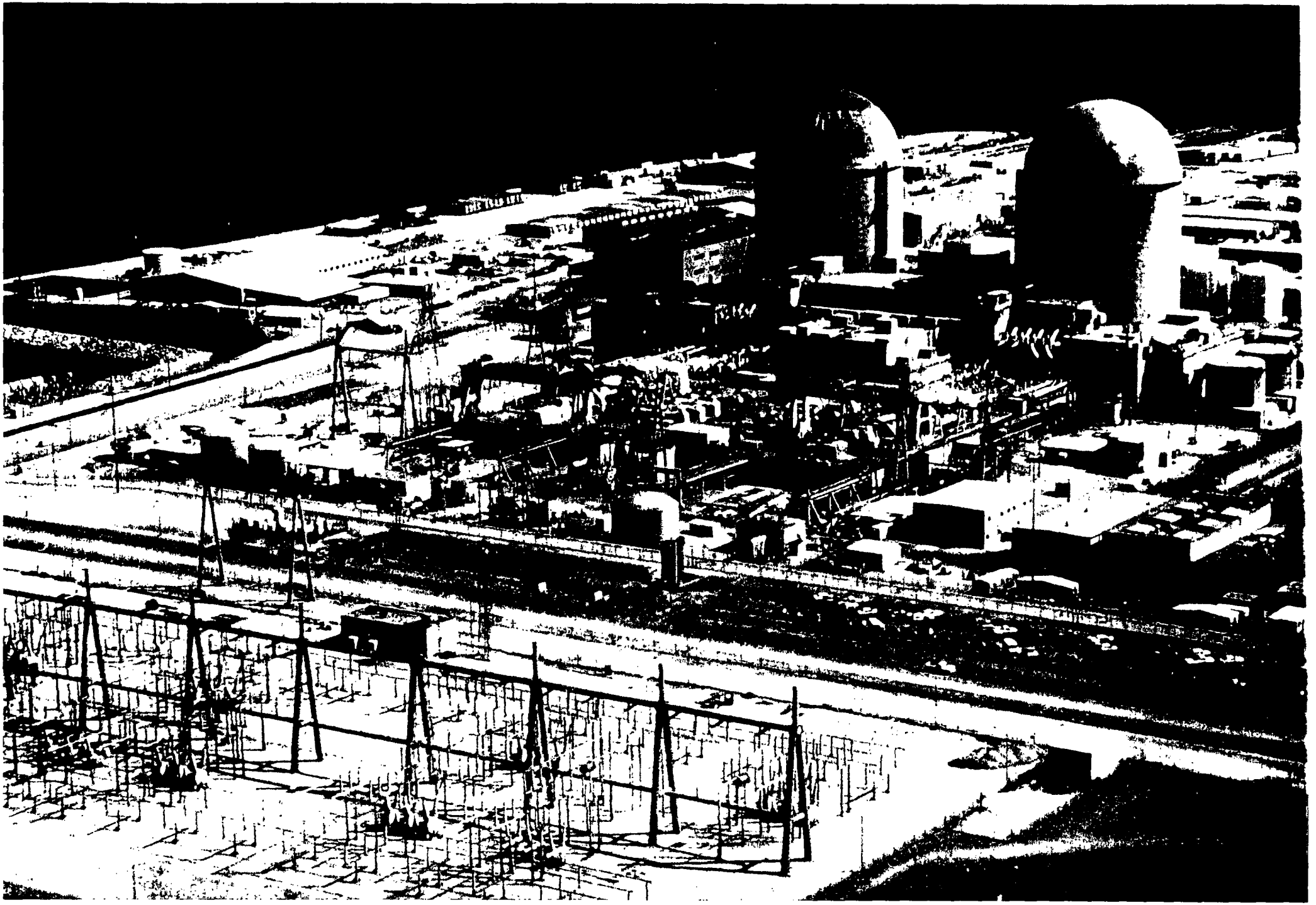
- Completed Construction
- Demonstrated Readiness to Operate
- Received Low Power OL in 2/93

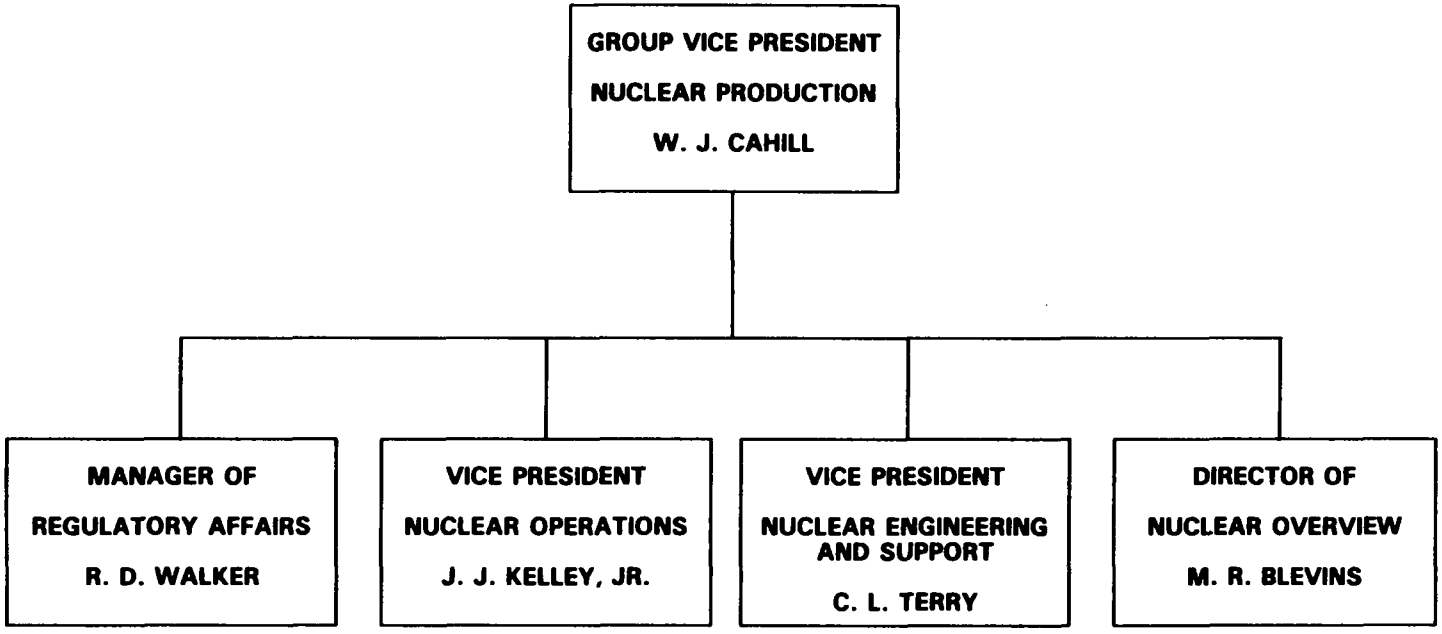
TU ELECTRIC PHILOSOPHY FOR OPERATION

- Senior Management Involvement With Comanche Peak
- TU Electric Involvement In Industry Groups
- Attention to Detail
- Conservative Actions
- Seek Improvements

AGENDA

- WES TAYLOR - NUCLEAR ORGANIZATION AND UNIT 1 EXPERIENCE
- LANCE TERRY - DESIGN, CONSTRUCTION AND OVERVIEW
- JIM KELLEY - OPERATIONAL READINESS AND STARTUP TESTING



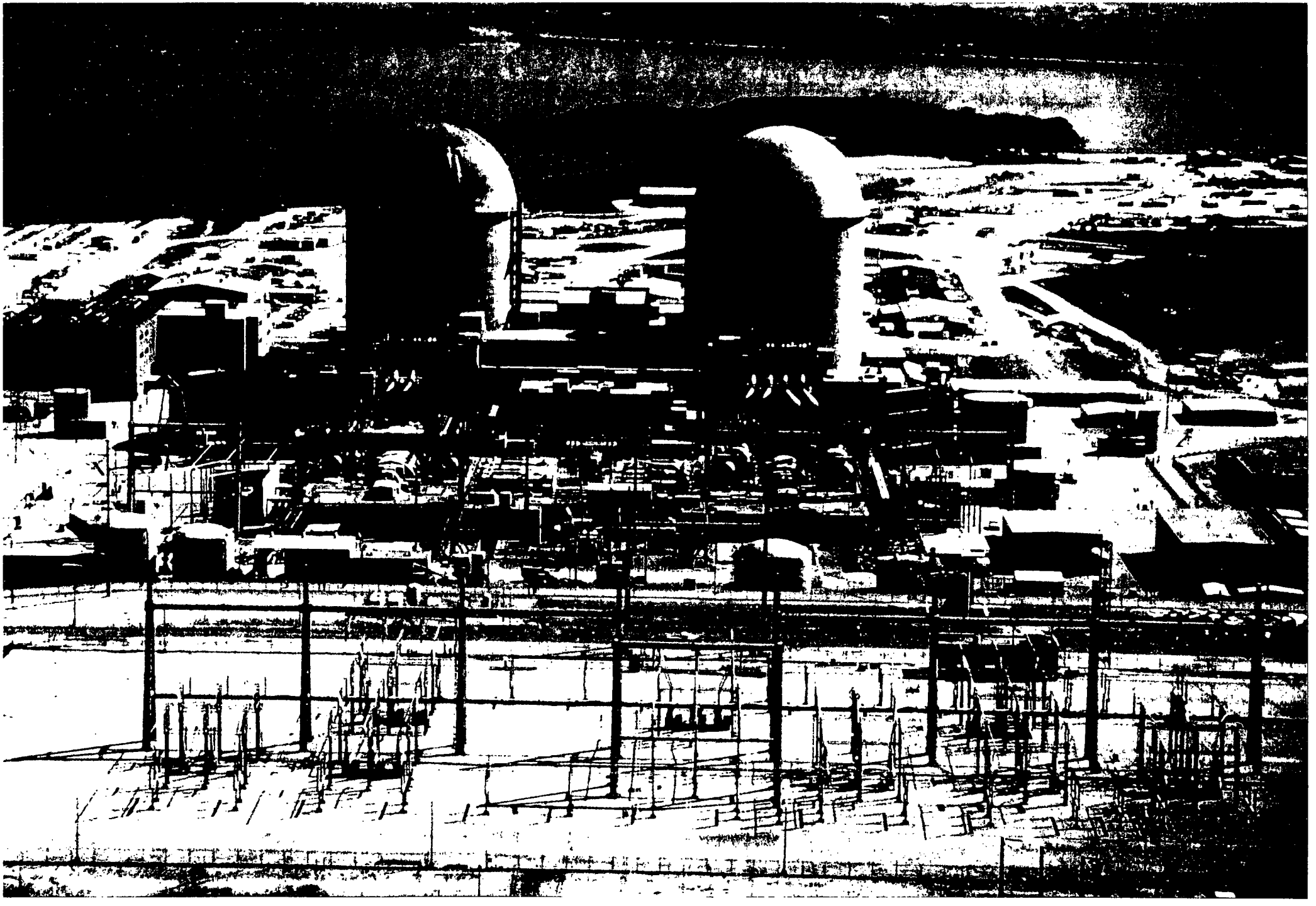

GROUP VICE PRESIDENT
NUCLEAR PRODUCTION
W. J. CAHILL
MANAGER OF
REGULATORY AFFAIRS
R. D. WALKER
VICE PRESIDENT
NUCLEAR OPERATIONS
J. J. KELLEY, JR.
VICE PRESIDENT
NUCLEAR ENGINEERING
AND SUPPORT
C. L. TERRY
DIRECTOR OF
NUCLEAR OVERVIEW
M. R. BLEVINS

PERFORMANCE OF COMANCHE PEAK UNIT 1

- Good Power Ascension
- Overall Good Performance
- In-depth Analysis of Plant Events
- Corrective/Preventive Actions
- Improved Second Cycle

MANAGEMENT EMPHASIS

- Constant Emphasis on Safety
- Questioning Attitude
- Management Involvement and Communication
- Effective Use of Task Teams for Evaluations



UNIT 2 INTEGRATED MANAGEMENT TEAM

- TU Electric Management
- Design Contractors (Bechtel, Stone & Webster, Impell, Westinghouse)
- Constructor (Brown & Root)
- Quality (TU Electric, Stone & Webster, Brown & Root)

UNIT 1 LESSONS LEARNED USED FOR UNIT 2

- Design Validation
- Hardware Validation
- Utilized Unit 1 Validated Design
- Lessons Learned were Collected
- Completion of Design Before Construction

DESIGN AND CONSTRUCTION VALIDATION FOR UNIT 2

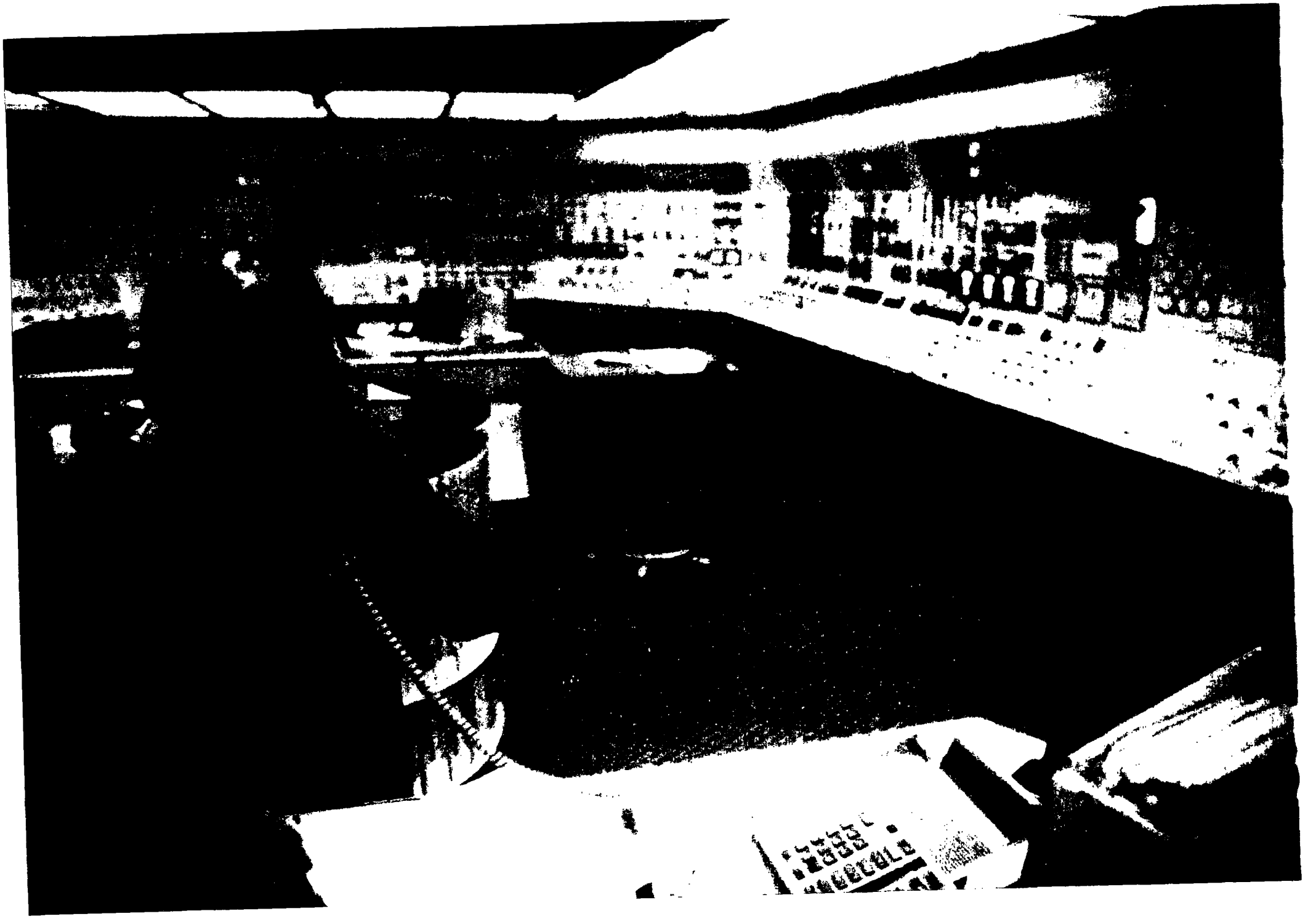
- Coordination of Engineering/Construction/QC
- High Quality Performance Achieved
- Independent Verification (IDA, CAT)

THERMO-LAG

- TU Electric was Proactive in Resolving the Issue of Thermo-Lag Qualification
- TU Electric Tested Thermo-Lag Using NRC Acceptance Criteria
- Test Results Showed that Thermo-Lag, as Installed in CPSES Unit 2, Meets NRC Requirements
- SSER 26 Issues Addressed

OVERVIEW ACTIVITIES

- Operational Readiness Assessment Team
- Shutdown Risk Assessment



SHIFT STAFFING

DUAL UNIT OPERATION

	Tech Spec Operating Requirement	Operating Practice
Shift Supervisor (SRO)	1	1
Unit Supervisor (SRO)	1	3*
Reactor Operator (RO)	3	4
Auxiliary Operator (AO)	3	7
Shift Technical Advisor (SRO)	1	1

*One May Be Designated as the Required Shift Technical Advisor

CONTROL ROOM STAFF EXPERIENCE

- 69 Licensed Operators
- 66 Dual Unit Operators
- Operating Experience
- Training Program Accreditation
- Success in Recent Licensed Operator Examinations

MAINTENANCE

- Preventive Maintenance Program
- Meet INPO Objectives for Safety System Availability
- Backlog Well Managed

UNIT 2 PREOPERATIONAL TESTING

- Testing Completed Successfully
- Operations Personnel Performed Well
- No Impact on Unit 1

USES OF OPERATING EXPERIENCE

- Unit 1 Experience Applied to Unit 2
  - Unit 1 Design Modifications
  - Personnel Performance

OPERATIONS PREPARATION EMPHASIS

- Transition from Construction to Operation
- Operators Control Systems and Areas
- Procedures Properly Implemented
- Operation of Two Units

PRECRITICAL CHRONOLOGY

2/02/93	License Issued by NRC
2/04/93 to 2/07/93	Completed Fuel Loading
2/11/93	Tensioned Head Closure Studs and Entered Cold Shutdown

SCHEDULE FOR CRITICAL OPERATIONS

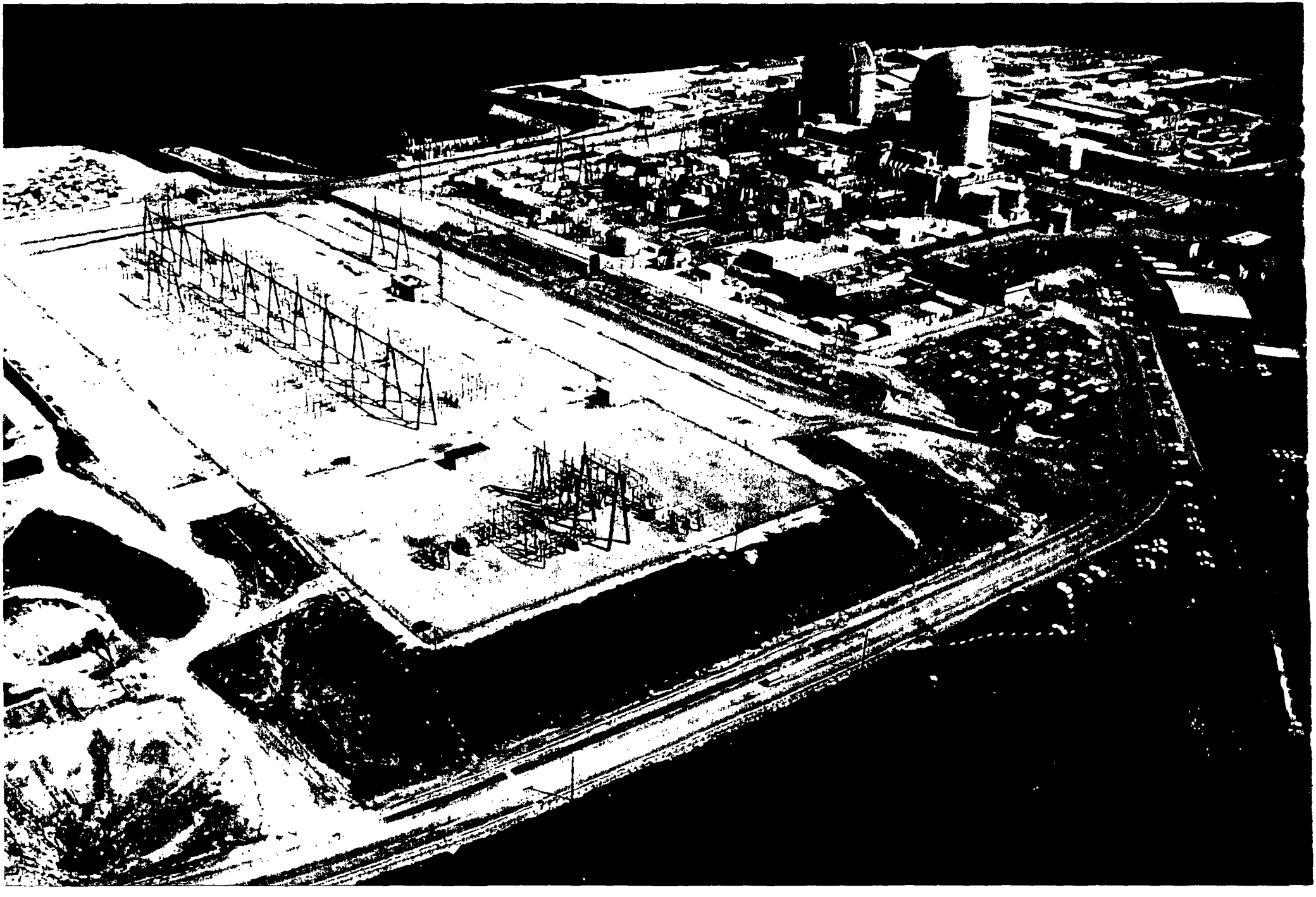
- Initial Criticality
- Ready for Power Operation

POWER ASCENSION PROGRAM

- 50% Power Plateau
- Self-Assessment at 50% Power
- 75% Power Plateau
- 100% Power Plateau

SELF-ASSESSMENT PERIOD

- Assessment by Functional Areas
- Supplemental Assessments
- Evaluation by SORC



CLOSING REMARKS

- Emphasis on Deliberate and Safe Power Ascension Testing

- Unit 2 Readiness for Power Ascension Testing

COMANCHE PEAK UNIT 2

FULL POWER

COMMISSION MEETING

MARCH 15, 1993

	PRESENTER
SLIDE 1	T. MURLEY
SLIDES 2-6	B. HOLIAN
SLIDES 7-10	J. MILHOAN
SLIDES 11-12	P. MADDEN
SLIDE 13	T. MURLEY

Contact: B. Holian
Phone: 504-1334

NRC STAFF PRESENTATION

- LICENSING REVIEWS
- REGIONAL INSPECTION AND OVERSIGHT
- THERMO-LAG

COMANCHE PEAK STEAM ELECTRIC STATION

- OWNERS
  - TU ELECTRIC
  - TEXAS MUNICIPAL POWER AGENCY (UNTIL AUGUST 1993)

- SITE
  - 7669 ACRES IN SOMERVELL COUNTY, TX (FORTY MILES SW OF FORT WORTH, TX)
  - ON SQUAW CREEK RESERVOIR

- PLANT DESIGN
  - 3411 MWT, 4-LOOP WESTINGHOUSE PWR

- UNIT 1/2 DIFFERENCES

LICENSING HIGHLIGHTS

- MILESTONES

DEC 1974	CP ISSUED (CPPR-127)
FEB 1978	OL APPLICATION
DEC 1981	ASLB HEARINGS
JUL 1988	ASLB DISMISSES PROCEEDINGS (JOINT STIPULATION)
JAN 1991	RESUME SIGNIFICANT CONSTRUCTION
FEB 1993	LOW-POWER OL ISSUED

UNIT 2 CORRECTIVE ACTIONS

- CORRECTIVE ACTION PROGRAM (CAP)
- CONFIGURATION MANAGEMENT INSPECTION (NOV-DEC 1991)
  - EFFECTIVE PROGRAMS FOR DESIGN, CONSTRUCTION, TESTING AND CONTROL OF WORK
- DESIGN ATTRIBUTE INSPECTION (APR 1992)
  - POST-CONSTRUCTION HARDWARE VALIDATION RESULTS PROPERLY TRANSLATED TO UNIT 2
- VALIDATION EFFORTS (MAY-DEC 1992)
  - INDEPENDENTLY VERIFIED THE PROPER TRANSLATION OF CAP FROM UNIT 1 TO UNIT 2 AND THE IMPLEMENTATION ON UNIT 2

OPERATING LICENSE

- UNIQUE LICENSE CONDITIONS

  - SITE MINERAL EXPLORATION

- LICENSE EXEMPTIONS

  - CONTAINMENT AIRLOCK TESTING

  - CRITICALITY MONITORING

- NO SER OPEN ITEMS

- TMI ITEMS COMPLETE
  - VERIFICATION OF SAFETY PARAMETER DISPLAY SYSTEM (30 DAY "RUN" ABOVE MODE 4)

OPERATIONAL READINESS ASSESSMENT

- JANUARY 4 - 22, 1993

- INTEGRATED EVALUATION OF

  - MANAGEMENT AND OPERATIONS
  - MAINTENANCE, SURVEILLANCE AND TESTING
  - ENGINEERING AND TECHNICAL SUPPORT
  - SAFETY ASSESSMENT AND QUALITY VERIFICATION.

- CONCLUSION

  - DEMONSTRATED ABILITY TO OPERATE SAFELY
  - TU ELECTRIC PREPARED FOR TWO-UNIT OPERATION.

CONSTRUCTION COMPLETION

- CONSTRUCTION PERMIT CPPR-127 ISSUED DECEMBER 1974
- PHYSICAL CONSTRUCTION RESUMED IN JANUARY 1991
- CONSTRUCTION INSPECTIONS REPERFORMED IN WHOLE OR IN PART
- OVERALL RESULTS

UNIT 1 OPERATIONAL EXPERIENCE

- FULL POWER LICENSE ISSUED APRIL 17, 1990
- COMMERCIAL OPERATIONS BEGAN AUGUST 13, 1990
- MANAGEMENT INVOLVEMENT AND OVERSIGHT
- UNIT 1 LESSONS LEARNED TRANSLATED TO UNIT 2
- OPERATOR STAFFING AND PERFORMANCE

UNIT 2 OPERATIONAL READINESS ASSESSMENT

- MAJOR INSPECTIONS

  - DESIGN INSPECTION
  - CONFIGURATION MANAGEMENT INSPECTION
  - DESIGN ATTRIBUTES VERIFICATION INSPECTION
  - TECHNICAL SPECIFICATIONS AS-BUILT INSPECTION
  - FIRE PROTECTION TEAM INSPECTION
  - CHECK VALVE INSPECTION
  - OPERATIONAL READINESS ASSESSMENT TEAM
  - PERSONNEL ERROR REDUCTION REVIEW

- CONCLUSIONS

UNIT 2 LICENSED OPERATIONS

- ENHANCED NRC INSPECTION
- ALLEGATION STATUS
- INITIAL FUEL LOAD
- CRITICALITY AND LOW POWER TESTING
- LOW POWER OPERATIONS ASSESSMENT
- NRC INSPECTION OF POWER OPERATIONS

FIRE PROTECTION

- INSPECTION (NOV 1992)
  - VERIFIED FIRE PROTECTION PLAN

- FOLLOW-UP INSPECTION (JAN 1993)
  - VERIFIED INSTALLATIONS

- THERMO-LAG
  - CRITERIA
  - PLANT SPECIFIC TESTING
  - TEST REPORT REVIEW
  - INSPECTION OF IN-PLANT APPLICATIONS

THERMO-LAG

- SSER 26

  - CRITERIA
  - FIRE TESTS
  - CURE TIME
  - COMBUSTIBILITY
  - QUALITY
  - AMPACITY
  - SEISMIC

- CONCLUSION

NRC STAFF CONCLUSION

- OPERATIONS PRIOR TO AND UNDER THE LOW POWER LICENSE HAVE BEEN SATISFACTORY
- STAFF WILL CLOSELY MONITOR INITIAL CRITICAL OPERATIONS
- FOLLOWING CONFIRMATION OF SATISFACTORY OPERATIONS AT LOW POWER, STAFF WILL MAKE A RECOMMENDATION TO COMMISSION REGARDING ISSUANCE OF FULL POWER LICENSE

DRAFT OPENING STATEMENT OF CITIZENS FOR FAIR UTILITY REGULATION, BEFORE THE COMMISSION, MARCH 15, 1993
PRESENTED BY BETTY BRINK, BOARD MEMBER, CFUR

On behalf of the CFUR board and members, I want to express our appreciation to the Commission for this invitation to address the concerns CFUR has raised regarding the installation of the fire barrier material Thermolag at Comanche Peak's Unit 2 before a full power license is issued

While this is not the forum CFUR had hoped for, we have requested full scale hearings on this subject, as the Commission knows, we nonetheless believe it shows a unique concern on the part of the Commission--and a unique opportunity--to shed more light on Thermolag before making such a momentous decision as the licensing of a nuclear power plant. This in itself can only result in a plus for the folks back in Texas who are going to be living and working near the plant, and for those of us who will ultimately pay for the plant, in dollar costs, and/or health costs.

Our request to you this morning is quite simple. Do not license Unit 2 until criteria that the NRC is now proposing for fire barrier material standards have been accepted and established in regulatory law. Common sense and history should tell you that a "proposed" criteria or standard may not, probably will not, wind up as the "accepted" criteria or standard. It very well may become more stringent, less stringent, or be found, after considerable debate, to be changed altogether.

TU's testing of its enhanced or modified installations of Thermolag has been done under criteria that is proposed only, and has yet to go through the rigorous process of peer review and public comment. We believe this makes a mockery of the law and the regulatory process designed to protect the health and safety of the public.

Licensing this plant under such conditions is an insult to the citizens who live and work near the plant and those who must ultimately pay for this plant. Make no mistake about it, the ratepayers in the TU service area, not the corporate officers, not the stockholders, will pay whatever costs accrue for the enhancement of, or removal of Thermolag and the installation of its replacement material, depending on the outcome of this process. So please, before you allow any more mistakes to be made regarding Thermolag, let the process play itself out, let the process work as it is designed to work. Enough mistakes, admitted "opportunities missed", have already occurred.

Licensing this plant before acceptance of new or revised standards is complete, reinforces the very real perception that criteria is being developed to favor Thermolag allowing plants such as Comanche Peak to use this material because of a large investment by the utility in money and time. "Inside NRC", December 14, said it this way, "The appearance of bias toward [illegible]'s product...is further fueled by the preliminary NRC approval of modified Thermolag panels at (TU's) Comanche Peak [illegible] prior to any settlement of what the objective.

industry-wide fire barrier standards should be."

There is also the public perception that because the NRC dropped the ball years ago on Thermolag, it must now prove, at whatever costs, that Thermalog is indeed safe, even though it failed tests for a fire barrier material under the current criteria, even allowing that that criteria was cloudy at best. (Chairman Selin, in your response to Congressman Dingell you say, "Although the present criteria are not considered flawed, they have been shown to be incomplete with respect to the process for performing an acceptable engineering analysis.") Indeed, as the NRC's documents and admissions now prove, the initial certification by the manufacturer, Thermal Sciences, Inc., based on the third party testing laboratory, Industrial Testing Laboratories, is questionable and is one subject, of many, which is being investigated by the IG's office, a Federal Grand Jury under the direction of the Justice Department, and a congressional subcommittee. These multiple investigations cloud the issue even further and no license should be issued until these too are played out. No one in this room or beyond knows what the final outcome of these investigations will be.

My time is short this morning so let me point out our technical concerns and set out our arguments regarding the licensing process itself.

Combustibility. The NRC staff recognizes that Thermalog is combustible. 10 CFR 50, A requires that "noncombustible

and heat resistant materials shall be used wherever practical." Yet in all tests Thermolag burns as a combustible. It flames within about 2 minutes or less, and continues to burn throughout the fire exposure, continuing to burn until it is extinguished by a fife hose spray. The American Society for Testing and Materials testing standard states that a material is combustible if three out of four samples exceed these criteria: the recorded temperature of the specimen's surface and interior thermocouples...rises 54 degrees F (30 C) above the initial furnace temperature; there is flaming from the specimen after the first 30 seconds of irradiance; and the weight loss of the specimen, due to combustion during testing, exceeds 50 percent. For the NRC's tests, four out of four samples of Thermolag panels suffered a weight loss in excess of 50 percent, and flaming continued in excess of 30 seconds.

The NRC admits that Thermolag is combustible, but refuses today to say that this disqualifies it's use at Comanche Peak. Rather it allows "compensatory measures" such as fire watches as a quick fix.

Fire watches are already required by the current standards. Increasing fire watches are only band aid fixes to this serious deficiency. In any event the capacity for human error remains and is a well founded concern for those of us who must live in the vicinity of the Comanche Peak plant.

Texas Utilities has paid a $50,000 fine for

falsified fire watch records and missed fire watches (EA 91-015) in 1991. We do not consider this to provide us with "reasonable assurance" that fire watches will always be performed as required, nor that they in and of themselves can provide the redundancy necessary for the defense in depth criteria. Only one such missed fire watch patrol is necessary for a fire to breach a deficient fire barrier and cause a failure in the plant's safe shutdown systems.

Sublimation. Every test report states that Thermolag catches fire at the beginning of the tests and continues to burn until it is extinguished. This indicates to CFUR that the material, at least on the flameside of the protective envelope is burning at a higher temperature than it should be, that is, that the material is combusting, not subliming. In sublimation, the material that is subliming changes from a solid to a vapor without an increase in temperature. As the solid material sublimes it is accompanied by the absorption of heat, thereby reducing the heat of its surroundings. On the other hand if the material is combusting it is releasing heat to its surroundings and its environs. This seems to CFUR to be what is actually happening, obviously defeating the purpose of the material to act as a fire barrier.

The flammability of the material itself should be of concern, regardless of some very controlled tests in a limited environment. What happens, for example, if the material cannot be extinguished in an hour, if for some

reason it cannot be got to physically to apply the spray?

Omega Point Laboratories. In a memorandum dated June 30, 1992, for Patrick M. Madden, NRR, from Kenneth D. Steckler, National Institute of Standards and Technology, Mr. Steckler voices concerns about Omega Point's ability to conduct E119 fire endurance tests. Apparently Omega Point was not included in a final list of recommended laboratories by the NRC because the president had been involved in one or more early SWRI testing of Thermolag; because there is "no controlled curing room for test assemblies"; and because "the furnace size is marginal." Mr. Steckler cautioned the NRC by citing two examples, that the utility was not necessarily using test assemblies that were identical to "end use". He said that it is "the responsibility of the utility to demonstrate via other experiments or engineering analysis (fin heat transfer theory) that indeed the test assembly is identical to or a conservative form of actual plant construction."

Has this cautionary note from NIST been addressed? If so where and how?

Contradictions. In Chairman Dingell's letter to Chairman Selin, the question "can Thermolag meet the standards as they are presently written, without the modifications which the NRC is proposing?" Chairman Selin's answer:

"Many Thermolag barriers...would not meet the acceptance criteria and test methods in Generic Letter 86-10. Recent

fire barrier testing by TU and TVA found that some unmodified Thermolag...barriers did not pass either the fire endurance acceptance criteria and test methods of Generic Letter 86-10 or the proposed NRC position.

These tests also found that upgraded Thermolag barriers (modified) have successfully satisfied the fire test acceptance criteria in the NRC's proposed position. *The ability of upgraded Thermolag fire barriers to meet the acceptance criteria and test methods in Generic Letter 86-10 has not been tested.* (Emphasis added.)

Is this the NRC's proposed position regarding TU and TVA only? Is Generic Letter 86-10 no longer applicable?

Porosity/Delamination/Stapling. Materials have been received on site at Comanche Peak with air voids and staples, at least 4% of uninstalled conduit section pieces were found to be defective. TU says that it inspects Thermolag materials at Thermal Sciences, Inc., before shipment to Comanche Peak, that material is not shipped to Comanche Peak unless declared "acceptable" by TU's source inspectors. How did this batch get through? How many others have gotten through? And how can the NRC accept fire test results without knowing that material such as this has been part of the "real world" testing at Omega Point Labs?

Ampacity Derating. This is an unresolved issue. The staff has taken the position that this is an aging issue and is long term rather than short term. To CFUR this is all of one piece. If the staff recognizes that ampacity derating

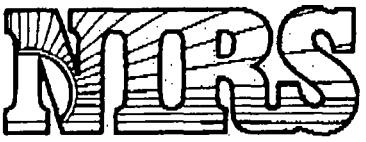
has been in fact "substantially higher" than figures originally reported by TSI and used in the cable sizing calculations at Comanche Peak, causing the power cables to exceed the design temperature rating of the cables, then it must also require that action be taken to correct this potential problem. Allowing TU to add more layers of Thermolag can only increase the ampacity derating and accelerate the time that some type of corrective action will have to be taken. This increases the risk to health and safety, and increases the cost. If accelerated aging is a result, then the cables will have to be replaced prematurely at some point in the life of the plant. How can this be justified by any reliable engineering analysis or cost benefit analysis?

Missed Opportunities. Throughout Chairman Selin's replies to Congressman Dingell, the litany of missed opportunities to address the Thermolag problems focuses time and again on staff's refusal to look closely at the technical issues when they were before their faces. CFUR provided the staff with just such an opportunity in 1989. At that time CFUR was attempting to reopen the licensing hearings on Comanche Peak. One of the issues we raised with the NRC was an incident regarding Thermolag panels which were arriving on site measuring less than the required thicknesses. This incident was exposed after a worker was fired for blowing the whistle on the defective materials. While the NRC addressed the firing of the worker, it refused

to address the overall safety issue of the Thermolag, other than treating the incident as "isolated." The incident is recalled on page 4 of Chairman Selin's opening statement to John Dingell's committee, stating that "after reviewing TU's letter and without further inquiry of TSI or TU, Region IV accepted resolution of the matter and closed the issue."

Had the NRC accepted CFUR's request for hearings, even had those hearings been limited to the Thermolag issue, the crisis faced today may have been avoided or mitigated. Certainly, as CFUR has argued before, the benefit of public hearings on an issue as critical to public safety as a nuclear power plant, can never be underestimated or minimized.

And so today, I ask you again, do not compound the mistakes of the past. Do not license this plant with questions about Thermolag outstanding. Do not license this plant until all the issues are resolved and the standards have met the rigorous test of reviews and public comment. This is what the law requires. You cannot do otherwise.



Nuclear Information and Resource Service
1424 16th Street, N.W., Suite 601, Washington, D.C. 20036 (202) 328-0002

PREPARED STATEMENT OF

MICHAEL MARIOTTE

EXECUTIVE DIRECTOR,

NUCLEAR INFORMATION AND RESOURCE SERVICE

BEFORE THE NRC COMMISSIONERS

MARCH 15, 1993

Thank you for the opportunity to speak here today. As you know, I am Michael Mariotte, executive director of the Nuclear Information and Resource Service (NIRS). NIRS works with about 1,000 local, state and regional environmental groups across the country interested in nuclear power, radioactive waste, radiation, and sustainable energy issues, including several groups interested in the Comanche Peak nuclear facility.

I should note at the outset that I have never understood, and do not understand now, the NRC's penchant for approving full-power licenses for reactors which have not even completed their low-power testing. It seems to me eminently reasonable to await complete results of low-power tests before voting on full-power licenses. Maybe I'm missing something, but I just don't understand the NRC's perceived urgency in this area. Surely the NRC would not advocate placing students in major universities before they had finished high school. Yet, that is essentially what the NRC does by, time and time again, approving full-power licenses before low-power testing is complete. Does the NRC think it is impossible for a reactor to fail a low-power test?

In any case, I have been asked to limit my remarks to the use of Thermo-Lag at Comanche Peak Unit-2.

Although I was not able to attend House Energy Committee Chairman John Dingell's full hearing on Thermo-Lag March 3, I understand that NRC Chairman Ivan Selin said that Comanche Peak Unit-2 would not be allowed to operate with fire watches--apparently meaning that this unit would be required to prove, unlike the 80 or so other reactors now operating with Thermo-Lag, that it has in place effective fire barriers.

If that is the case, then the Commission must vote today to deny Comanche Peak Unit-2 a full-power license.

For, as best as NIRS has been able to determine, Comanche Peak Unit-2 does not meet existing NRC criteria for fire barriers, nor does it meet even proposed NRC criteria for fire barriers.

First, it is absolutely unacceptable for the NRC to consider licensing a reactor which meets proposed criteria. At the Dingell hearing, Chairman Selin assured Rep. Dingell that the proposed criteria--which includes a weakening of existing fire barrier testing methods--would be submitted for public comment.

That has not yet been done. In fact, we do not believe that there is a legal basis for the NRC to qualify a fire barrier material, or overall fire protection scheme, based on proposed criteria. It probably need go without saying that NIRS will vigorously oppose the proposed criteria, at least in so far as they weaken existing fire protection standards. Judging from testimony from the 3-M Corporation--hardly an anti-nuclear outfit--it appears that the proposed criteria will meet opposition from the industry as well.

So how can the NRC say that Comanche Peak-2 can be licensed without fire watches? In truth, it cannot. You cannot have it both ways. Either it meets the existing criteria, or it does not. In fact, it does not.

However, I wish to point out that Comanche Peak-2 does not meet even the proposed criteria. Specifically, the reports we have received from the Comanche Peak-2 tests at Omega Point Laboratories, reports based on NRC submittals to Chairman Dingell, indicate that those tests were not done in accordance with the Commission's proposed testing criteria, much less the existing--and only legally defensible--criteria.

First, the proposed criteria state quite explicitly (page 2, attachment, proposed position, November 19, 1992) "If megger tests are not performed at frequent intervals during the fire exposure, indications of insulation damage in insulation may go undetected. Insulation, when removed from elevated temperatures will reset. Megger testing of insulated cables after the fire endurance test and after the cable has sufficiently cooled may not detect degradation in the insulation resistance. Therefore, wet or dry megger of cables after a fire exposure does not provide reasonable assurance that the cables would have functioned as intended during the fire exposure. To provide reasonable assurance that the cables would have functioned during and after the fire exposure, megger tests need to be performed before the fire test, at multiple time intervals during the fire exposure (i.e., every 20 minutes during the 1-hour fire test and every hour during the 3-hour fire test)...."

It does not appear that Comanche Peak has met these criteria. For example, a November 25, 1992 memo from K. Steven West to Conrad McCracken, describing Comanche Peak test scheme 12-1 (a successful test, according to Comanche Peak SSER 26), states "AUE performed megger tests of the instrumentation cables before the fire exposure and after the hose stream test but did not megger them during the fire exposure. During my visit to OPL of November 3, 1992, Mr. Bhatty informed me that the licensee decided not to perform megger tests of the instrumentation cables during the fire exposure because: (1) the megger tests would require that the circuit integrity circuit be disconnected, which would interrupt the circuit integrity monitoring, (2) OPL would not allow megger testing of cables while its data acquisition system was connected to the cable thermocouples, and (3) the cables will be at or near their maximum temperatures immediately following the hose stream test. The licensee believes that the worst case insulation resistance values would exist at the end of the test, when the cables are at their maximum temperatures, rather than midway through the test."

This is in obvious direct contradiction to the NRC's position, and is, in itself, a violation of the proposed criteria, and is evidence that Comanche Peak-2 does not have an approved fire barrier. I could not find any indication in the Comanche Peak SSER that this issue has been addressed.

I also note that during this "successful" test, the thermocouples exhibited "erratic" behavior with most of them displaying "unbelievable readings." The only thing unbelievable is that this was considered a successful test. In addition, according to the memo, "the Thermo-Lag material began to burn about 2 minutes into the fire exposure and continued to burn throughout the fire test." This is obviously evidence of combustibility, another violation of proposed criteria and a violation of Comanche Peak's own acceptance criteria.

Texas Utilities, in its undue haste to obtain an operating license, has not had time to test all configurations of its "enhanced" Thermo-Lag (nor, probably, does it want to spend the money

for all that testing). But I was astonished to read, on page 9-20 of Comanche Peak SSER 26, "the applicant documented about 180 cases where the application of Thermo-Lag fire barrier materials used to protect electrical raceways and structural steel deviated from the tested configurations." (emphasis added) The NRC decided to "sample" six of these. Three of these six areas could not pass without additional compensatory measures, and probably have not yet been fully qualified. Does this 50% "success rate" suggest that there may be some 87 other areas in the plant which cannot be qualified--and for which compensatory measures are not in place? It is precisely this type of regulation by audit that got the NRC in trouble over Thermo-Lag in the first place. Can you not learn from your mistakes?

Thermo-Lag cannot meet seismic qualifications required under 10 CFR 100, Appendix A, because it has never been tested. I honestly don't know if this is a big deal for Comanche Peak. Texas doesn't seem to me to be a very major area for earthquakes; on the other hand, I don't fully understand the complexity and breadth of the New Madrid fault and whether it is capable of reaching into the Comanche Peak area.

In our various petitions to the NRC, NIRS argued that, in an earthquake, Thermo-Lag could break off into large chunks and shear cables and support trays. In its response of February 1, 1993, the NRC staff attempted, in denying our petitions, to alleviate this concern by admitting that seismic testing has never been performed for Thermo-Lag, but stating that a computer analysis--done by a consultant to Thermal Science Inc. (and we all know how well TSI-initiated testing has been performed), indicates that this concern is misplaced. Instead of breaking into large chunks, according to the NRC staff, "it is the NRC staff's judgment...that preformed Thermo-Lag panels are not likely to get detached from cable trays or conduits during an SSE [safe shutdown earthquake]. The material, however may crack or crumble into powdery material or small fragments under an SSE" (emphasis added). Frankly, we do not feel relieved. Perhaps we were wrong. Perhaps this material will not sever cables during an earthquake. But if it crumbles into a powder it sure won't be there to protect against an earthquake-initiated fire! And, as we all know, fire is the greatest threat from an earthquake. Other materials have been tested, and should be able to withstand most earthquakes.

Now, in the SSER, we learn that Texas Utilities has performed additional "calculations" for seismic qualification. If they're so confident about these calculations, why don't they test it?

Another issue. In our petition of September 3, 1992, NIRS presented to the Commissioners results from a test conducted by a nationally-recognized independent laboratory, Southwest Research, that indicated that the combustion of Thermo-Lag produces lethal amounts of hydrogen cyanide gas and other toxic gases. We submitted these test results, although they were marked "Confidential," due to our concern for the utility personnel conducting hourly fire watches ordered by the NRC to compensate for Thermo-Lag's shortcomings. (We have since received approval from the test's sponsor, Promatec, Inc., to make the tests and results public).

The NRC Commissioners have never responded to our submittal of these test results. The NRC staff has simply stated that its own tests, conducted at NIST, indicate that the combustion of Thermo-Lag is no more toxic than the burning of a Douglas Fir. We honestly do not know how toxic burning a Douglas Fir might be. We do know, however, that we submitted these test results in all seriousness, and that we are highly disappointed in the staff's response.

These test results, if true, mean that the lives of the hourly fire watch personnel are in considerable danger if they happen to come across a fire in which Thermo-Lag is already burning. Given that the NRC's best test results indicate that the material catches fire within two minutes, we believe this is a valid concern.

However, we are not prepared to argue that the NRC's NIST results are invalid. Instead, we have asked, and have received no answer for the NRC's explanation for the discrepancy of the Southwest Research Labs results versus the NIST results. Was one of the tests poorly conducted? If so, which one? We note that Southwest Research did two tests, both with similar results.

We have considered this issue for months, and can come up with only three logical explanations. First, one of the tests is faulty. Which one, and what were the faults? Second, and a far more disturbing possibility: the labs tested different materials. This would mean that at some point in the past six years, TSI--without informing anyone--has changed the composition of Thermo-Lag. Thus, the material in Comanche Peak-2 would not be the same as the material in other nuclear power plants. If TSI changed the composition of the material without informing anyone, then the NRC has a far more serious problem on its hands than the possibility of an ineffective fire barrier. Third, perhaps equally disturbing, quality control at Thermal Science is so poor that different sheets offered for testing are of radically different composition, so that one sheet may emit toxic fumes while another might not. Again, this would be a serious problem. We believe this issue, and the toxicity issue generally, must be resolved before licensing of Comanche Peak-2 can proceed.

Under the proposed fire barrier criteria, Thermo-Lag fails in numerous ways: megger tests, seismic criteria, combustibility, and, perhaps, toxicity--although the latter is admittedly more of a concern for fire watch personnel than fire-fighting personnel, who, hopefully, would be equipped with respirators and other protective gear.

However, the proposed criteria do not yet exist, and cannot be used to license a reactor. We have serious legal problems with this concept. If proposed criteria can be used for licensing purposes, then of what purpose is public comment? This is quite similar to NIRS' recently filed suit against you over your Part 52 rules adopted without public comment. Licensing Comanche Peak-2 using proposed criteria never submitted for public comment is substantively the same issue. What difference does it make if you never take public comment, or if you use criteria, regulations, etc. before accepting public comment? In either case, the public comment obviously has had no impact; the NRC seems intent on doing whatever it feels like and the public be damned.

Clearly, the Thermo-Lag installations at Comanche Peak-2 do not meet existing fire barrier criteria. Specifically, they cannot pass a full hose stream test. All of you heard Richard Licht of the 3-M Company explain that the hose stream test is not meant to replicate fire-fighting conditions. Instead it is intended to represent a variety of circumstances, including aging, erosion, etc. In other words, there are important reasons for using a full hose stream test.

What you are proposing to do with these proposed criteria is substitute your own, inexpert,

judgement for that of nationally-recognized testing agencies, such as ASTM. And the only possible beneficiary of this reduction in test standards is Thermal Science, Inc. Other fire barrier materials, can, and have, passed a full hose-stream test. Your support for the proposed criteria is all the more remarkable since, if there was ever a situation that called for a conservative margin of error, it is in nuclear power plants--for which the NRC's own safety studies indicate that up to 50% of the risk of core melt is caused by fire.

We find it even more galling that the Commission appears willing to accept "enhanced" installations of Thermo-Lag as acceptable fire barriers. In this case, the Commission appears willing to reward Thermal Science, which, either incompetently or deliberately (and a federal grand jury is investigating this), understated ampacity derating figures and gained a tremendous competitive advantage. Now the NRC proposes to reward the company by allowing it to sell two, three, perhaps five times as much of its material to "enhance" its original faulty configurations.

I don't personally believe that any NRC Commissioner has any particular interest in Thermal Science. Thus, I cannot for the life of me understand why you would go to such great lengths to prop up this company, which, at best, has not served the NRC or the nuclear industry well. What is going on here?

Speaking of ampacity derating, it was admitted at the Dingell hearing that no tests have been done on the "enhanced" versions of Thermo-Lag at Comanche Peak-2 to determine the effect of the enhancements on ampacity derating. 15% or more of the Thermo-Lag wrapped cables at Comanche Peak-2 could be affected by this issue. And, of course, these are the critical power cables. It is logical to assume that the "enhancements" will actually further devalue ampacity derating numbers. Considering that the NRC has stated that it will soon issue a Generic Letter on the ampacity derating issue, it seems premature at best to approve an operating license based on faulty or unknown ampacity derating criteria.

To sum up, use of the proposed fire barrier criteria would subject you to potential legal problems and, unless public comment is something to be merely mocked, these criteria may yet change. Thermo-Lag, as installed at Comanche Peak-2, and probably everywhere else, does not meet even the proposed criteria. It certainly does not meet existing criteria. Nor does it meet combustibility criteria or seismic criteria. Finally, it does not meet any conceivable ampacity derating criteria.

I am not naive enough to think that you ultimately will vote against the licensing of Comanche Peak-2. Indeed, the Louisiana group Citizens Against Nuclear Trash--in deciding whether to pursue an intervention against the proposed Louisiana Energy Services uranium enrichment plant--researched the issue and found that the NRC has never denied a license to any applicant--of any kind--patient enough to go fully through the licensing process.

But I am prepared to take you at your word that you will not allow the licensing of Comanche Peak-2 in the absence of effective and proven fire barriers. If that is indeed the case, for the reasons above then you must either delay your vote, or, if you must vote today, you must vote no. If you wish to instead license the plant with fire watches in place, I am prepared to address that issue as well.

I don't understand what the rush is to license Comanche Peak-2. The lights in North Texas are not about to dim. Why not take the extra time, conduct the extra tests, if necessary remove and replace the Thermo-Lag, to ensure that the plant meets your own requirements. Comanche Peak-2 already has been substantially delayed--delays that reflected its own incompetence and inadequate management. Now they want you to make up for their years of problems by rushing through with a vote before they're ready. And Texas Utilities certainly cannot say it was unaware of the Thermo-Lag issue. In 1989, when one of their own employees tried to warn the utility that the material wasn't any good, rather than investigate and find a better quality product, they fired the employee. And they've been covering up ever since.

When we filed a petition with you last August demanding a "stop work" order on the installation of Thermo-Lag at Comanche Peak-2, the NRC replied that the installation was being undertaken "at the applicant's risk that the Thermo-Lag will be found to not satisfy its performance requirements." We replied that "the risk is shared by most of north Texas." That remains the case today, for, as we have outlined, Thermo-Lag doesn't, and probably can't, meet performance requirements. Yet when it comes down to the choice of financial risk to the utility versus safety risk to the public, the NRC--as you will prove today--will vote for the utility every time.

Again, I thank you for your efforts in recent months to increase public participation in NRC activities, and especially NIRS participation. Using proposed criteria before public comment--after stating under oath that public comment will be received--is, however, not very reflective of a commitment to actual public input. For public participation to be meaningful, it must, at least sometimes, change your minds. It cannot be used merely to ratify previously determined decisions, or as a sop to deflect public anger (i.e. well, we took public comment, but we were right all along...). That would be a cynical abuse of the public, not genuine public participation.

In the meantime, I restate my offer made to Chairman Selin to use the NIRS network to encourage greater public participation in NRC activities. We need only minimum concessions--primarily NRC documents and data made available in easy-to disseminate electronic form. If you honestly want increased public participation, we're prepared to help you.

In the case of Thermo-Lag, we just don't understand why you can't admit it--the stuff doesn't work and it has to come out. We're not looking for NRC heads to roll, or to cast blame here and there. We don't care about that. What we care about is that nuclear power plants operate according to the regulations. Sometimes we fight you over what the regulations should be, but we believe that you will uphold the regulations you have adopted. In this case, you are not doing so, and we can't understand it. Let's take this material, and its lengthy and increasingly infamous history, out of our nuclear plants, and move on to the next issue. You can, should, and must start today.

You would be sending a message that you take your regulations, not with a nod and a wink, but seriously. I firmly believe that the nuclear industry would respond, while perhaps grumbling at first, positively and decisively. They're waiting for you to make the move, and this is where you can make it. Thank you.

PRESENTATION TO NRC COMMISSIONERS

by Owen L. Thero, President
of Quality Technology Company,
and CASE Consultant

on behalf of
CASE (Citizens Association for Sound Energy)
1426 S. Polk Dallas, Texas 75224
(Mrs.) Juanita Ellis, President
214/946-9446

at Commission Briefing on

Tuesday, March 16, 1993

on granting of Full-Power Operating License

Comanche Peak Steam Electric Station (CPSES)

Unit 2, Docket No. 50-446

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on granting of Full-Power Operating License
for Comanche Peak Steam Electric Station (CPSES)
Unit 2, Docket No. 50-446

My name is Owen L. Thero. I am President of Quality Technology Company, and since late 1988 I have been a Consultant to CASE (Citizens Association for Sound Energy).

CASE and I appreciate this opportunity to address the Commission on its consideration for granting of a full-power operating license for Unit 2 of Comanche Peak Steam Electric Station, Docket No. 50-446.

As the Commissioners know, CASE has been actively involved in monitoring the safety of the Comanche Peak nuclear power plant since 1974, in front of the Texas Public Utility Commission, the NRC Atomic Safety & Licensing Boards, the NRC Staff, and in other public informational forums (such as public speaking), and most recently monitoring the plant under the Joint Stipulation and as a member of the Comanche Peak Operations Review Committee (ORC).

For all that has happened during all these years, CASE's position today on the Comanche Peak plant, from one aspect, is not very much changed from what it was in 1974, in that we are concerned that Comanche Peak as an operating nuclear power plant has the potential for posing a danger to public health and safety which requires the most prudent management and safety-conscious operation humanly possible -- and it must be treated accordingly. During the licensing proceedings, CASE tried to help assure that the plant would either operate safely or not at all. Once Unit 1 of the plant went into operation, we have tried especially hard to provide constructive criticism which will help assure that the plant will operate as safely as possible. It was never our desire to be in the position of having to say, "We told you so."

Since 1974, both CASE and TU Electric have learned a great deal about how to build a nuclear power plant. Through the years, CASE has been among TU Electric's most vocal critics when we believed it was warranted. However, CASE's primary goal has been to ferret out the truth about Comanche

Peak -- whatever that truth turned out to be -- and to document and present the facts as we found them to better inform the public, including the regulatory authorities, so that the public health and safety and the environment/ecosystem could best be protected. In all fairness to TU Electric, since the 1982-1983 time frame up to the time of licensing of Unit 1 when CASE came before the Commission, we believe they made tremendous strides in correcting major design and hardware deficiencies at the plant, and even more significant progress in developing a management that was able to acknowledge that those problems existed and needed to be corrected.

CASE is pleased to advise the Commission today that we have seen still more significant progress recently on the part of TU Electric management regarding their increased efforts to develop a root cause analysis program, which is essential to a successful corrective action program which precludes the recurrence of significant conditions adverse to quality. As the Commission is aware, CASE's concerns for the eight months or so prior to full power licensing of Unit 1 led us to strongly urge and request the imposition of a licensing condition on TU Electric in order to more fully assure a disciplined accountable approach to resolving operational incidents (see CASE's February 6, 1990, request to the Commission pursuant to 10 CFR 2.206 and paragraph B.7 of the Joint Stipulation). Although the NRC Staff denied that request on February 8, 1990, and the Commission declined review, it remained CASE's firm belief that TU Electric and the public would be better served if a formal root cause analysis program, including both front-end analysis and evaluation of incidents, had been imposed as a condition of TU Electric's license for Unit 1.

As CASE stated at the Unit 1 Commission briefing on April 16, 1990, because of the unique history of Comanche Peak and the utility's past inability to put into place an effective working process to properly implement 10 CFR Part 50, Appendix B, Criterion XVI, CASE believed it was essential for formalization of, and written commitment to, a root cause analysis program as a condition of licensing. CASE believed that such a requirement was critical to Comanche Peak because of over a decade of management infected by a "problem denial syndrome," the high cost of accountability, and the impossibility of the NRC Staff's providing constant vigilance -- in particular since Comanche Peak was at that time being shifted back to oversight by NRC Region IV.

Although the Commission has not asked for CASE's position on whether or not Comanche Peak Unit 2 should receive a full-power operating license, we believe it is appropriate to advise the Commission from CASE's unique perspective of our views at this point in time. As was the case in April 1990, in CASE's view, neither the plant nor TU Electric management is problem-free, and we of course recognize that perfection could never be achieved. Although there still remain some open concerns, which will be discussed later herein, CASE feels much more confident regarding the safety of the Unit 2 physical plant than we did at this same point in time regarding Unit 1.

CASE sincerely wishes that we could guarantee you and the public that Comanche Peak is in fact safe and that it can operate safely for its entire 40-year life. Unfortunately, CASE cannot give you that assurance. Over the past almost five years under the Joint Stipulation, CASE has been able to monitor the completion of Unit 2 to a far greater extent than had been anticipated, and there is absolutely no question that the plant is much different and much safer than at the time of the licensing hearings.

In addition, in CASE's assessment, the current management of Comanche Peak is much more responsive and effective than management has previously been, and is on the right track to achieving understanding and resolution of CASE's specific concerns. However, as we approach the full power licensing of Unit 2 and operation of a two-unit facility which shares some common areas, CASE cannot say with certainty whether or not the plant as it currently exists is capable of operating safely for its lifetime. We acknowledge that the plant is near to passing all of its regulatory hurdles, and the successful completion and enhancement of programmatic and process changes by TU Electric will go a long way toward helping to alleviate many of CASE's concerns.

CASE is very much concerned about its inability (in accordance with the Joint Stipulation) to continue to monitor that implementation. And there remain some nagging matters of concern to CASE, which will be discussed in more detail later herein under "Open Areas of Concern," regarding which the NRC Staff either does not share our concern or believes that the concerns are on track to being adequately addressed and resolved.

Perspective on Joint Stipulation

On June 28, 1988, CASE and TU Electric signed a Settlement Agreement which included as one of its provisions the dismissal of the licensing hearings, and on June 30, 1988, CASE, TU Electric, and the NRC Staff signed a Joint Stipulation, which allowed CASE to continue our work, but in a different forum than the licensing hearings process. For the almost five years since the Atomic Safety & Licensing Board approved the Stipulation and dismissed the licensing hearings on July 13, 1988, CASE has been actively pursuing its rights under the Settlement and the Joint Stipulation. We have continued to aggressively assert all of our rights in a variety of ways and matters. As CASE advised the Commission and the public at the time of full power licensing of Unit 1, CASE's basic role did not change, and we have continued to monitor, within our limited capabilities, issues of concern to CASE and its consultants.

Although CASE did not always get exactly the response we would have liked to from TU Electric, in some instances we actually got more; and in many instances, were able to reach agreement with TU's proposed resolution.

For the most part, in regards to the issues which we have identified as being of concern to CASE, we have been able to make evaluations and assist TU and the NRC Staff in arriving at reasonable resolutions.

It has not always been easy. At times there have been near-breakdowns in the process, yet it has been a continuing learning process on the part of TU, CASE, and at times the NRC Staff to implement the Joint Stipulation. For the most part it has worked -- primarily, we believe, because we have all kept talking until we get things worked out. We did not expect our position to always be accepted; but we did expect the issues to be fairly handled and resolved.

If there is one complaint CASE has had about the process, it would have to be that at times TU appeared more reluctant or slower than CASE would have liked in giving CASE the timely access to the plant and to documents, and at times to technical personnel which we needed to independently assure ourselves that the plant is as safe as possible. On the other hand, much of the time CASE has been able to obtain the documents and information we need, and CASE has monitored such activities as: evaluating the disassembly of the internals of the check valves as it was done: and three CASE monitors onsite observing the hot functional testing for Unit 1. In some instances, TU has gone beyond the letter of the Stipulation: in the spirit of the Settlement Agreement and the Stipulation, TU, for example, allowed CASE Consultant Jack Doyle not just to monitor, but to participate fully in, the training program for root cause analysis by EG&G; TU Electric's presentation and explanations alleviated CASE's concerns regarding the stuck stud issue; and recent face-to-face meetings between CASE and TU Electric personnel who included those accomplished professional individuals who established and work with the TU root cause analysis program at Comanche Peak were especially enlightening (to both TU and CASE) and helpful. CASE is especially pleased with the results of TU Electric's efforts to work with CASE to address and resolve CASE's concerns regarding the root cause analysis program. This is the kind of forthrightness and cooperation on TU's part which helps inspire confidence. Conversely, when it was not forthcoming, it decreased our confidence.

In summary, CASE in fact has in many ways been able to accomplish much more under the Joint Stipulation than had been anticipated, and overall, CASE feels that the monitoring process under which we have been working since mid-July 1988 has been successful in helping to assure that the Comanche Peak plant is much safer than it otherwise would have been.

Observations on Regulatory Oversight

At the time of licensing of Unit 1, CASE acknowledged and thanked the Commission for its assignment of the Technical Review Team (TRT) in 1984 and continuing through the creation of the Office of Special Projects (OSP) in 1987, in response to the concerns raised by CASE and numerous workers to the Commission about the condition of Comanche Peak. We recognized that the commitment of agency resources, personnel, and dollars was substantial. We believed and continue to believe that the effort was absolutely essential and very worthwhile.

As the Commission knows, prior to 1984, there were significant problems with NRC Region IV's oversight of Comanche Peak, and CASE was often Region IV's severest critic. As stated at the time of Unit 1 full power licensing, CASE had some concern regarding the change-over from the NRC's Office of Special Projects (OSP) back to Region IV. Although OSP had not always agreed with CASE's position, OSP had, overall, done a very good job and we appreciate their efforts. CASE's concerns at that time were based on the historical perspective of Region IV's handling of Comanche Peak's regulation, the departure of OSP inspectors who were knowledgeable about Comanche Peak's recent history, and the possibly negative impact this change might have had on the implementation of the CASE/TU/NRC Staff Joint Stipulation. As we stated at that time, CASE approached the transition with an open mind, and we remained cautiously optimistic but eternally vigilant.

An area of CASE concern and disappointment for a while was what CASE perceived to be the NRC Staff's lack of responsiveness regarding TU Electric's corrective action program which, in CASE's assessment, was for a time sending the wrong message to the utility. However, the NRC has recently greatly improved in its regulatory oversight regarding this particular concern, and CASE has developed a considerable amount of confidence both in NRC management (at Region IV and NRC headquarters) and in the NRC inspectors assigned to the Comanche Peak plant.

CASE is pleased to report that, in CASE's assessment, although NRC Region IV personnel do not always agree with CASE, there has been overall great improvement in the approach, attitude, responsiveness, and apparent capability of NRC Region IV personnel from that encountered prior to 1984. CASE acknowledges and appreciates their efforts.

Open Areas of Concern

CASE's open areas of concern result from our involvement in the Joint Stipulation and activities on the site. Although we have not kept exact records of how many issues are resolved, most of the numerous concerns which have been raised by CASE were discussed with TU Electric, and resolved satisfactorily by TU with some form of explanation, documentation, or corrective action, and thus those issues never rose to the level of an open CASE concern or dispute. Where appropriate (e.g., at the request of workers or "whistleblowers") CASE has brought issues to the attention of NRC Region IV for investigation and, hopefully, resolution.

The Joint Stipulation is an active and continuing agreement. Among the numerous issues and concerns raised by CASE over the past almost five years are the following which have continued to this time under the Joint Stipulation:

Root Cause Analysis Program

The implementation of an effective Root Cause Analysis program has long been a major concern and effort of CASE, and one of the more significant programs in which CASE has made a contribution is in TU's ongoing development of a root cause analysis program which will be effective and functioning. CASE Consultant Jack Doyle prepared a root cause evaluation using the Station Service Water System (SSWS) as an example. Mr. Doyle recommended, strongly supported, and assisted in bringing to fruition a respectable root cause analysis program. He also monitored and participated in the intensive week-long training program for root cause analysis by EG&G (and found the program to be excellent); CASE recognizes and greatly appreciates TU Electric's having gone beyond the Joint Stipulation by allowing Mr. Doyle's direct participation.

Mr. Doyle also suggested a front-end analysis which exceeds the requirements of 50.59, including the introduction of a key-word data base. CASE appreciates TU's going to a key word data base; we think it will do a vast amount of good in a number of areas, including 10 CFR 50.59 and 10 CFR 50.70 areas, as well as assisting TU in identifying and resolving unanswered safety questions.

At the time of Unit 1's licensing, CASE stated to the Commissioners:

> "The front-end issues are not completely resolved, although we are generally pleased with the progress of the development of the program that we have seen so far. We are reserving our opinion on implementation: we have little to go on regarding implementation

yet, but in the one example (as part of an audit) of which we do have knowledge, there is some concern.

"CASE has as open issues the front-end analysis process, screening, and implementation of 10 CFR 50.59 and root cause analyses, and again strongly urges that a commitment to an effective and aggressive root cause analysis program be included by the NRC as a licensing condition. . . ." (Emphases added.)

Since the full-power licensing of Unit 1, CASE has continued to monitor the implementation of the root cause analysis program. During that time, CASE became increasingly concerned about what appeared to CASE to be the planned in-process erosion of the influence and effectiveness of the independent aspects of the Quality Assurance program as implemented by TU Electric. This became partially evident to CASE with the project's transition to a total performance-based evaluation of in-process activities, and more recently, by removing the independence of the corrective action program from QA to the line by eliminating the Corrective Action Request (CAR) in preference to the ONE Form and TUE Form programs.

In CASE's assessment, once Criterion XVI of 10 CFR Part 50, Appendix B, "Corrective Action," became the programmatic responsibility of those individuals performing the line functions, with QA assuming a more passive role of monitoring from the periphery and after-the-fact scrutiny, it became the practice of TU Electric to make it the responsibility of the affected line organization/individuals to evaluate their own mistakes/problems and resolve them by implementing the root cause analysis program utilizing the guidance of a very subjective procedure in STA-515. It appeared to CASE that what should be QA functions have now become line functions, with QA relegated primarily to carrying out only one Criterion (XVIII, "Audits") of 10 CFR Part 50, Appendix B, and carrying out this Criterion after the fact.

This apparent erosion and lack of implementation of an effective root cause analysis program prompted CASE to review, in detail, TU Electric's root cause analysis procedure STA-515, resulting in CASE's issuing its September 28, 1992, report entitled "CASE Assessment of Root Cause Analysis Program As Currently Being Implemented at CPSES."

In its review of Procedure STA-515, Revision 2, CASE did not find a system of process control which guides the core of actions utilized by TU Electric to determine root cause evaluations. Rather, CASE found a series of undefined and subjective categories of consequences and probabilities which then established the level of potential risk (and introduced an unspecified category of assumed risk) which in turn determined the extent of resources, scope, and depth of the root cause analysis to be performed.

This manner of root cause/corrective action determination, in CASE's assessment, is far afield from the stated direction in 10 CFR Part 50, Appendix B. Appendix B requires the licensee to develop and implement a program, independent of the line responsible for cost and schedule/ production, to determine the cause of significant conditions adverse to quality and to take corrective action that precludes recurrence.

This requirement, also in CASE's assessment, was never intended to have the subjective determinations made a part of a program (e.g., Procedure STA-515) to resolve significant conditions adverse to quality. That determination was already made during the screening process identified by TU Electric in its response to CASE.

It must again be made extremely clear that a root cause analysis would not even be required if the deficient conditions were not first determined to be classified (by ONE Form/TUE Form/Conditional Release Reports) as a significant condition adverse to quality.

Once a condition had been determined to be significant via the above-mentioned "invoking" procedure, all that should have resulted would have been a piercing root cause analysis without all the subjective and arbitrary tests being performed, any of which could determine if a root cause analysis should even be conducted, or at least the amount of effort to evaluate the condition and its corrective measures.

TU Electric's December 7, 1992, response to CASE declared a philosophy of relying on the decisionmaking ability of its various managers mainly within the affected organization to define the extent of the root cause analysis required. It also allowed the line to set the limits of the corrective measures thought necessary (keeping in mind several prescribed caveats, not the least of which is cost) to eliminate recurrence which could affect or be a risk to the health and safety of the public.

In its concluding response to CASE in its 12/7/92 letter, TU Electric stated, in part, that it:

> ". . .. believes that this letter and the accompanying Response, address CASE's concerns and demonstrate that a comprehensive root cause analysis program is in place and operable at CPSES." (Emphasis added.)

After very careful studying and analysis of TU Electric's December 7, 1992, response, it was CASE's assessment that TU Electric's root cause analysis program was neither comprehensive nor functioning as an effective process to adequately identify the cause(s) of, or to prevent recurrence of, significant conditions adverse to quality. CASE had never withdrawn its request for a licensing condition for Unit 1, and we anticipated that we would similarly ask for a licensing condition

for Unit 2 regarding the root cause analysis program (and we so advised both the NRC and TU Electric).

TU Electric had developed a root cause analysis program around Procedure STA-515 which, by their own admission, required subjective interpretation. CASE maintained that so much of Procedure STA-515 requires subjective decisions that the subjectivity not only guided the root cause analysis program but could interfere with (and, in CASE's assessment, in some instances had already interfered with) TU Electric's ability to perform adequate implementation of the root cause analysis program. TU Electric also claimed that any problems with their program are isolated, and further that the undefined or subjective calls were purposeful in order to allow "conservative" interpretation/implementation. TU Electric argued that cost analysis is essential in order for the analyst to make root cause/corrective action decisions. CASE disagreed.

TU Electric had, in CASE's assessment, incorporated loopholes into root cause analysis Procedure STA-515 as required management decisions (more subjective and biased interpretation). CASE maintained that a procedure cannot be both subjective and comprehensive unless the subjectivity is part of a strong and proceduralized/defined controlled process and unless there is verifiable objective evidence that those making subjective decisions have the capacity to do so. This caveat had not been demonstrated either by procedure or results.

A meeting was held between CASE and TU Electric root cause analysis personnel on January 19, 1993, in an attempt by TU to more fully understand CASE's concerns. During that meeting, in addition to more specific details, what CASE told TU, in effect, was:

> **What we are telling you, TU, is that — no matter how well intentioned your root cause analysis program was, no matter how it was supposed to work, no matter how hopeful CASE and CASE Consultant Jack Doyle were in 1990 that it would work properly, no matter whether or not CASE or CASE Consultant Jack Doyle or the NRC or anybody else reviewed, participated in the formation of, and/or approved it -- *your root cause analysis program as it exists today is not working*, and *in CASE's assessment it is not adequate to achieve the ultimate goal of developing and implementing an effective corrective action program which is capable of protecting the public health and safety, the environment, and the ecosystem.***

CASE had attempted to ascertain *why* the corrective action program and the root cause analysis program was not fulfilling its intended purpose. And CASE had specific and documented concerns about specific portions of both the root cause analysis procedure and the root cause analysis process. It was CASE's strong belief that it is essential for

TU Electric to recognize and correct any problems with the process and programs, rather than simply relying on past decisions which, although they may have appeared to make good sense at the time, had now proven to be ineffective.

In a January 29, 1993, letter to CASE (LIT-93/1263), TU Electric provided the following regarding the results of the meeting on 1/19/93 and advised CASE, in part (see TU letter, ATTACHMENT A hereto):

> "As George Edgar discussed with you on January 27, 1993, TU Electric/CPSES Management has reconsidered its process for root cause determination, and the related processes and controls for formulating, implementing, and assessing the effectiveness of corrective actions for such root causes. TU Electric/CPSES Management believes that the following changes in those processes and controls will improve both quality and efficiency:
>
> - ". The Nuclear Overview Department (NOD) will be assigned responsibility for root cause determinations on Plant Incident Reports (PIRs).
> - ". The responsible line organization will determine corrective actions (during the process of formulating corrective actions, the responsible line manager will consider the NOD as a resource.)
> - ". The NOD group performing the root cause determination will review the responsible line organization's corrective action to assure congruence with the root causes.
>
> "The procedures, training, management attention, and organizational realignments that are necessary to translate the concept outlined above into an effective, workable process will take months, as opposed to weeks. The changes and any transition will be undertaken deliberately so that potential quality and efficiency improvements are not defeated. No firm estimates of time for implementation have yet been established. . . ."

TU Electric's actions and response alleviated and resolved one of CASE's primary concerns with the root cause analysis program.

An additional meeting was held between CASE and TU Electric root cause analysis personnel on February 22, 1993, to discuss the items which CASE still considered open after receipt of TU Electric's 1/29/93 letter. During that meeting, additional major progress was made, and in a March 8, 1993, letter to CASE (LIT-93/1264), TU Electric provided its understanding of the results of the meetings on 1/19/93 and 2/22/93 and advised CASE, in part (see TU letter, ATTACHMENT B hereto):

"As a result of our meeting on January 19, 1993, and a subsequent telephone conversation between you and George Edgar, representatives of TU Electric agreed to discuss the following items with their management:

"A. For Plant Incident Reports (PIRs)

"1. Provide initial STA-515 treatment of at least a Category 3 Analyst.
"2. Provide some form of RCA unless facts at any point in the process indicate the item is an obvious Category 4 and/or a PIR was not required.
"3. Downgrade to a Category 4 and/or Non-PIR only after completing Items 1 & 2 above with the concurrence of the ONE Form Committee.

"B. Include in STA-515 a cross reference to STA-421 and STA-422 to establish STA-515 as an integral part of the Criterion XVI Corrective Action Program.

"C. Establish a timely STA-422 check of corrective action approved by management as compared to the identified root causes to provide reasonable assurance against recurrence.

"D. Assign Nuclear Overview Department (NOD) personnel responsibility for root cause determinations on PIRs

"After the discussion with management, TU Electric agreed to a process for root cause determinations as described in my letter to you dated January 29, 1993 (LIT-93/1263).

"At your request, representatives of TU Electric met again with you and Owen Thero on February 22, 1993 to discuss the items which CASE believed to remain open after agreeing to implement the process change discussed above. This meeting began by summarizing Items A through D above and the following agreements, which were made regarding each of the items:

"Item A It was agreed that STA-422 would be revised to state that PIRs will be a Category 1, 2, or 3. Additionally it was agreed that STA-515 would be revised to state that for PIRs the minimum classification would be a Category 3 with an alternative of returning to the ONE Form Committee.

"Item B TU Electric agreed to revise STA-515 to include STA-421 and STA-422 as a cross-reference.

"Item C This was agreed to as discussed in my letter to you dated January 29, 1993 (LIT-93/1263).

"Item D This was agreed to as discussed in my letter to you dated January 29, 1993 (LIT-93/1263). . . ."

With the proposed changes and enhancements which TU Electric has stated that it will make to the root cause analysis program -- assuming that they are implemented properly as envisioned -- the major concerns which CASE has with the program itself will be resolved, and we do not plan to further pursue those remaining, which are of much lesser importance. As stated previously, however, the implementation of recent proposed changes to the root cause analysis process has not yet been fully undertaken or completed, and CASE will, for the most part, be unable to monitor that implementation. CASE strongly urges that the NRC Staff continue to monitor such implementation. Further, CASE suggests that the NRC Headquarters Staff closely review and monitor Comanche Peak's root cause analysis program for use as a possible model for other nuclear power plants.

Other open issues of concern were detailed in the February 6, 1990, CASE 2.206 petition which was filed regarding the Unit 1 full-power license. Although most of the issues in the 2.206 petition have now been resolved, others remain open, specifically:

Harassment and Intimidation

CASE has been concerned for many years with harassment and intimidation of workers at the Comanche Peak plant. Even today, CASE is not satisfied that TU Electric has a full understanding of harassment and intimidation issues or an adequate response mechanism to them; nor, in CASE's assessment, is the NRC Staff's response mechanism adequate to either identify or resolve harassment and intimidation issues.

Thermo-Lag and Borg-Warner Check Valves

At the time of Unit 1's licensing, CASE also had open concerns about Thermo-lag and Borg-Warner Check Valves, and aspects of these concerns remain today. CASE will make additional comments regarding Thermo-lag issues, as appropriate, at the time of our presentation to the Commissioners.

TU Electric has taken the position that, contrary to CASE's assertions, the root cause/corrective action program is adequately implemented and CASE should not have expected that, since ". . . the concerns that arose earlier with Thermo-Lag and Borg-Warner check valves were quite

different than today's concerns . . ." and that ". . . the root cause analysis program did not give rise to the more recent concerns, . . ."

CASE agrees that the root cause analysis program did not cause the recent problems; however, bad parts coupled with bad controls did. Those same bad parts (i.e., the lack of both the Thermo-Lag and Check Valve vendors and TU Electric to either provide or install products which met the design and performance standards and regulatory requirements) and controls were a problem prior to, during, and subsequent to Unit 1 fuel load/operation and remain a problem today.

CASE is not so much concerned with TU Electric's technical ability or desire to fix problems as they surface (e.g., Thermo-Lag, Check Valves, Rosemount Fittings, Temporary Modifications) as that TU Electric isolates each specific event to a fault; this, in CASE's assessment, prevents the in-depth root cause analysis and forward-looking corrective measures which are necessary in order to preclude recurrence. The concept of "string-pulling," in CASE's assessment, is not yet the framework of TU Electric's root cause analysis/corrective action program.

Maybe TU Electric can justify that it was perfectly acceptable, if not even expected, that the series of technical and programmatic problems in Unit 1 prior to fuel load and currently being dealt with could not have been anticipated or identified by a comprehensive root cause analysis investigation, but CASE certainly expected it. More importantly, it is essential to assuring the health and safety of the public.

CASE rejects TU Electric's apparent position that there should be little or no objection to, and no causal linkage between, the bad parts and bad controls of old, and the current bad parts and bad controls. This scenario, as presented by TU Electric, appears to CASE to be an attempt to convince that this is simply the price one has to pay for high-tech projects. CASE disagrees.

At the time of Unit 1's licensing, CASE had also raised (among others) the following issues and concerns, some of which had risen to the formal dispute level, applicable to Unit 1:

Reactor Coolant System (RCS) Cold Hydrostatic Test (dispute, closed):

Although this dispute has been closed, it remains CASE's position after extensive review of the record compiled by TU Electric in 1982, regarding the Reactor Coolant System Cold Hydrostatic test, that TU Electric failed to comply with the ASME Section III construction requirements as well as the requirements mandated by 10 CFR Part 50, Appendix B.

CASE continues to maintain that the test, as conducted, did not fulfill the final construction milestone (Reactor Coolant System Cold Hydrostatic test) required in order to prove the integrity of the system to function in the "cold" test configuration and that from a QA/QC perspective no other substitute test can adequately fulfill that requirement, although the VT-2 additional test performed did give some added assurances and was successfully completed from an engineering perspective.

Although the NRC accepted TU Electric's original test, along with the VT-2 test results, with which CASE Consultant Jack Doyle agreed, other CASE personnel continued -- and still continue -- to have concerns about the integrity of the cold hydro test. (See 8/18/89 letter and enclosure to CASE and TU Electric from Christopher I. Grimes, Director, Comanche Peak Project Division, Office of Nuclear Reactor Regulation, in response to the 1982 Cold Hydrostatic Test dispute between CASE and TU Electric.)

A more positive development, however, is that TU Electric utilized the lessons learned regarding the Unit 1 Cold Hydrostatic Test issues to good advantage in its testing of Unit 2. For example, in NRC Inspection Report 50-445/92-08, 50-446/92-08 (cover letter dated April 23, 1992), regarding an inspection conducted February 2 through March 21, 1992, the NRC Staff stated, in part:

> ". . . the coordination and communication among the various departments (construction, engineering, quality control, startup, and operations) were excellent during the performance of various observed testing activities. The performance of the ASME quality control inspectors during the secondary and reactor coolant system hydrostatic tests was also excellent. . . ."

And, in NRC Inspection Report 50-445/92-38, 50-446/92-38, (cover letter dated November 10, 1992), regarding an inspection conducted September 9 through October 22, 1992, the NRC Staff stated, in part:

> ". . . Areas Inspected (Unit 2): Routine, announced inspection of preoperational test program requirements, procedures, implementation, and result evaluations; and quality assurance audits. During the inspection, inspectors also witnessed various activities associated with the containment structural integrity and containment integrated leak rate tests. . . .
>
> "Results: . . .
>
> "* The licensee's results evaluation and data package for Preoperational Test Procedure 2CP-PT-SS-01, 'Reactor Coolant System Cold Hydrostatic Test,' were satisfactory. The

administrative controls for the review and approval of the test were a strength (paragraph 9.2). . . .

"9 **REACTOR COOLANT SYSTEM HYDROSTATIC TEST - PREOPERATIONAL TEST RESULTS EVALUATION (70562)**

"In this area of the inspection, the inspectors evaluated a preoperational test procedure for the reactor coolant system hydrostatic test. In particular, the inspectors reviewed the procedure for technical and administrative adequacy and consistency with regulatory requirements, guidance, and licensee commitments. . . .

"9.2 Conclusions

"The reactor coolant system hydrostatic test results were evaluated and found satisfactory regarding the system test boundary, the water quality for the test medium, the minimum test temperature for nil ductility protection, the minimum and maximum test pressures, the duration of the test, and the post-test calibration of pressure gauges. The administrative controls pertaining to review and approval of the preoperational test were a strength."

Scaling Calculation Program (dispute, closed):

The Scaling Calculation Dispute between CASE and TU Electric was active at the time of Unit 1's licensing (now closed), the subject of which originally arose in November 1987 and was not resolved for over three years. In CASE's assessment, TU Electric's failure to establish a comprehensive scaling calculation and documentation review program resulted in incorrect top-level engineering governing design basis documents which had impacted the field calibration status of various instrumentation and control system devices that could have resulted in the improper operation of the plant; both the NRC Staff and TU Electric disagreed with CASE's assessment of the importance of this issue. In any event, however, problems with an inadequate documentation review program continued to plague TU Electric.

A more positive development, however (as was the case with the cold hydro test issue) is that TU Electric exhibited the ability to learn and improve. In the specific area of TU Electric's scaling calculation program, the NRC Staff configuration management inspection team in late 1991 recognized TU Electric's scaling calculation program as a strength following TU's implementation of corrective actions after the Scaling Calculation Dispute.

Temporary Modifications

A continuing concern of CASE has been the lack of responsiveness by TU to resolve identified concerns dealing with temporary modifications which were brought forward by CASE and to CASE by workers at the plant. This was one of the concerns contained in CASE's 2.206 petition at the time of Unit 1 licensing and remains a concern today.

An example of the fallacy of the recent change in approach by the utility is exemplified by the temporary modification (temp mod) issue. At a January 1993 NRC exit which CASE was not allowed to attend (because this right under the Joint Stipulation expired January 1, 1993), the NRC apparently found some problems with temporary modifications resulting in a Notice of Violation to TU Electric regarding this issue. At the January 15, 1993, NRC public meeting regarding temporary modifications, although the utility admitted that there were some instances when they did not handle the issue as well as they might, they used as an excuse for not implementing the kinds of controls they might have, that it was because it was kind of a mundane, benign process, going in and just putting in things to aid during construction, tests, or operation.

CASE disagrees emphatically with TU Electric's position regarding the temporary modifications issue. In CASE's assessment, 10 CFR Part 50, Appendix B, Criterion III, Design Control, clearly should have always been applied to temporary modifications (which also have the potential of becoming permanent in some instances) as well as to permanent modifications. It is CASE's position that all of the internal and external interface controls mandated by 10 CFR Part 50, Appendix B, Criterion III, Design Control, apply for temporary modifications just as they do for permanent design modifications. There is no waiver of which CASE is aware which would allow the utility -- or the NRC -- to ignore changes to the design, whether temporary or permanent, or to waive the implementation of Appendix B controls for any such changes which affect the system performance or procedures. It is especially upsetting to CASE, after all the time, money, and effort which was expended during the operating license proceedings regarding the absolute necessity of applying Appendix B criteria to design, that the issue of temporary modifications has been and continues to be a problem on the very eve of TU Electric's request for an operating license for Unit 2.

Also of concern is the fact that it is only after totally inadequate responses to complaints and now a Notice of Violation from the NRC that TU Electric appears to finally be ready to implement adequate and hopefully lasting corrective action.

CASE is also very much concerned about what appears to be word engineering: the changing of "work control problems" to "status control

problems." It appears to CASE that this is an attempt by the utility to downgrade the importance of the issues which the utility must face. CASE's concern in this regard is heightened by what appears to CASE to be a further lessening and deterioration of the role of Quality Assurance (QA) and therefore a lessening and deterioration of TU Electric's application of the requirements of 10 CFR Part 50, Appendix B; this is exemplified by the formation of the "Overview Group" (which utilizes a "QAD" form, which is separate from deficiency paper utilized by the project, rather than a CAR form, and utilizes it only as the Overview Group's own internal mechanism to alert management to problems as viewed by the Overview Group). It is CASE's understanding that the QA program now basically is limited to audits; however, audits are only one Criterion (XVIII) of 10 CFR Part 50, Appendix B. It is also CASE's understanding that the QA Group is now considered to be a facet of the Overview Group -- rather than the QA Group and the QA program being the backbone and primary mechanism for the carrying out of the requirements of 10 CFR Part 50, Appendix B. In CASE's assessment, this is a sign of lack of commitment by the utility to abide by and implement all of the tenets of Appendix B.

There has been, from CASE's perspective, a change in the philosophy and direction of the CPSES project management to focus on the technical aspects of the FSAR/Technical Specification requirements rather than strong management to 10 CFR Part 50, Appendix B, to assure compliance with the technical requirements of the FSAR/Technical Specifications. CASE disagrees emphatically with this TU Electric current philosophy and direction.

It became obvious to CASE that this lessening of in-process programmatic controls involving the corrective action program outside of the independent administration of the QA organization, was being emphasized by a series of what CASE considered to be shallow and ineffective root cause analyses culminating in the project's being plagued by a series of repetitive hardware and programmatic problems.

SAFETEAM and Corporate Security Programs

One item of continuing concern to CASE has been the TU Electric SAFETEAM and Corporate Security programs' apparent inability to adequately process worker concerns on plant safety as well as harassment and intimidation. Both TU Electric and the NRC Staff have been made aware of many of our specific concerns as they develop. After CASE's analysis of this matter had been sufficiently completed, CASE advised TU Electric and the NRC Staff of our specific concerns on this subject.

In addition, CASE has the following more general concerns:

Radiological Work Control

CASE has become increasingly concerned regarding radiological work control practices when interfacing with external work groups performing safety-related tasks. We first became alarmed with this lack of work control which resulted in the wrong unit/wrong valve incident in March 1992, and others which followed even though TU Electric took what they considered to be adequate corrective action. It should be noted that the wrong unit/wrong valve incident and others have resulted in NRC Notices of Violation. CASE's position is that the subsequent instances should never have happened had TU invoked the corrective action measures recommended by CASE. We anticipate at least one additional meeting with TU Electric regarding specific aspects of radiological work control (see item C.10, pages 3 and 4, of TU's 3/8/93 letter, ATTACHMENT B hereto), and we remain hopeful that meetings of the minds can take place as successfully as was the case regarding the root cause analysis program.

Work Control

In addition to specific concerns regarding radiological work control at the plant, CASE has an overall concern regarding work control.

Because of the history of problems associated with work control at Comanche Peak during Unit 1's operation and Unit 2's construction, CASE also has a general concern regarding TU Electric's successfully and safely operating and maintaining Comanche Peak as a two-unit plant which has shared common areas. We strongly urge TU Electric to recognize the potential for adverse consequences, pay particular attention to this aspect of operations and maintenance, and continue to try to improve in this regard, and further we urge the NRC Staff to continue to look closely at this.

Open Item Resolution

Over the past two meetings of the Operations Review Committee (ORC), CASE has analyzed the data provided by TU Electric in their plant performance operations reports and presented our analyses to the ORC. It appeared to CASE that there was an undue amount of open items to be resolved which are older than three months without noticeable improvement in working off and completing these items. These work items covered all aspects of work activities (ONE Forms, PIR's, Corrective Maintenance Work Orders, Preventative Maintenance Work Orders, IOER's, Technical Evaluations, etc.). In and of themselves, each separate item's impact on the plant's performance and safety might

not be significant; CASE's concern is that we have no way of knowing whether or not the cumulative effects have the potential for eroding the safety margin.

TU Electric's Switching to an 18-Month Fuel Cycle

CASE is concerned about TU Electric's switching to an 18-month fuel cycle. This is an area regarding which there is simply not enough information to adequately address margin of safety issues, in CASE's assessment; the problems which may be created in the long run may not be as cost effective or safe as the utility currently believes. CASE is concerned that sufficient information is not known at this time to indicate that the benefits (e.g., fewer outages, fewer shipments, and fewer times during which the fuel must be handled) outweigh the problems and potential risks to the public health and safety.

Non-Radiological Hazardous Waste Dumps at Nuclear Power Plant Sites

The NRC needs to be more aware of, and concerned about, having uncontrolled hazardous non-radiological waste dumps at nuclear power plant sites with the potential of adversely impacting the operation of the nuclear plant, in CASE's assessment. This issue was first brought to CASE's attention by an alleger ("whistleblower"), Linda Porter, a former Protective Coatings Foreman at the Comanche Peak plant. CASE still is not satisfied with what has been done to resolve the concerns of the employees who went onsite, accompanied by CASE, and pointed out to TU Electric and the Texas Water Commission specific locations where they either had themselves dumped, or had witnessed, hazardous waste on the grounds of the Comanche Peak nuclear plant site.

Following hearings before the Texas Water Commission, TU Electric was required to excavate and remove what was identified as Landfill 3 and to close and monitor additional onsite landfill locations. In particular, there is no evidence which has been provided to CASE or the allegers that the specific locations identified in areas which at the time were above ground but which allegedly are now under water in Squaw Creek Reservoir have been adequately investigated or removed; the information to CASE from those witnesses is that TU Electric dug in the wrong place. CASE is much less pleased with the way that TU Electric has responded to this particular issue than with other issues to which CASE has brought their attention. Several witnesses brought specific concerns, and many of them went to the site and pointed out specific locations to both TU Electric and the Texas Water Commission; however, there has been no feedback to those individuals about the resolution of their concerns. The NRC left it up to the Texas Water Commission to resolve the issues. And CASE has no independent way to monitor these particular issues.

In addition

Although we are aware of the NRC Staff's position of acceptance on certain issues, CASE still has concerns about several matters, some of which we mention here for the record:

the integrity of the welds, due to the use of the Visual Weld Acceptance Criteria (VWAC) program (i.e., inspecting welds through paint);

the acceptability of welds on the steam generators, secondary side; and

several aspects of the 1982 cold hydrostatic test.

In addition, there are several issues with which CASE will probably never be comfortable which we litigated in the operating license proceedings and lost, which we mention here for the record; these include:

the overexcavation (rock overbreak) of the foundation for the plant; and

the crack in the Unit 1 base mat.

In conclusion:

CASE is very much aware that our time to monitor the plant under the Joint Stipulation is quickly running out, and that our ability to do so lessened considerably when some rights under the Joint Stipulation ran out January 1, 1993. For this reason, for the past several months, CASE has been doing everything within our ability to encourage TU Electric to put into place programs and processes which will work. Generally, whenever CASE has been able to sit down face-to-face with those individuals with TU Electric who are knowledgeable about the specific areas of CASE concerns, and reason together, we have been able to reach solutions which are helpful to everyone and which more fully protect the public health and safety.

It will be up to TU Electric (as it always has been) to fully develop and implement a root cause analysis/corrective action program and process which really works consistently and effectively. And it will be up to the NRC Staff to make certain that such a process is really in place and working. There has been a lot of progress made by TU Electric and by the NRC Staff; however, the implementation of recent proposed changes to the root cause analysis process has not yet been fully undertaken or completed, and CASE will, for the most part, be unable to monitor that implementation.

At this time, CASE's monitoring ability has already been reduced (in accordance with the Joint Stipulation), for the most part to those issues which pertain to CASE's participation on the Operations Review Committee (ORC). TU Electric and CASE are also committed to continuing to attempt to resolve some issues, such as radiological work control, which are still open. It is anticipated, however, that there will be issues remaining open when CASE completes its participation in monitoring the plant under the Joint Stipulation (which expires July 13, 1993), although it is expected that the major concerns will already have been addressed and resolved to the extent possible by that time; because of the very nature of the issues involved in monitoring a nuclear power plant, it is CASE's belief that this would probably always be true. CASE will make certain that both TU Electric and the NRC Staff fully understand what these concerns are.

CASE and I personally appreciate the opportunity to address you today and we look forward, for the relatively short period of time remaining under the Joint Stipulation, to working with the NRC Staff and TU Electric to achieve mutually-shared goals of protecting the public health and safety and the environment/ecosystem.

ATTACHMENTS:

Attachment A - TU Electric's January 29, 1993, letter to CASE (LIT-93/1263)

Attachment B - TU Electric's March 8, 1993, letter to CASE (LIT-93/1264)

Attachment C - Excerpts from CASE's 4/16/90 presentation to NRC Commissioners at time of Unit 1 licensing re: Accomplishments

TU ELECTRIC

Log# LIT-93/1263
File# 10086

January 29, 1993

Juanita Ellis -- via fax
President, CASE
1426 South Polk Street
Dallas, TX 75224

SUBJECT: PROCESS FOR ROOT CAUSE DETERMINATION

Dear Juanita:

As George Edgar discussed with you on January 27, 1993, TU Electric/CPSES Management has reconsidered its process for root cause determination, and the related processes and controls for formulating, implementing, and assessing the effectiveness of corrective actions for such root causes. TU Electric/ CPSES Management believes that the following changes in those processes and controls will improve both quality and efficiency:

- The Nuclear Overview Department (NOD) will be assigned responsibility for root cause determinations on Plant Incident Reports (PIRs).

- The responsible line organization will determine corrective actions (during the process of formulating corrective actions, the responsible line manager will consider the NOD as a resource.)

- The NOD group performing the root cause determination will review the responsible line organization's corrective action to assure congruence with the root causes.

The procedures, training, management attention, and organizational realignments that are necessary to translate the concept outlined above into an effective, workable process will take months, as opposed to weeks. The changes and any transition will be undertaken deliberately so that potential quality and efficiency improvements are not defeated. No firm estimates of time for implementation have yet been established.

Should you have any questions, please let me know.

Sincerely,

Susan Palmer
(LITCB)

Susan S. Palmer E24
Stipulation Manager

SSP:lmb

cc: W. G. Counsil BT-19
R. A. Wooldridge BT-32
O. L. Thero
CCS E06

TUELECTRIC

Log# LIT-93/1264
File# 10086

March 8, 1993

Juanita Ellis
President, CASE
1426 South Polk Street
Dallas, TX 75224

SUBJECT: RESULTS OF ROOT CAUSE ANALYSIS (RCA) MEETINGS JANUARY 19, 1993 AND FEBRUARY 22, 1993

Dear Juanita:

As a result of our meeting on January 19, 1993, and a subsequent telephone conversation between you and George Edgar, representatives of TU Electric agreed to discuss the following items with their management:

A. For Plant Incident Reports (PIRs)

1. Provide initial STA-515 treatment of at least a Category 3 Analyst.
2. Provide some form of RCA unless facts at any point in the process indicate the item is an obvious Category 4 and/or a PIR was not required.
3. Downgrade to a Category 4 and/or Non-PIR only after completing Items 1 & 2 above with the concurrence of the ONE Form Committee.

B. Include in STA-515 a cross reference to STA-421 and STA-422 to establish STA-515 as an integral part of the Criterion XVI Corrective Action Program.

C. Establish a timely STA-422 check of corrective action approved by management as compared to the identified root causes to provide reasonable assurance against recurrence.

D. Assign Nuclear Overview Department (NOD) personnel responsibility for root cause determinations on PIRs

After the discussion with management, TU Electric agreed to a process for root cause determinations as described in my letter to you dated January 29, 1993 (LIT-93/1263).

At your request, representatives of TU Electric met again with you and Owen Thero on February 22, 1993 to discuss the items which CASE believed to remain

COMANCHE PEAK STEAM ELECTRIC STATION
P.O. Box 1002 Glen Rose, Texas 76043-1002

open after agreeing to implement the process change discussed above. This meeting began by summarizing Items A through D above and the following agreements, which were made regarding each of the items:

Item A — It was agreed that STA-422 would be revised to state that PIRs will be a Category 1, 2, or 3. Additionally it was agreed that STA-515 would be revised to state that for PIRs the minimum classification would be a Category 3 with an alternative of returning to the ONE Form Committee.

Item B — TU Electric agreed to revised STA-515 to include STA-421 and STA-422 as a cross-reference.

Item C — This was agreed to as discussed in my letter to you dated January 29, 1993 (LIT-93/1263).

Item D — This was agreed to as discussed in my letter to you dated January 29, 1993 (LIT-93/1263).

Additionally, CASE provided to TU Electric a listing of those CASE Issues which it believed to be closed (Attachment A). In an attempt to close those issues which CASE believed to be open, it was agreed that the most efficient way to proceed was to discuss each section of the cover letter to the TU Electric response on Root Cause Analysis. Conclusions reached regarding each section of the cover letter are summarized below:

A.2 - Closed; however, certain elements associated with the wrong valve/wrong unit incident are covered in section C.10, below.

B.1 - Closed. These issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993.

B.2 - Closed. These issues are resolved with CASE's understanding of the relationship between invoking procedures and implementing procedures.

B.3 - Closed. These issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993 and with the understanding between CASE and TU Electric of the need to minimize subjectivity throughout the root cause process.

C.1 - Closed. These issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993 and by elimination of a Category 4 PIR.

C.2 - Closed. These issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993.

C.3 - Closed. These issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993.

C.4 - Closed. These issues are resolved by discussion and mutual understanding.

C.5 - Closed. These issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993.

C.6 - Closed. These issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993.

C.7 - Closed. These issues are resolved by discussion and mutual understanding.

C.8 - Closed. Although CASE and TU Electric disagree on past history, these issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993.

C.9 - Closed. These issues are resolved with the agreement to implement the revised process for root cause determinations as described in my letter to you dated January 29, 1993; however, CASE cautioned that TU Electric needs to maintain objectivity and NOD needs to maintain scrutiny through trending.

C.10 - Closed. These issues are resolved by agreements on training associated with the interview process and agreements to further discuss remaining issues related to the wrong valve/wrong unit incident with Radiation Protection and Work Control. Mr. Counsil's letter to you dated November 3, 1992 (LIT-92/1242)

discusses TU Electric's position on these issues. TU Electric has reviewed CASE's position and believes a meeting to discuss these issues would be beneficial. I will contact you in a few days to determine a mutually agreeable date to meet.

As a result of the agreements and understandings reached at these meetings CASE informed TU Electric and the Operations Review Committee on February 24, 1993 that all issues associated with Root Cause Analysis were considered by CASE to be closed.

Should you have any questions, please let me know.

Sincerely,

Susan S. Palmer E24
Stipulation Manager

SSP:lmb

ATTACHMENT

cc: W. G. Counsil BT-19
R. A. Wooldridge BT-32
O. L. Thero
CCS

Closed CASE Issue No. Assigned by TU CI	Closed CASE Issue No. Assigned by TU CI
8	84
9	85
	86
11	87
17	88
18	89
19	
	90
24	91
25	92
26	93
27	94
28	95
29	96
	97
33	98
36	99
41	100
42	101
43	102
	103
56	
57	119
60	124
61	125
64	129
65	
66	131
67	134
68	135
69	138
	139
70	
71	140
72	142
73	143
77	144
78	

ATTACHMENT C TO CASE'S 3/16/93 PRESENTATION TO COMMISSIONERS

For the benefit of those of you who are not as familiar with CASE and its work, we repeat here some excerpts from its 4/16/90 presentation to the Commissioners at the time of Unit 1 licensing; figures (such as how many audits CASE has participated in, etc.) have not been updated, but where other changes have been made, they have been so indicated in brackets []:

Accomplishments

It should be noted that the most CASE has ever been able to do (either in or out of the hearings process) is to evaluate samples of the plant's systems, components, documents, and processes. In many cases, before the hearings and after the hearings, the issues of concern to CASE were brought to our attention by concerned workers. The CASE/TU Settlement Agreement and the CASE/TU/NRC Staff Joint Stipulation were designed with that reality in mind, so that CASE could exchange the licensing process for the monitoring process and still continue the same work but in a different forum.

- An important part of CASE's monitoring program is its membership on the Operations Review Committee (ORC), where CASE President Juanita Ellis is a full voting member and Billie Garde is the alternate. [Update: CASE Consultant Owen L. Thero is currently the CASE ORC Alternate.] CASE (including its consultants) has participated fully and actively in activities of the Operations Review Committee, and will continue to do so.

- In her role as an alternate on the Operations Review Committee, Billie Garde, Attorney for CASE, reviewed TU Electric's fitness for duty program and procedures, and recommended programmatic changes which were ultimately adopted which enhanced TU Electric's program beyond regulatory requirements to ensure that the work of potential substance abusers was evaluated for safety impact.

- Pursuant to the CASE/TU agreement, Billie Garde, Attorney for CASE, conducted training in the proper handling by utility management of professional dissent ("whistleblowing") in order to ensure that Comanche Peak's work force feels free to raise safety quality concerns without fear of reprisal. She conducted approximately 25 two-hour sessions to approximately 1300 mid-level and upper utility management personnel. The program was well-received and is now being committed to a formal one-hour training tape which will be used with mid-level management.

- As part of CASE's day-to-day monitoring of Comanche Peak, since July 1988, the CASE personnel have monitored approximately 79 QA onsite audits (over 50%) and have reviewed and evaluated at least 142 audit reports. CASE in some instances has been instrumental in effecting stop work orders (Teflon tape: MIG vs. Stick), CAR's, NCR's, DR's, ONE

Forms, and work orders, as well as identifying deficiencies during the monitoring of audits.

- CASE personnel physically monitored the Hot Functional Test, VT-2 Test, the loading of fuel, installation of the reactor head, replication process used by APTECH on the check valve swing arms, magnetic particle test of the containment liner welds, root cause analysis training, 10 CFR 50.59 training overview provided to the ORC members, and general employee, radwaste, and radiation protection training.

- CASE personnel physically inspected Unit 1's four steam generators, hundreds of emergency lights, fire extinguishers, scaffolds, and numerous component inspections performed by the TU auditors.

- CASE personnel have attended 991 of all NRC public meetings held onsite and numerous NRC public meetings held in Arlington, Texas, and Rockville, Maryland. CASE personnel have also attended and/or participated in various brief ings and discussions with TU and/or NRC Staff.

- CASE has interviewed and processed several alleger concerns, some of which have led to the identification and correction of problems at Comanche Peak, some of which are still under review by TU and/or the NRC Staff, some of which have been confirmed by the NRC Staff in Inspection Reports, some of which have resulted in Notices of Violation and/or Enforcement Action, and some of which have been raised to the level of a CASE dispute under the Joint Stipulation.

- CASE personnel assisted in the presentation and resolution of harassment and intimidation concerns presented to both TU and the NRC, documented in NRC Inspection Report 50-445/90-05, 50-446/90-05, pending enforcement action. CASE believes that the results of this issue have brought to the attention of TU Electric's new management the importance of eradicating harassment and intimidation from the site.

- In addition, the CASE personnel have reviewed and evaluated thousands of NCR's, DR's, CAR's, NRC Inspection Reports, SDAR's, TU correspondence, ORC packages, prerequisite and preoperational test packages, and thousands of pages of documents related to CASE questions and/or concerns.

- CASE has submitted over 300 written requests to TU Electric for documents or service, plus numerous verbal requests.

- CASE has issued major reports and evaluations regarding: Cold Hydrostatic Testing; Sealing Calculation issues: Root Cause Evaluation using the Station Service Water System (SSWS) as an example; analysis of SALP Report.

- CASE personnel also have spent numerous hours reviewing various regulations, codes, standards, and reports (e.g., ASME, ANSI, AWS, EPRI). CASE also reviews numerous documents onsite and receives

numerous documents from TU and the NRC on an automatic ongoing basis. Since the July 1988 CASE/TU Settlement, CASE personnel have reviewed, evaluated, and/or analyzed literally millions of pages of documents.

In addition to the other monitoring done by CASE personnel and consultants, CASE Consultant Jack Doyle has monitored and assisted in the resolution of problems from an engineering perspective in the following areas (which are in no particular sequence or order of importance):

- Evaluated SWEC's analysis of the shield wall associated with the upp er lateral and lower lateral restraints (which had been begun but had not been completed during the licensing hearing process).
- Reviewed and had input into CPPP-7 Revision, on piping and pipe supports, including parametrics.
- Reviewed the issues on the Criner/Meers faults.
- Monitored the NRC/TU investigation into the Striping Cycling and Thermal Stratification (SCATS), which is an international open item.
- Reviewed sections of the FSAR and (to the extent possible) evaluated the technical specifications.
- Monitored the NRC/TU meetings on power ascension for elimination of the 25% plateau.
- Reviewed the CPSES pump and valve in-service program.
- Evaluation of the 1982 hydrostatic test for ASME III.
- Monitored and evaluated the VT-2 test.
- Reviewed the Offsite Dose Calculation Manual (ODCM).
- Evaluated SWEC Report on Kapton (SWEC evaluation of the impact of Kapton at Comanche Peak).
- Evaluated the reports on the evaluation of Bahnson where they did 34,000 reviews of the weld material inspections.
- Evaluated the gouges in the transition areas of the Reactor Coolant Pumps (RCP's) that were smoothed out or machined out.
- Evaluated EFE change of control from SWEC.
- Evaluated AFW back-flow problems. The result of the back-flow probl em failed a strut which led to the evaluation of all strut brackets for angularity clearance.

Excerpts from CASE's 4/16/90 presentation to NRC Commissioners at the time of Unit 1 licensing re: Accomplishments (continued)

- Evaluated quite extensively TU's erosion/corrosion monitoring progra m. Mr. Doyle is pleased with the corrosion monitoring program that TU h as established, particularly in reference to the SWS system, and will continue to monitor implementation.

- Evaluated Advanced Design Change (ADC) program.

- Evaluated longitudinal welding problems with some vendors piping.

- Evaluated SWEC analysis regarding cold springing of pipe where they opened a valve or cut a pipe to replace a valve and it jumped an inch; SWEC did an analysis to determine what the stress levels were.

- Evaluated the impact of 11 calculational errors by SWEC.

- CASE (including its consultants) has participated fully in activities of the Operations Review Committee (ORC) and Mr. Doyle and Ms. Garde participated as representatives of CASE in development of a large portion of the ORC's evaluation of readiness for fuel load (Mode 6 only): Mr. Doyle has made a presentation to the ORC regarding the need for a root cause analysis program: and at least one CASE representative usually participates in plant tours which normally occur prior to ORC scheduled meetings.

- Evaluated Aircom and independent laboratory analysis done for TU of the counterfeit bolt problem. from the evaluation, in conjunction with the fact that the A325 bolts are all pretorqued (which should preclude failure mechanism being present), as far as the information Mr. Doyle has at this time, from his engineering perspective it is a non-problem at Comanche Peak. CASE still has concerns about other aspects of this matter and will continue to monitor the progress of its resolution.