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COMANCHE PEAK MEETING BETWEEN

NUCLEAR REGULATORY COMMISSION STAFF

AND TEXAS UTILITIES

MOTIONS FOR SUMMARY DISPOSITION

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23 August, 1984

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REPORTED BY: Pam Alford, C.S.R.

ORIGINAL

APPEARANCES

Spottswood B. Burwell	NRC
Thomas A. Ippolito	NRC
Richard Vollmer	NRC
Robert Bosnak	NRC
David Terao	NRC
William Horir	Bishop, Liberman, Cook, Purcell & Reynolds
David Wade	TUGCO
Lon Fikar	TUGCO
Robert Iotti	Consultant to TUGCO
Bob Masterson	Consultant to TUGCO
Vic Farrarini	Consultant to TUGCO
Barbara Boltz	CASE
Dr. David Boltz	CASE
John Holt	REA
Bill May	REA

P R O C E E D I N G S

MR. BURWELL: Okay. My name is Spott Burwell. I am the licensing project manager for the Nuclear Regulatory Commission. We are gathered here today for a meeting between the NRC Staff and Texas Utilities to discuss, I believe it's two or three of the Motions for Summary Disposition which Texas Utilities has filed with the board, and I believe these were filed in June or July. The meeting today is open to the public in accordance with our procedure, and there has been a meeting notice issued. I doubt seriously if the parties down here have received it since when I left, why, we were one secretary short and still trying to get the thing in the mail. The meeting notice said that the meeting was open to the public. The meeting notice also stated that there was some possibility that it might be necessary for the members of the staff to go on site with the applicant to look at certain of these pipes and that any members of the public who needed or desired to attend that should make arrangements with the applicant. Now, I am not sure that will be necessary today. In any event, I think we are ready to basically proceed with the first Motion for Summary Disposition, which was a motion filed on June

the 17th. This relates to the applicant's motion for summary disposition regarding stability on pipe supports.

This discussion on this item is a continuation of a discussion held on August the 8th and August the 9th in Bethesda, meeting again between Texas Utilities and the staff. With that, I turn the opening of the discussion over to Mr. Ippolito.

MR. IPPOLITO: As you know, I set up this meeting, and the purpose for me setting up this meeting is that I read the transcripts of the previous meeting, and even though I'm not expert in pipe support design, it was readily apparent to me that we don't seem to be able to converge on the resolutions of two issues. One that Spott just mentioned that I will call stability, and the second issue is generic stiffness, I believe. I felt that both the staff and the applicants have been talking about these two issues for about two or three meetings, and I felt that was enough and that something had to be done. We have present here, I think, the people who could make these things happen. I think that this meeting will conclude with a resolution. And as I perceive the resolution, it's going to be as follows:

One, let me speak -- I'm going to delay any discussion on generic stiffness until Mr. Fair arrives, he is down at the plant right now. I am focusing now only on the issue of stability. As I see the issue, we will resolve it in one of two or possibly three ways. One is let's take the pipe supports in question and fix them in the traditional sense. Two, this is an "or," or provide an analysis -- the applicants to provide an analysis from the responsible design organization. I guess what I mean here is that if Grinnell was the responsible organization, we want it from Grinnell. If Gibbs-Hill was the principal design organization, then we want it from -- okay? And then as you would guess, these analyses must address all of the uncertainties, all of the appropriate uncertainties. And the third option is, and it's an option to you, you could do both.

Now, I believe we're prepared to identify the types of supports that we're talking about, and that will help us focus on what we are talking about. And I guess we leave it up to the applicant in discussion as to how to proceed from that point.

MR. VOLLMER: One element in that would be preceding those options, we would want you to

establish a program and tell us what that program is, too, for you to go out and identify those supports in the plant which would fall under the criteria that we're giving. So it would be your responsibility to go out and identify where they are and what needs to be done either the fixing or the analysis. Okay. Dave, why don't you --

MR. FIKAR: Let me just make some remarks. Tom, you made my opening remark awhile ago.

Obviously, we have been at this a long time. We started filing these summary motions three months ago, and we finally got them all. We haven't got any of your responses. We're going to be ready to load fuel here in the early part of October. The hatch will be closed this weekend, and we're ready and willing if you will specify just exactly what you want us to do. We've got the resources here to do it, so I'm right on with your approach, Tom, and hopefully, while we're here today, tomorrow, or however long that takes, we'll have resolved this thing. I suggest you be specific and stay with the motions that were filed and not generate any new ones. That always helps speed up things. Narrow the issues rather than, as you pointed out, we need to work towards some conclusion rather than a divergent set

of questions or so forth. With that, we are here, have at us.

MR. TERAO: I think one of the major problems we had from the August 8th and 9th meeting as between the staff and the applicant is that we never completely agreed on the definition of unstable pipe supports. I believe we reached some understanding in concurrence on instability of piping systems, but when it came to unstable individual pipe supports, we never seemed to agree on a definition. We proposed a definition, and apparently it was rejected by the applicant. So, in order to achieve a viable means of resolution of this issue, we believe it's necessary to first clearly establish a mutually agreeable definition of instability and then proceed with an analytical or physical fixes for these, quote, unstable pipe supports. Now, the definition that we proposed during the last meeting was that instability would be the ability of a pipe support to shift or move to an unqualified position. In this respect, we aren't saying that it is necessarily a safety concern to the extent that we aren't implying that it necessarily results in an unstable piping system or other collapsed mode failure, but we're saying that if the support does

not have a positive controlled clamping mechanism to assure that the support cannot slide or rotate along the pipes, then we have difficulty accepting the analysis for that support because of the uncertainties involved in that design.

MR. IOTTI: I don't think we fundamentally disagree with the definition. We tend to disagree in the word unqualified position, because it depends on how you define unqualified as to where we may have some --

MR. BOSNAK: To me unqualified means unanalyzed --

MR. IOTTI: Unanalyzable. If it hasn't been analyzed and all analyses -- any analysis has certain qualities. A support has to be in a certain location the analysis puts it. It doesn't effect the result of the analysis if the support is off a certain amount. So if you could define unqualified as being within those tolerances. And then I don't think you yourself would have a problem with the definition of the word, as long as the control exists that prevents that support from moving farther out than this region, within which the analysis would hold, then you would consider that stable.

MR. BOSNAK: I could accept that.

MR. IOTTI: In that sense, I think we would agree with you. Also, in the second sense, is in the word positive control. There's two things that can be defined as positive control. One is where you design a positive control intentionally, in other words, you make sure -- absolutely sure by design that that positive control exists. And another way for positive control to exist where the geometry of the system gives you positive control and you don't necessarily have to design for it.

MR. BOSNAK: That's a case-by-case situation. The other is generic.

MR. IOTTI: We can agree -- with those two caveats we can agree with that definition. That's been the board's disagreement in the last meeting. We can't agree on the definition of positive control. We can't agree on the definition of unqualified with -- another way of putting it is if there is no control, and this thing can move in some manner where the system becomes unanalyzable because the uncertainties become so many that you can't possibly address them.

MR. BOSNAK: There are uncertainties which you might be able to identify, but you might not be

able to model.

MR. IOTTI: To me, it's the same thing as unanalyzable. When I defined unanalyzable, I just wanted to state for the applicant where we disagree with the definition of instability that was put forth by the Commission, by the staff, last time. We don't disagree with the definition itself, we disagree with some of the terms within the definition.

MR. BOSNAK: Probably we didn't communicate. In other words, we didn't get into the details enough to understand how you could have solved the problem, and, therefore, we couldn't -- we could not agree.

MR. IPPOLITO: I think we have reached an agreement. Am I wrong? I think Dave has defined what we believe to be instability. You have said you agree, provided that we agree in the two areas mentioned, and I think staff would agree to that as stated by Mr. Iotti.

MR. BOSNAK: One is a generic sense and the other is a case by case.

MR. IOTTI: I mentioned yesterday the easy way to proceed right now is to address those two areas, positive control, and whether the problem is

analyzable or not. We have to talk specific, if I recall that from our last meeting. We are not talking about a large number of supports falling into the category. You can correct me if I'm wrong. You have a concern over a particular one, there is only one of those.

MR. IPPOLITO: If we can agree to a definition, I think that would be a milestone. Once we agree with the definition, I want that for the record. Do we agree with that definition? Then you may want to proceed with the area in which you are going.

MR. VOLLMER: One point needs clarification. I think what Iotti had indicated in his concept of definition, there was an implication that design included certain margins under which the design would still be applicable if there was motions of the pipe support. Is this marging quantified in design or is this something that is an inherent process? In other words --

MR. IOTTI: Can be inherent in the geometry of the design. That's where you have to discuss each specific case.

MR. VOLLMER: You're saying that in the design process that there are numbers called out that the

pipe support is normally plus or minus so much that the design is applicable.

MR. BOSNAK: Those would be positive tolerances.

MR. IOTTI: Yes.

MR. BOSNAK: Quantifiable.

MR. IOTTI: Positive and negative tolerances.

MR. BOSNAK: But quantifiable.

MR. IOTTI: Yes, because you can analyze the problem. So I guess we agree. If the staff can agree to those caveats on the definition, we'll agree with the definition.

MR. BOSNAK: When you go out and identify each of the problem supports, you would have to then identify how you are going to solve it, whether it be by the generic sense or --

MR. IOTTI: That's correct. That's consistently what Tom has said. We would tell you what our plan of attack would be, if it's just changing it because it's a lot faster. We might not even agree with you that it's potentially unstable, but it's a hell of a lot easier to change. Or we may decide to analyze. If I am correct, we're down to four supports. It's not worth spending a month arguing over four supports.

MR. IPPOLITO: I think we have reached a milestone. I think we've agreed on a definition.

MR. IOTTI: I don't know that I can speak for David, I recognize that that is my own opinion.

MR. IPPOLITO: What was before, was before. We have a definition. I think now we can proceed with the definition. I think, David, what we were going to do based on this definition, you are going to identify certain groups or categories that you feel fall within this definition.

MR. VOLLMER: I think his definition was generic, and whatever it applied, I guess we could discuss examples of that.

MR. IPPOLITO: Okay. Fine.

MR. VOLLMER: One point I think that needs to be made, and it's perhaps inherent of what you said, but I think it's an important one. We would not expect, I say not expect, TUGCO to take a look at the design drawings with the tolerances and say, "Gee, that support fits within that," because any lateral movement could be constrained to this amount. We would expect that, I think as Tom indicated, that the original design organization would likewise find these acceptable, because that would be needed to complete the design control

process.

MR. IOTTI: In essence, what you really are telling me is that the initial design organization must have gone through that thought process when they designed or else --

MR. VOLLMER: Well, that's --

MR. IOTTI: We agree with that.

MR. BOSNAK: In other words, if they specified a clamp, and it got changed somewhere along the line, then whatever you ended up with has to go back and be acceptable.

MR. IOTTI: That's correct. We don't disagree with that.

MR. TERAO: I think what I would also like to add to your caveat is that in the specific supports to have for each specific support some statement from the effective -- effected design groups regarding the acceptability of that support from either I.T.T. Grinnell Home Office or M.P.S.I. Home Office, whether they believe that support will perform its intended function and not lose its functionality because of any significant uncertainties, and from the Gibbs-Hill offices an assurance that the particular, quote, unstable support design will not effect the validity of their

piping analysis.

MR. IOTTI: Well, I'm not so sure I can interpret that, because let's take a hypothetical that that support is done by I.T.T. Grinnell, and I.T.T. Grinnell, the home office, whoever designed it, tells you in their opinion that support is stable, it will behave stably.

MR. TERAO: I didn't say in their opinion.

MR. IOTTI: Whatever. They say it's stable, why should Gibbs-Hill do anything?

MR. TERAO: Because ideally the supports, the specific evaluations evaluated by the effected --

MR. IOTTI: The piping analysis group never conducts that evaluation.

MR. BOSNAK: Who has the responsibility of the whole piping system. You've got the supports and you've got the piping, and there's always one organization that's responsible for the system as a whole, and its performance. Piping and supports, obviously one has an effect on the other.

MR. IOTTI: That's right.

MR. BOSNAK: So there's one group that does the initial design, lays out the design specifications.

MR. IOTTI: That group is Gibbs-Hill. I think what David is driving at, he would like

Gibbs-Hill to concur to that particular support which is being stated as beingstable. Gibbs-Hill concurs with that. Gibbs-Hill is not responsible.

MR. TERAO: I would like the design group, the effected design group to evaluate the specific unstable support in that design area from a functionality standpoint of the pipe support, it would be the I.T.T. Grinnell Home Office or M.P.S.I. Home Office, but the effect of the support on the validity of the piping analysis that would have to be Gibbs-Hill.

MR. IOTTI: I understand. What I'm saying, either I.T.T. comes back and says that support we don't consider it stable, in which case the only way Gibbs-Hill would have would be either to remove it or simply confirm that that support is assumed as being stable. Therefore, there is no impact on the analysis. We can do it a lot easier for us to have Gibbs-Hill review. I know what the answer is already. The reason I keep asking questions, I'm not so sure I understand what you want.

MR. FIKAR: I am confused, also.

MR. TERAO: There's quite a bit of difference when Gibbs-Hill reviews an as-built drawing for

the general acceptability of that support verses revealing a potential concern, a specific potential concern, of a specific typed support configuration to assess then that uncertainty on the validity of the piping analysis.

MR. IOTTI: What you would like us to do if there is a particular support which is alleged to be potentially unstable, you would like to see what the consequences of that unstability if it were in fact unstable would be on the system.

MR. TERAO: If there's anything that the piping stress analysis engineering group is aware of that could either cause it to be more unstable or whether or not they can see that.

MR. IOTTI: Okay. I had misunderstood what you were --

MR. BOSNAK: If you take a generic approach, what you're saying is correct, you know, the other groups will establish the stability, but if you're taking the case by case approach, you have set up tolerances, and then those have to be --

MR. IOTTI: I understand. I misunderstood what Dave was telling me. Now, I understand. There's no problem for us to do that. But to a larger extent, it will depend on the choice that

we make for each particular support, because if we opt not to go through this route, we'll just fix it to conform to what everybody will agree to, if it's stable, that may be the simplest way. If we choose the other way, then I agree we'll do so.

MR. TERAO: I think we have reached an understanding.

MR. IOTTI: Okay.

MR. WADE: Do we need to talk about specific types or are we set from the previous meeting as to what these particular types are that you have a concern with? Are they exactly the same ones we discussed before?

MR. IOTTI: I think it's worth going back and summarizing which one we have a concern so that we --

MR. WADE: We don't need any misunderstandings of what the scope of this is-

MR. IOTTI: I'm going to refer back to the affidavit, David.

MR. WADE: That would be the easiest way, the affidavit classifies them into different so called types, so we'll refer to those type numbers.

MR. TERAO: For the type one supports, these are the box frames with single structure snubbers.

MR. BURWELL: I believe you're discussing --

MR. IOTTI: Page nine of the affidavit.

MR. BURWELL: Figure on page nine.

MR. IOTTI: Figure three, page nine.

MR. TERAO: Figure four, page thirteen. These are the modifications made to the single struts.

MR. IOTTI: Referring to the original design, which is a box frame on a single strut. We no longer have any of those, and the proposed modifications or existing modifications to those are listed on page thirteen, figure four, type one, two, and three.

MR. TERAO: I believe from our August 8th and August 9th meeting, we commented about the uncertainties involved in the modifications using the index lugs and the additional strut. But the modification used in U bolts we concurred that from a stability standpoint, we found that the U bolts when added to the box frame will preclude either sliding or rotation of the box frames, the pipe, so our concerns are only related to the first two modifications.

MR. IOTTI: Okay. With regard to the index lugs, at least I am prepared to tell you there is

only one. We haven't determined what we intend to do. And I think one of the things we may want to do is go look at it in the field. This is maybe one of those situations where geometry is such that it can't go anywhere in any case, and that which way we're going to proceed --

MR. BOSNAK: Where is that location?

MR. IOTTI: I don't recall, but we'll take you there.

MR. TERAO: Let's move on to type two.

MR. IOTTI: Could you again refresh my memory on your concerns for the type two, the ones for the additional struts. There I don't think it's so much lateral or axial movement.

MR. TERAO: Both of those were either the uncertainty involved in accounting for the friction.

MR. IOTTI: Unfortunately I don't have the total number of these, but they are few. Okay. So the second type is the one that had --

MR. TERAO: The type two or the U bolts single struts with thermal gap.

MR. IOTTI: Figure five, page fifteen of t affidavit.

MR. TERAO: The modifications that you have proposed were to either sinch U bolts or to add

supplementary steel.

MR. IOTTI: Right.

MR. TERAO: I believe our comments from the stability standpoint on sinched U bolts, we felt that your testing and analysis performed under the different dispositions adequately precluded the stability, the instability concern with this particular support, and with respect to the bumpers, the supplementary steel, although we did not agree with that fix, resolved the stability standpoint, the stability concern, your analysis, which showed that even without the supports on the main stream line, the piping stresses were still acceptable to us, makes this a mute point in the sense that I think it's not worthwhile to argue whether or not this is an acceptable size of restraint if the analysis, even with this restraint excluded, shows the stresses to be acceptable, and I don't think we should argue the point any more.

MR. IOTTI: I agree.

MR. FIKAR: Good. We can make some copies of this, of the affidavit.

MR. IPPOLITO: We've got one.

MR. TERAO: I believe the one with the bumpers, there was only one of those in the entire

plant.

MR. IOTTI: That's correct.

MR. TERAO: Type three, unstable supports, the double-strutted frames. And as we pointed out at the last meeting, I believe these are either double strutted or triple strutted, but the concern being addressed in the double-strutted frame dispositions related to really the single-plane -- hard single-plane frames that are supported by struts or snubbers, probably struts, I doubt if they are snubbers.

MR. IOTTI: To the best of my knowledge, I haven't seen any with the snubbers.

MR. TERAO: These we didn't know at the time how many large single-plane frames there were.

MR. IOTTI: There's a total of three, and they are all triple struts -- yeah, they are all triple struts. And again, I would propose that before we do anything else, we go look at them. There are some in the odds building and some in the electrical building or near the electrical building. I have the drawings. We can go to elevation below eight seventy-three and look at all of them.

MR. TERAO: We still have a concern on these particular frames.

MR. IOTTI: I guess what we had discussed, was

an option of doing a bounding analysis to show that even if the frame were to move, you wouldn't have reverse consequences. After we look at them, we may stay with the same option, we may change the option. In any case, I think it would be worthwhile for all of you to see the supports, these gang supports.

MR. VOLLMER: We saw two of them yesterday, we didn't see the other one.

MR. IOTTI: Those are it.

MR. TERAO: But our concern with the home offices of I.T.T.Grinnell and M.P.S.I. and Gibbs-Hill to comment on these frame designs not only through a bounding analysis --

MR. IOTTI: Well, I guess it would apply if our intent is to do an analysis. If our intent is to change them, of course, I'm not so sure whether it would be worthwhile to go back.

MR. VOLLMER: Fix them where they are?

MR. IOTTI: I guess I have to confirm how many of these double-strutted box frames there are.

MR. BURWELL: Off the record.

[A short time was had off the record. Thereafter, the following proceedings were had.]

MR. BURWELL: On the record, please.

MR. TERAO: The type four restraints are the single-strut snubbers with snub U bolts. From the last meeting I believe our comments were that from a stability standpoint and from the testing and analysis that were performed on the U bolt sinching summary disposition, we found that these restraints were stable. At this point, what I would like to do is to go back to our agreed upon definition of instability and have the applicants then identify if there's any other supports that fall under that definition that are not included under these four categories.

MR. IOTTI: Dave, I don't have the answer to that question. We are going to be looking. We don't think there are any, but we'll have to go back and provide you with that answer.

MR. VOLLMER: Part of what we said we would ask you for was a program using this definition to go out and make sure that everything had been looked out and identified.

MR. TERAO: So then there's the fifth category that we don't know what's in there at this time?

MR. IOTTI: Whether there's any?

MR. TERAO: Whether there's any, if it per-

forms under our agreed definition even it should be addressed in this fifth category.

MR. HORIR: The point I would like to make is that with respect to this fifth category that is an area where we are getting beyond the scope of the actual motion itself. My question to you, I would like to get your opinion, we have our opinion, is that when we go into areas that are beyond the questions that we are raising in the motion itself, perhaps it would be best to address those on a separate track as opposed to leaving the motion itself awaiting a resolution until we get to those?

MR. TERAO: I believe that's a legal question that our lawyer should be answering. Unfortunately we don't have our lawyer with us today.

MR. IPPOLITO: Let me pursue that. As far as I am concerned I think at this meeting we finally defined what stability is. The motion concerns the issue of stability. Now that we understand each other, it's -- to me it's everything that fits within that definition. I mean to me it properly belongs to your motion.

MR. HORIR: The motion addresses the types of supports which were identified by the intervener as being potentially unstable, and the motion

was filed as part of a plan to resolve the intervener's allegation.

MR. BOSNAK: We're interested in making sure it meets all of the requirements.

MR. HORIR: We don't disagree with that at all. We're just questioning whether the proper attack is to include that within the motion itself.

MR. IOTTI: We keep talking as if there were some that fall within category five. Why don't we find out if there are any. I don't think there are any. The other thing I would like to suggest, we define functional ability by the definition, because someone along the line is going to challenge our definition of stability.

MR. BOSNAK: We would prefer that.

MR. TERAO: The way I described these supports, I said that the word unstable is actually a misnomer when applied to pipe supports individually, that really the concern is that the precariousness of the support that there is uncertainty, and it does not necessarily fall under the classical definition of stability -- instability.

MR. HORIR: Tom, before we leave the point, could we get an agreement that will at least discuss with your legal staff, the proper approach for

this stiff category.

MR. IPPOLITO: I'll assure you that's what we'll do.

MR. TERAO: Leaving our established definition of instability on individual pipe supports, funtional ability, precarious supports.

MR. IOTTI: It doesn't matter what we call it here.

MR. TERAO: From our last meeting, we did ask for some further information on the acceptability of the supports with the extended mass that we are still looking for, but I do want to point out that it doesn't fall under this specific category of "unstable pipe supports".

MR. IOTTI: I'm sorry. I am missing a point. Maybe your name -- the names you have given extended mass.

MR. TERAO: There was an extended mass with a trunnion and U bolts holding that extended mass on to the pipe.

MR. IOTTI: Yes. I understand. We are scheduled to have the information to you at the end of next week. Okay. We haven't forgotten. I just needed to refresh my memory as to what it was that we are talking about.

MR. IPPOLITO: Does this mean this is another technical issue which is or is not within the scope of the summary disposition?

MR. TERAO: No. I'm saying this is within the scope of stability, but it's not under the scope of our established definition of instability. This actually falls under the classical sense of the definition of instability that indeed these supports are unstable from a classical sense, and we just wanted some verification of what was done to justify that design.

MR. IPPOLITO: It is within or out. Do I have to talk to the lawyers as to whether or not this is to be discussed as our responsibility to the summary disposition or do we put that in another box?

MR. HORIR: That's another one we think should be in another box. It wasn't addressed within the scope of --

MR. BOLTZ: May I ask a question? On the responses within the scope of the contention that the utility is going to make the NRC, does case receive a copy of this or is case going to receive a copy?

MR. IPPOLITO: Yes.

MR. BOLTZ: And matters outside the scope of the contention, if there are any, depending if there are any supports that fall into the category, and depending on what the two lawyers do, would case get a copy of those?

MR. IPPOLITO: Yes.

Let me propose the following: We have not had an opportunity to caucus with John. What I propose is like a twenty minute break caucus with John and we would proceed with the generic stiffness as we have hopefully proceeded with the stability question. Okay.

MR. BURWELL: Before we go off, may I raise the question, I believe Dr. Iotti recommended that we go look at the gang hangers. In any event, do we desire to do that or not? I'm not comfortable that a decision was reached on that.

MR. BOSNAK: We would like to go later after this is over this afternoon.

MR. IOTTI: Not just the gang hanger, but also what we call the keyed box frame if you would, index lugs.

MR. VOLLMER: I would like to see the shield as a separate issue, that is a separate issue. I have time problems.

MR. IPPOLITO: Okay.

MR. VOLLMER: I also would like to set it up, I have a five o'clock plane.

MR. FIKAR: That has nothing to do with this hearing.

MR. BURWELL: What have you just told me? Are you saying you want to do it now or do you want to wait or try to do Mr. Fair next?

MR. VOLLMER: I would like to do Mr. Fair next, and if it could be handled as expeditiously as that was.

[A short time was had off the record. Thereafter, the following proceedings were had.]

MR. BURWELL: I believe we are ready at this point and time to discuss the motion for summary disposition entitled Applicant's Motion for Summary Disposition regarding use of Generic Stiffnesses instead of Actual Stiffnesses in Piping Analysis, my accent on that, that's A-c-t-u-a-l, actual stiffnesses in piping analysis. This motion was filed on May 21, 1984. I believe we received some additional information on this item by letter dated July 16, 1984.

MR. IPPOLITO: Okay. What I'd like to do is to make sure we are all at the right -- all have

the correct understanding of where we are at this point in time, because we have had again a number of meetings. I would like to have John Fair summarize for the staff where we believe we are and see if we all agree, and then we will proceed from there. Okay. John.

MR. FAIR: Okay. The applicants have used generic stiffness values as a modeling assumption in piping analysis for class two and class three piping systems. In designing these supports, however, they used a deflection criteria with the applied load from the piping analysis. Therefore, there was no direct correlation between the modeling assumption and piping analysis and the supports design. The item raised an issue with this assumption used for the support design whether it adequately represented the actual support stiffnesses as built in the field. In order to answer this, the applicants analyzed a few sample piping analysis problems in their summary disposition. In one of the piping analysis problems, it turned out that a support was overloaded by approximately fifty-seven percent. This staff did not agree that this set of analyses demonstrated adequacy of the generic stiffness used. The applicant did another

sample of four piping analysis, and again identified one case where the supports would be loaded above the allowances. At the last meeting, we were still not in agreement that this demonstrated the adequacy of the design practice on stiffness. Therefore, the applicants were going to go back and propose an additional screening criteria to try to determine which supports were of concern and how to resolve the issue.

MR. IPPOLITO: Is that where we are?

MR. IOTTI: That's where we are. This is precisely correc[illegible] Yes.

MR. IPPOLITO: I hope the applicant is able to respond.

MR. IOTTI: The applicant is partly able to respond, because our schedule to respond fully to you was to respond by the 30th. Unfortunately, it's not the 30th. I have some material with me that I can -- if you wish to discuss it, but I would like to go back a little bit to the beginning. Applicants have submitted all of these analysis, not because they believe there was anything wrong with using the generic stiffness, that's being used by other applicants in other plants, but there was a concern expressed both by the intervener and by the

staff. We still don't believe there's anything wrong with the approach of using generic stiffnesses. You have to understand that some of the results that have been achieved by the most recent analysis, still have very significant conservatisms within them, which we have chosen not to remove because we think they are still applicable. We could still have the opportunity to go back and remove the conservatisms, and those results will probably show no overloading of supports. I say probably, because we haven't done so. Just my own opinion. We have to distinguish, I think, between what -- I don't want to call it a standard industry practice, because unfortunately there doesn't seem to exist a real standard industry practice with regard to using generic stiffnesses with class two and three piping. Everybody does it in a different manner. In this regard we are no different than many. A lot of people just use the assumption that these supports are totally rigid. It's the very same people that employ snubbers, the same snubbers we are employing here. One of the conclusions that we have arrived at from our analysis that the snubber turns out to be the weak link in determining the actual stiffness of the system, not always, but in a large num-

ber of cases. So again let's distinguish those two facts. Our analysis was done in the same manner as being done in many many plants, the majority of plants in this country including the plants of the vintage of Comanche Peak. What we then have done is attempt to demonstrate even if you were to use the actual stiffness, the same approach employed there would be no safety concern. It is true we have identified for some of the analysis that some of the supports if you were to do the analysis with the "Actual Stiffness", and you have to bear in mind when we're referring to actual stiffness, we're referring to calculated stiffness, which may or may not be the real stiffnesses. They are out there. Okay. These are calculated stiffnesses. Then you might calculate some of the supports to be overloaded. Those that we have found so far, we believe even though overloaded in the strictest sense, would not fail. So again we don't think there is a safety impact. But we also found as part of our work, that invariably the supports that turned out to be not just overloaded, but overloaded by the rated load, actual load verses rated load, turned out to be snubbers and also snubbers which were initially very lightly

loaded. The combination of the light loading is what prompted the stiffness of this particular support to be much lower than the generic stiffness. Let me take you through a numerical exercise if you will. Let's take a particular support and let's suppose that this support is comprised of a frame and snubber attached to that frame. Because the applicant uses the deflection criterion, they would take the load as determined from the piping analysis, and the load in the piping analysis you have to understand has implicit in it that the seismic deflection of the piping is very very small. For instance, an average seismic deflection of piping at the support point is generally left in six mil, that gives you a load, but that load is applied, as John Fair so well put, to a frame that has to satisfy a deflection criterion of one-sixteenth. Let's suppose that that load turns out to be a low load. If you take a low load and you use a one-sixteenth criterion of the frame, you can have a frame that's very very low stiffness. Let's say the frame deflects .06 inches, close to one-sixteenth, to get stiffness, you just divide the load by the deflection. So if the load let's say is fifty pounds, you divide fifty pounds by .06.

You end up with a stiffness of nine hundred pounds per inch. Let's say that this is a four-inch line. The generic stiffness -- I think it's two times ten to the fifth. Two times ten to the fifth. So right there you have more than two orders of magnitude change in stiffness. Of course, when you re-analyze with the actual stiffness, you may see the load of that particular support increase that drastically. On the other hand, if you don't load it to fifty pounds, so you don't get increase of a factor of ten, so you don't load five hundred pounds. If it shows a snubber, let's say a PFA one-half snubber, you increase a factor of ten. This is all hypothetical. We haven't seen this CASE, I am just taking you through a numerical exercise. That snubber would be calculated as being a load. So what that does, what I'm telling you, is that that snubber wasn't needed to begin with. The load was so low you didn't need support to begin with. If you take that support out, nothing happens, stresses in the pipe are still okay. The other supports accomodate the remainder of the load. What all of our sensitivity studies have shown that type of support tends to be predicted as being overloaded. Our supports, which are initially low loads and tend to

be standard components, which have rated low, and the designer rather than using a conservative approach will take the standard components which is next to it, so you normally have a little margin because of the particular set of circumstances. And this is what prompted our suggestion that we could arrive at a set of criteria that would enable us to determine without doing an analysis which particular supports per pipe size might be candidates were you to take an analysis with these actual stiffnesses for potentially overloading. I am prepared to discuss some of the initial findings, for instance, we don't need to look at any lines that are four inches or less. We just -- just no way that the normal design process would lead you to under design supports now, and then in lines that are larger than four inches but less than twelve inches, we would be concerned with, if the applicant has used snubbers like a PSA one-half or PSA three-fourths, because the loads were very low. Then those snubbers may not have significant capacity to accomodate other load increases that might accrue out of actual analysis. I am just describing for you the set of criteria you will come up with. We have not finished the work. Even if the work is completed at

least what I have done, somebody has to check it, verify it. We need to try it out and see how well it works. That hasn't been done yet. As a matter of fact, I was going to complete that and call John and sit down and explain it to him what we have done and see if he would agree with it. So that's where we stand at that point. I would just like to reiterate that so far none of the results that we have seen, would tell you that we have a safety problem. In other words, even if we were to remove the snubbers that turned out to be overloaded, the stress analysis would say your piping system is okay, the remainder of the supports are capable of accepting the loads. And to us that's really what it boils down to. There's no question in our minds that the generic stiffnesses approximation -- it's a convenient approximation that's been made by many others and ourselves. Whether it's a good assumption, whether it's good engineering approach to be taken for the design of the piping system, depends on whether if you use it you have a piping system which is safe as opposed to having a piping system that's specified to the inth degree. You will never get there. If we were to use the actual stiffnesses, those are not likely to be the actual

stiffnesses that you will see on sight, because there is a small gap in any support or there is a small place. In reality, the true actual stiffnesses bear only some resemblance to calculated actual stiffnesses. So we should not lose track of that also, and that's why we think at that point, we've gone as far as we can go other than completing the lastest efforts that we've committed to do, which we'll complete by the end of next week. I guess I've said my piece at this point.

MR. WADE: It boils down, we think that we're well within what has been done in the past in the industry and that because of inherent conservatism in the piping analysis that our approach is perfectly acceptable. We have no reason to believe otherwise.

MR. IOTTI: There's one other item that I would like to ask for completeness. Where the generic verses actul stiffness has the most pronounced effect on the results of the piping analysis and the possible safety implications of piping analysis in the seismic analysis. You have to bear in mind that this, because we also submitted affidavits on safety factors. The reason we did so is so that at least you will be aware that the seismic analy-

sis has inherent conservatisms which are present in the analysis that are being performed. So what I'm saying is there is conservatism in the analysis. There is different types of conservatisms, some is in the method of analysis itself. But in addition to that to pinpoint to the analysis the input motions are already conservative. It's true you can even play this game. The problem with generic verses actual stiffness is that you can play this game forever. In other words, we can go back and analyze every piping system in the plant, and two months after we do, we're analyzing them again because some information says, "Well, the stiffness there is really not what you should assume, you should assume something else."

MR. WADE: Two different analyst can come up with different results depending on how he models the piping system itself. These things all come in to play. Simplifying the assumption in generic stiffness is certainly acceptable with the conservatisms that are built in to account for those uncertainties.

MR. FAIR: I said before that I agreed that generic stiffness was a standard practice used by the industry. I have no problem with the generic

stiffness using those assumptions in piping analysis. I disagree with your statement that you do it exactly like the rest of the industry. There are variations amongst the industry. Some of the industry actually calculated the supports stiffness by other stiffness criteria.

MR. WADE: A lot do not.

MR. FAIR: I disagree, that having to evaluate the stiffnesses is a non-ending loop. We have established that you can vary quite a wide range with those assumed generic stiffnesses with no impact on piping analysis. And as we have already identified, it's just those cases that come out very lightly loaded of supports that have very high flexibility that can have an impact on the piping analysis.

MR. FIKAR: It's a non-ending loop, Tom. We filed this thing in May. We're going to load fuel in six weeks. We ain't there. We would like to get there if there's some -- if we could narrow that down, let's close that loop, whatever it is. You know, it's really not -- it's, I guess, the way some sampling was done or some analysis.

MR. IOTTI: I think it's categorized correctly. I didn't mean an unending loop you and I could

never agree as to when we would finish. Rather I am saying there will always be a third person come in and say, "I disagree of how you've done the calculation of stiffness, and you'll have to do it over again." And in that sense, it's not something that can be precisely addressed.

MR. FAIR: We're not talking about precision here. We have established that within your -- within an order magnitude of your generic value, you didn't have any significant impact on piping analysis based on your samples. I agree with you that you cannot precisely calculate the stiffness of supports in the field to three decimal places. But in order of magnitude, is a reasonable number to shoot for.

MR. IOTTI: Well now, I would agree with you, but you can certainly calculate it within a factor of two. I think our disagreements are getting less and less. The question is what do we do next.

MR. WADE: We need a conclusive practice to put this issue to bed so that when we finish this effort we know that results are going to be the end, and there is not going to be another loop that we have to go through.

MR. IOTTI: Our intention is to complete this

designing criterion definition which will tell you how you would identify per pipe size the supports which could be susceptible to overloading were you to do an analysis. The designing criteria will exclude certain pipe sizes, because there doesn't seem to be a way in which you will ever get into an area of specific loads at which -- there is no reason to believe that there may be some supports as being overloaded. The load itself is not the criteria, the load in combination with the type of standard components is really the criterion. For instance, there will be variability loads. Let me give you an example. We may say for a sixteen inch line, any support which -- if there are any supports which are loaded less than three hundred pounds, we ought to look at that particular stress problem, because there would be a support which will have both a very low stiffness, something of the order of two orders of magnitude less than generic stiffness. That particular support happens to be a standard component instead of PSA3, which you would expect to see on size line maybe a PSA1 or one-half then that could be overloaded. That's the type of criterion we'll have for you. I want to confirm that's what we're gearing to.

MR. WADE: What is your acceptance criteria for all that? What does it take to satisfy you.

MR. FAIR: We would like to see what you are proposing. I am in agreement with Dr. Iotti that the correct criteria is the lighly loaded support and it should be based on pipe size.

MR. IOTTI: To go further, what then we propose to do is, one, we identify that particular stress problem that is a candidate to have some of these supports. We have two options to go, one of them to take that support out and rerun the analysis without calculating the stiffness, take out to see if anything happens. Okay. If you don't need it to begin with, who cares. The other option is actually calculate the actual stiffness and reroute that particular stress problem and then determine what the consequences would be, and they might show us an overload or not. And what Dave is trying to add that we're shooting an elusive target, we don't exactly know how far you want us to go in this or what would be acceptable to you. In other words, where do we draw the line? We will review every stress problem from this standpoint looking at the results, identifying the stress from this criteria, define which stress problem may have to

be looked at again. That far we can go.

MR. WADE: We don't want to proceed with the re-analysis until we know what the accepted criteria is, once we have that, we can proceed beyond that point.

MR. FAIR: We certainly have acceptance criteria for the design supports and pipe at the facility. I don't see there is any question of what the acceptance criteria is.

MR. IOTTI: I think he's looking at something else. Let's say there are two thousand stress problems in the plant. We've seen seventeen thousand supports. Okay. And we can look at all two thousand stress problems. That's one way to do it. You can only look at a percentage of those and draw a conclusion that you have a certain confidence. Say if you look at two hundred and fifty of those, and you find nothing within two hundred and fifty with regard to safety, you can draw a conclusion, you can say, "Well, if I were to look at the other one thousand, whatever, one thousand and six hundred or so, you would find no more than maybe a certain number of supports which would fall in that category." You can say that with a certain confidence level. What he's saying, what is the criterion? One hundred

percent confident there is none, ninety-five percent confident there is less than one percent.

MR. FAIR: You just said a couple of thousand stress problems. How many exactly greater than four inch piping analysis problems.

MR. IOTTI: I don't know, that's part of the stuff I have got to do next week.

MR. FAIR: I thought it was in the order of a couple of hundred.

MR. FIKAR: We don't want to do everything and satisfy there is no problem. That's a waist of time. Maybe I am addressing Vollmer and Bosnak. Go out there and look at that plant. You have never seen hangers as massive in any plant you have been into as you have seen here. The seismic zone is the lowest in the country. Conservatism, conservatism, conservatism. We don't want to waist our resources doing a bunch of studies which we are absolutely confident are going to come out all right. That's what we're pleading for. We didn't put snubbers in, because we didn't think they were needed based on our criteria. Again if you want to re-analyze and somebody says you can't do that, you'll probably analyze that one way. I don't want to give the impression we put something in there we

didn't need. And it's generally standard industry practice. That's what's concerning us.

MR. FAIR: I haven't agreed in total that your total design practice being standard industry practice all the way through. I believe there is part of it that do comform with the standard industry practice. The other side is as far as acceptance criteria once we determine a proper screening criteria to look at the supports wherever we come across the supports, we ought to agree on --

MR. IOTTI: Okay. I mentioned two options, one of them is re-analysis, the other one is removal and re-analysis with generic. Where the most uncertainty comes in, in my opinion, is not re-analysis with the generic stiffness, because that's standard method. But if you then get down to the calculations of all the actul stiffnesses for that particular systems -- I mean what's the merit of doing that if your approach is to just take that support out.

MR. FAIR: Well, I'm not in agreement with that statement. If we had determined from your affidavit and studies that there is a range of stiffness which has no significant impact on the

piping analysis, then why do you have to calculate the stiffness of every support that passed your screening criteria.

MR. IOTTI: Then I don't have any disagreement with you. Then we'll just either take the support out or -- in other words, it's our option at that point as to what we're going to do. So I guess what we have agreed to do, is that we'll wait until we formalize the screening criteria. I can go over with you my scratch notes. I haven't formalized them yet. You will know all of what it is you're going to get at the end of next week, it will come as no surprise. Particularly if you don't agree with it, I would like to know now, because it will save me an exercise in futility. I have tested over a few piping systems, it seems to work. In other words, I have been able with this criterion, to come to the same conclusions as I did with all of the analysis that has been submitted to you. We would predict a few more supports than what we have actually found to be overloads. It would identify the stress problems that we analyzed but found nothing wrong with. So at least it meets that test. But I want to do it a little bit more. What I don't have is how many stress problems we'll end up

with when we apply this screening criteria. I don't know that yet, because that's the part that we'll be doing next week. He'll go back and look at every stress problem and identify the supports, and then either include or exclude that particular stress problem.

MR. FAIR: Let me ask you a question. If you were to select the option where you would just assume the support is not in the analysis, what would you do in the field with that support?

MR. IOTTI: Remove.

MR. FAIR: Okay.

MR. IOTTI: I don't want it there. If we can't remove it, then that option is not viable to us. We would re-analyze the actul stiffness.

MR. FIKAR: Well, I am concerned we are going to get involved with a whole bunch of re-analysis and overly cautious concern, and it's going to cost us time, money, and effort. That's my problem. You all after having hearing this, maybe we can get together.

MR. IPPOLITO: I'm going to say what I think I heard, and I will demonstrate my ignorance of the subject. I think I can summarize what I'm hearing. I summarize what I'm hearing is that you propose to

use a method of analysis to consider generic stiffness.

MR. IOTTI: Well, that method of analysis. It was reviewed. It was approved by the F.E.R.

MR. IPPOLITO: Fine, but in going back and looking, we find that generic stiffness, does that envelope all of the system or all of the supports? The question is now that we know that, what do we do about it now? I change that statement. Now that we know that, what are you going to do about it? And what upsets me a little bit about this conversation, I'll tell you frankly, you seem to be telling us, the N.R.C., tell me how much is safety. I think the applicant has to sit down and say, "Given this problem, how do I resolve this problem." Okay. And then we'll review that problem, I mean your recommended solution to that problem.

MR. FIKAR: I don't even know if we have a problem.

MR. IPPOLITO: That's fine.

MR. IOTTI: I'll make a stronger statement than that. We have done enough in our opinion to have satisfied ourselves that there was no safety implications, so we didn't -- if we had taken the attitude that you are trying to characterize us

with, what we would have done, we could have stonewalled this. We have done what other industry has, why should you do anything with actul stiffness, we didn't do. We put in the actul stiffnesses. We did sampling, and on that sampling basis, we determined -- applicants did, and I concur with that. I am not the applicant per say. There is no safety concern. That's my opinion at that point. How much further, well, I can go further. I can do more samples, and again I expect the result to be the same.

MR. VOLLMER: You drew that conclusion based on the fact that even though you had supports overloaded, it was your presumption that enough conservatisms existed so that there would have been no failure.

MR. FIKAR: No safety issue.

MR. VOLLMER: Hear my words. I said you drew a conclusion based on an assumption that otherwise existed. I would like a demonstration of that.

MR. IOTTI: Well, it was based on two things. One, that even though the supports were overloaded, it wouldn't fail. That was one thing, because the type of overloading we saw was not so large as to cause the particular standard component in our

opinion to really fail, clearly exceeded the rated load. And the second portion of our position is that there was inherent in the input of analysis and the method of analysis conservatisms that far out weighed the nonconservatisms introduced by these gneric stiffnesses. I want to make a statement that I don't think it's fair to characterize the applicant that they don't have the concern. They did what they thought was sufficient to satisfy the commission; there was no safety problem. What we're disagreeing is the degree to which we need to satisfy the staff. That's why we have to ask the question, because obviously we were satisfied ourselves.

MR. FIKAR: We want to satisfy you within some reasonable bounds, that's all I'm saying.

MR. IPPOLITO: Let me ask John a question. Were you presented with the basis upon which these conservatisms were considered to be bound, the problem?

MR. FAIR: Well, they had two separate basis. Dr. Iotti had the test data on a particular snubber which showed that it would not fail under the load they had calculated.

MR. IOTTI: That's the same snubber that was

calculated to be overloaded, PSA1.

MR. FAIR: And the second basis was another summary disposition on safety factors of the seismic design, which is somewhat of a -- we characterize them as medium margins of safety in various analytical processes in the seismic design. There was enough uncertainty associated with them that we wouldn't use those numbers straight from that affidavit.

MR. IOTTI: That, of course, was your characterization. The medium margin of safety we're talking about is a factor of safety of forty-four zero. Maybe we still consider that medium. We never made a statement that that was the true margin of safety there, but it's of that order. We are not talking factual twenty percent, forty percent, fifty percent, we are talking large factors in input. Primarily, that doesn't come from the method of analysis, it comes from the actual seismic input.

MR. FIKAR: That's my point, again, that the seismic criteria, we get such a large safety factor, which is really what this is all about, looking at the plant and knowing what we've got here, there's got to be some reason to all of this.

MR. BOSNAK: When we were here two years ago, this was the problem at that time, and it sounds like it still is. We haven't made much progress. And the point was that it was not that you couldn't use generic stiffness, but it was the deflection criteria on the supports particularly where you had a light loaded support, and we recognize that, you know, seismic load. The definition that goes into the load is very conservative, but in a way, that's an apple and an orange we're looking at.

MR. IOTTI: I agree with that.

MR. BOSNAK: It sound like you're making some progress on how do you identify the supports that we need to worry about, and I don't think we want to introduce the -- you know, the effect of seismic analysis and the conservatism there. We are trying to look at a particular support load path and which ones are we going to be concerned about.

MR. IOTTI: The reason I made that statement, was because Tom was a little offended at what he thought was the applicants' attitude. That's not the applicants' attitude. We have been concerned, what do we do now that actul stiffnesses are different. We concluded in our own mind that it wasn't a safety problem, and we stopped.

MR. BOSNAK: I think you're going down the right path. The thing is when you have finished what you have started, then we need to take a look at what you have.

MR. IOTTI: I agree with that. The reason we're asking the question is that, for instance, when I complete the designing criteria and I apply it, I would consider -- I will go far enough to satisfy myself. I am assuming I will find no surprises. I am assuming that it has convinced me. So far that again has been worn out. I will be very suprised if I don't. Given that, I will say I have done enough, I'm happy, there's no safety problem. That might not satisfy you.

MR. BOSNAK: We may or may not agree depending on what you have looked at, I guess.

MR. IOTTI: I guess to the extent that you have agreed that that's the proper way of proceeding, I'm happy. At least I know what I'm shooting for. I am not shooting at an open-ended type of approach.

MR. IPPOLITO: Are we sending that message? Is that the message you want to give them?

MR. BOSNAK: Yes.

MR. IPPOLITO: Okay. I just wanted to make it clear.

MR. IOTTI: Well, maybe the 30th of this month, this whole thing will be put to bed. I hope so.

MR. IPPOLITO: Okay. Good.

MR. FIKAR: I do too, I hope so.

MR. IPPOLITO: Anything else on this subject?

Okay. We're ready to go on to another of your summary dispositions. John, correct me if I characterize it wrong. It's U bolts or U bolts used as two-way restraints.

MR. FAIR: That's correct.

MR. IPPOLITO: John was in the process of completing his evaluation, and what he wanted to do is to apparently go look at what were identified as maybe eight or so of the most significant of these U bolts and just confirm that, yes, in fact the plant is built as you have indicated in your design and in your drawing. He went this morning with your people, and the thermal agra , whatever was over it, was removed in front with John present. John made some measurements. And I would like to have John tell you what he discovered while he was there. Did you see all eight?

MR. FAIR: Yes.

MR. IOTTI: John, are these the same eight that we have identified as the --

MR. FAIR: Yes. I was going to lead this with a little recap of the motion. These are the cases where you use U bolts for one-way restraints with the presumption that they provided no lateral restraints to the piping system. There were a limited number which you identified in the affidavit. The argument in the affidavit, the steps of the arguement, went this way: there was a sixteenth of an inch gap designed in these U bolts. You identified eight of them where the total movement exceeded that one sixteenth of an inch total seismic plus thermal. You did some sample re-analysis, seismic re-analysis, assuming no gap present for two of the U bolts that had the largest total displacement, found no problem with the piping analysis. Tested a couple of sizes of U bolts, determine that they could take substantial lateral deflections, and then concluded that there was no safety concern with these seventy U bolts. I have no problems with your technical arguments that you put forth. The only thing I wanted to do was to go out to the field and take these eight U bolts and confirm the existence and nonexistence of these gaps. As it turns out, when I took the measurements this morning, the sixteenth of an inch gap existed in the direc-

tion of restraint and not in the lateral direction. As a matter of fact, six out of the eight supports I checked had lateral gaps less than one sixteenth of an inch, and only two of them had a sixteenth of an inch gap or better in the lateral direction.

MR. IOTTI: I'm not sure I follow. What do you consider directional restraints? Directional restraint is up?

MR. FAIR: That's correct.

MR. IOTTI: Can you resummarize it again? You said six out of eight had no gap laterally?

MR. FAIR: Had lateral gaps less than one sixteenth of an inch, this is total lateral gap on both sides.

MR. IOTTI: Right. That's the way it's stated here.

MR. FAIR: There was one that had practically zero gap in the lateral direction.

MR. IOTTI: That's total?

MR. FAIR: Total, both sides. Therefore, I was unable to confirm that the sixteenth of an inch gap exists on these U bolts.

MR. IOTTI: You said something else about the restraint direction having a sixteenth of an inch--

MR. FAIR: I also looked at the drawings as

I was reviewing these supports, and the sixteenth of an inch gap that is specified on the drawing is in the direction of the restraint and not the lateral direction.

MR. IOTTI: Which systems were they on? Do you recall?

MR. FAIR: Majority of them were component tooling.

MR. IOTTI: Okay. So that's been tested, hasn't it?

MR. FIKAR: Uh-huh.

MR. IOTTI: All right. Well, I don't have an answer to this question for you. I would like to discuss what the impact of this would be on any of our technical results, because I don't believe it would have any in terms of the lateral capability even if it acts as a restraint, which it would, it would still not impact, because if anything, the gaps are small, and we assume the loads on lateral would be even smaller. There would be some impact on thermal, which had been discussed. So far as the conclusion on our affidavit, that would not change. We may have a different thing that we need to address as to why the sixteenth of an inch of a gap is not there. Did you follow what I said?

MR. IPPOLITO: I think that's what John said was he had no problems with your analysis, but the plant apparently does not conform to your analysis.

MR. FAIR: Well, I'm not sure that that's the case.

MR. IOTTI: What I'm trying to say if we were to analyze, but that I would come out even better. I've made worse assumptions. To me the larger the gap -- when I analyzed it, I analyzed it without any gap. The larger a gap, the more a deflection. What I assume that lateral load is higher, because I'm letting it deflect to a larger portion, so with the gap, there's even less -- I would have even less of a load. The results don't change. His problem is where's the sixteenth inch of a gap.

MR. FAIR: Let me say I have two problems. One problem is that the summary disposition motion with it states that there is a sixteenth of an inch gap, that leads me to the conclusion that the sixteenth of an inch gap was in a lateral direction, and therefore, we were only concerned with eight total supports. We took a sample of the worst two and showed no problem, and I thought it was a pretty good sample. The second is in the basic assumption of ignoring the lateral restraints. Now, if you do

have a gap in there and it did exceed the movement, I have no problem with making that assumption. However, if the gap does not exist there, I consider that a bad assumption even if it does not turn out to be a safety problem. I think that was a poor engineering practice.

MR. IOTTI: Well, yeah, maybe it was. I'm not quarreling with that, because I don't see any reason to go over spilled milk. I mean that has already been made abundantly clear before. But is there an adverse consequence from a bad assumption? The answer is no in any case. I don't necessarily agree with your characterization either when you say the gap is less than sixteenth of an inch. But how much less. Clearly in the case where there is no gap, I may agree with you.

MR. FAIR: Let me state I only looked at those supports, those eight, which the movements were greater than one-sixteenth.

MR. IOTTI: Total thermal plus seismic. I guess implicitly we agree with you in that instance, it would act as a lateral restraint. Okay. But there is no safety implication for adverse -- you know, implication reversed to safety from that U bolt acting as a restraint. I would like to keep

the two issues separate whether the gap is really there or not from the conclusion of the affidavit if I can. If I may from the work that I did, this is my own personal work. From what you tell me, that doesn't invalidate any of this other than the dimensions may not be correct in this particular support. The conclusion would still be the same that there is ample ability of the bolt to withstand the lateral load that would be imposed on it, in fact the lateral load might even be left less. Secondly, that the stresses on the piping system would not be adversely affected, because we assumed in our analysis that there was no gap.

MR. FAIR: You analyzed just the seismic, and at the meeting I asked you why you didn't analyze the thermal, and you said the gap existed.

MR. IOTTI: Yes, that's true. The thermal had been analyzed, they had analyzed the thermal.

MR. FAIR: They had no sample.

MR. VOLLMER: No gap.

MR. IOTTI: I have to go back. For some reason this whole section has disappeared from my affidavit. Do you have the affidavit with you? I think we need to take some time to go find my attachments. They were attached, the table was one, and all of

the attachments later, I don't remember the number now, disappeared from my entire package here, so I need to refresh my memory.

MR. BOSNAK: I think normal practice would be to do it without a gap. I don't know what they did.

MR. IOTTI: Rather than make a fool out of myself and me say one way or the other, I would say no.

MR. FAIR: I believe from the last meeting we had determined that those particular analyses may be superceded by some field work.

MR. IOTTI: Unfortunately, I don't have the stuff with me. It would seem to me it was probably analyzed without the gap, but I can't assure you of that.

MR. FAIR: I would assume that that would have been correct, but as I was saying, I believe that those analyses may be superceded because of some field modifications.

MR. IOTTI: That's correct. The prior analysis where the thermal analysis indicated that the restraints -- that the U-bolts would act as a two-way restraint where the thermal expansion was larger, so through that sixteenth of an inch gap, they modified the support.

[A short time was had off the record. Thereafter, the following proceedings were had.]

MR. IOTTI: When we left off, there was some question as to what Gibbs-Hill might have done with regard to some of the analyses with the two-way restraining action of the U-bolt had been considered in determining stresses, independent of that later on, whatever supports had been found constraining the motion was modified. There was also -- I was also to confirm what we had done with regard to re-analysis in the affidavit. And let me add the second portion first in re-assessing typing stresses increased in supports other than those that would act as two-way restraints and also increased in support loads as added to it as would be happening to the supports that act as two-way restraints. The applicants only re-analyzed the seismic portion. And the reason we did so is because it was believed that the sixteenth inch gap or whatever lateral would not effect the thermal analysis at all. So we were interested as to how the seismic load would be effected, seismic stresses, seismic loads that would remain tube support, that's one item.

However, in assessing the capability of the U-bolt to take whatever loads might be imparted to it and what margin it would have on that load, I want to again clarify that applicants used the combination of thermal plus seismic. We assumed the total displacement as calculated on the basis there would be no lateral combination of thermal and seismic would be applied, so insofar as a U-bolt on accepted loads, I don't think there is any question in my mind that it is capable of doing so with regard to possible effect of pipe stresses since no analysis has been redone with regard to the effect on thermal if the gap that is supposed to be there is not there. All I could do is go back to some of the initial analyses of the same problem, for instance, problem AB-162E was re-analyzed by applicants for the purpose of the affidavit. It was analyzed by Gibbs-Hill. When Gibbs Hill ran the analysis with the gap as being non-existent to find out what the effect of the restraining action would be insofar as thermal results, the stresses of the equasion ten went up to about twenty-five percent, not everywhere, but the highest stresses went up to about twenty-five percent. If you were to take that as being the characteristic of the responses,

you would get that you might see that is added on to the stresses, if you were to calculate the normal stresses, just the normal. If you were to do just thermal, it would go up twenty-five percent. Thermal is not a significant portion of the analysis, but I haven't done an analysis, so you have to take this with a grain of salt. I did not do the prior analysis, Gibbs-Hill did, so I can only look at their results and attempt to draw conclusions from those results.

MR. FAIR: I think that we're going to have to get this particular motion straightened out with what actually exists where the applicants designed their sixteenth of an inch gap in the supports and a conclusion on the safety consequences.

MR. IOTTI: Well, I don't anticipate any problem with that, and it's a short turnaround. All we'll have to do is add the thermal analysis, the same problem again, that is with regard to the safety issues, with regard to why the gap that's shown on the drawing is not there. I consider that a separate issue.

MR. FAIR: Let's get that straightened out. I happen to have all the drawings with me. The gap

that's shown on the drawing in the direction of the restraint. I have gone and essentially confirmed that that gap does not exist in the direction of the restraint. The concern here, of course, is not the restraint, but the unrestrained direction. And I have measured various gaps from practically zero to slightly above a sixteenth of an inch total on each side. You may want to reconfirm that by your own measurements, but it wasn't very easy to do on some of those supports.

MR. IOTTI: I think the most straightforward way is for us to assume there is no gap and tell you what the consequences are.

MR. FAIR: I also have to conclude that it would have been appropriate whether or not this turns out to be a safety concern, it was an inappropriate assumption not to assume that these supports provided lateral restraint. There was no basis for making the assumption.

MR. IOTTI: I guess I would have to agree with you for that fact that they were also intended not to have any gap. The conclusion is fairly inescapable.

MR. WADE: According to John Byner that I just talked to, he said that's intended for there

to be a restraint rack on the drawings.

MR. IOTTI: He's talking about unrestrained. These confirmed that that is not the problem. The problem is the other. Okay. I guess we'll have to modify the affidavit to reflect that new analysis. That's a short turnaround. We can have that done by the end of next week. That's not the problem. The other part, I guess I have to talk to some more people here why it's not there and why the drawings show it as such.

MR. FAIR: I want to reiterate the gap as exists as shown in the drawings.

MR. IOTTI: Your question is why do we say there was no restraining action where it wasn't supposed to be? Yeah, I think it's a point we have to address clearly. It was obviously our understanding that it was, we would have never written it otherwise.

MR. IPPOLITO: I would appreciate you reviewing those drawings.

MR. IOTTI: Well, we'll do so, you can rest assured.

MR. IPPOLITO: As a double check, because if we are wrong, I would like to know we are wrong, but, you know, we will look at those drawings, and

if they are the correct drawing and all that shows that its dimensions not given.

MR. IOTTI: We understand your point, and we will address it. Does the approach we have outlined satisfy you? Same problems, give you the results drawing the same conclusions as we did in the affidavit plus the question of the drawings and the appropriateness of making that assumption.

MR. FAIR: Yes.

MR. IPPOLITO: Is there another agenda item?

MR. BURWELL: I believe you wanted to get a status report on the original insert information, is that true?

MR. IOTTI: Well, again, I don't have all the answers, but I've got enough, I think, that I can give you a status report on it.

MR. BURWELL: I just wanted to clarify that. The next item that we are discussing is the applicants' motion for summary disposition regarding the design of Richmond insert and the application to support design. This motion was filed with us on June the 2nd, 1984.

MR. IOTTI: As we left the meeting of the 8th and 9th, we had agreed upon a set of action items. Applicants were supposed to provide additional

information to the staff. One of the items we don't have today, this is the details of the 8th Richmond insert pattern, and I am not in a position, even if I wanted to, to give you the plan on it. That is something that is going to have to wait until John gets back, again our schedule of completing it and getting it by the end of next week. You will have all this. One additional item was -- we did go back and the particular elements -- the stresses are computed as are outlined elements. There is a finite layer on the outside. They are not an extreme fiber, on the other hand, it's a fin element. There were two aspects to the question. Whether one should even attempt to derive the bending movement to the finite element. The other one is, of course, where the stress is being calculated. To attempt to answer the question as to why we felt it was necessary to go to finite element analysis. We believed there was sheer contribution to this particular stress pattern in the bolts, it wasn't just pure bending. As I pointed out to you, we had two test cases that were run, one under tortion and the other one under sheer in the field with the tube steel offset -- the hole in the tube steel offset to the

point in one particular instance you could only see pure bending. If you are ever going to get pure bending in the bolt, that's going to be the case. We then looked at the results of the test and attempted to superimpose on those results the loads. The one we calculated assuming pure bending, MC over I, and we did so by simulating the bolt as a simple cantilever and also a guided cantilever, because its behavior as a guided cantilever was a difference of the two between them. Again, these results are fresh off the press, if you will, and they haven't been reviewed, so I'm somewhat hesitant to show them to you. If you look at that particular one, it shows in either case the cantilever, the guided cantilever are not quite full. The loads depicted by the test is higher than what you would predict by the analytical approach using MC over I. That means there's some resistance there. It isn't just bending resistance, that's why we elected to go to finite elements to find out how much of that resistance was due to bending and how much was due to sheer. We don't know of any other way to do so other than to do a finite analysis. You are welcome to glance at these results. Again, bear

in mind, they haven't even been reviewed, they have just become available.

MR. FAIR: I'm not sure what you just told me. You are relying on the load reflection on the test to verify --

MR. IOTTI: To verify that there is more to the bolt -- that simulating the bolt as if it --

[A short time is had off the record. Thereafter, the following proceedings were had.]

MR. IOTTI: What I was saying is that as you plot load reflection, you can equally plot movement rotation if in fact what you see in the bolt is essentially pure bending, then that bolt essentially behaves as a cantilever or guided cantilever. You should be able to match the results of the test fairly well to the results you have there. If that bolt doesn't behave, a flectual member -- it's a short stout flectual member, as well as both sheer, you have to determine which part is due to sheer, which part is due to flectual resistance. The only way we know how to do that is to find finite element analysis, that's a way of rationalizing where we went to finite analysis of the bolt. We suspected that it

was something more than just M over I effects, and the results that we got out of finite elements did confirm that. So we think this addresses the particular action as to why we can reduce the stresses that you would compute from bending if you just use the MC over I approach. That's what I thought was one of the action items that we agreed on, and this will be provided to you as a rationalization. If you don't agree, your next question will be how many more of those supports of table A or B will be added to the number that will have to investigate further. I don't recall the exact number,but it seems like twelve more supports will have to be added, if I recall correctly, so we are not talking about a large number, in any case. The third action item is confirmed with the fatigue analysis that we had done included in the affidavit was performed using S836 or had in fact accounted for the high strength bolt. We did go back, and it was done strictly on S836. Now, we have gone back and redone a fatigue analysis for those few high strength bolts. We were also to go back and verify whether in some tube steels are there still instances with the MZ Movement -- the MZ Movement rotating is not being released. And

the answer to that is there aren't any MZ Movements also released.

MR. FAIR: This is current design practice.

MR. IOTTI: Well, no. This is something that I don't want to get too much into it, but we may have to modify our affidavit. There was some misunderstanding of what we believe the MZ design people -- the analysis was misinterpreted. They in fact gave us the MZ Movement. The MZ Movement apparently was always released. So that's the information I have as of today, but I haven't had a chance to go back and talk to the people who actually did the analysis, so take that with a grain of salt again. The last time it was -- on providing additional information, the prying action for larger size tube steel, that would be forty-eight inches as opposed to twenty-four inch. Again, I'll give you an unreviewed result, but it appears not to be a problem from the standpoint of prying force, not necessarily the prying action, the prying ratio. Okay. Because ultimately it's the prying force. The six-by-six tube steel with one-inch inserts. We will be providing you with the table that shows the various tube sizes from four-by-four, three and three eighths, all the way

to eight-by-eight by a half, and it will show the reaction with or without the end restraints and give you prime factor for each of them. So I think that addresses all of the action items that we agreed upon at our last meeting. As I said, I don't have any information at all on this eighth insert pattern. If you want, we'll try and define it this afternoon and go look at it, but I have got nothing at all with regard to that.

MR. FAIR: I think that may be worthwhile to walk out and take a look at it.

MR. IOTTI: First, we've got to identify where it is. I haven't the foggiest idea. It will take us some time. Once we identify it, we'll take you there.

MR. FAIR: Let me recap on this MZ Movement. If you confirm that your information is correct, it was never modeled as fixed.

MR. IOTTI: That's correct, which means that our affidavit makes an unwarranted assumption that the information that we have to be correct or to our best belief may in retrospect turn out to be incorrect, because the analysts were confusing in the MS Movement.

MR. FAIR: The other side, there are some

longer spans than your typical twenty to twenty-four inches, and the longest is forty-eight inch.

MR. IOTTI: The longest is forty-eight. We looked at all different type tube steels to address your question on prying action, and we have that tabulated both in terms of pryin. factors as well as the prying force.

MR. FAIR: And that was done in a generic fashion versus looking at specific supports.

MR. IOTTI: Well, it was a combination. The study was done in generic fashion, but what was done specifically is to confirm there was nothing longer than forty-eight. There are some six-by-six-by-three eighths with a one-inch insert.

MR. FAIR: I think that's it.

MR. IPPOLITO: Just let me ask, this is going to be submitted when?

MR. IOTTI: The whole package, everything that we have agreed upon the meeting of the 8th will be turned over to you hopefully by the 30th.

MR. IPPOLITO: And this includes the revision of the affidavit, too?

MR. IOTTI: Yes, if in fact we can confirm that. You can understand now, I am thoroughly confused, because I investigated that quite

extensively and actually sat down with the analysts as we were doing it. I mean, really, if in fact we have to revise the affidavit, the 30th submittal will also include that the end of next week.

MR. BURWELL: I believe the remaining part of it would be a visit to the plant to get a look at some of the hangers. I believe those three gang hangers were specifically one of the areas and the vertical hangers that was represented by figure one on page -- or type one on page nine of your affidavit on stability.

MR. WADE: Before we leave, we have another action planning going on axial restraint rotational resistance question that we discussed a couple of weeks ago. I am assuming since we are not discussing that here, that plan inyour mind will solve a plan that will bring that issue to an end or are there other issues there that we ought to discuss right now.

MR. IPPOLITO: Let me make this clear, I called a meeting primarily to resolve what I thought were the two significant areas where the staff and the applicants could not converge. When I was briefed last week, when I was back in

Washington, these were identified as areas that, you know, we are never going to get there unless something is done, so we came here prepared to do that while we're here. John said that, "Hey, I can clean up one of the areas by going down and looking at this gap." So that's the reason why, you know, we included on the agenda, and I don't know whether we're prepared to talk about anything else or not. Staff, tell me we're not, and we'll cut it off right here.

MR. FAIR: We're not.

MR. BURWELL: We're not on the other, so in answer to your question ---

MR. IPPOLITO: In answer to your question, I don't know if we've got a problem, but it wasn't presented to me as a problem that I had to, you know, focus on.

[A short time is had off the record. Thereafter, the following proceedings are had.]

MR. IPPOLITO: We have agreed that we will tour the site at two o'clock, and that will close the meeting up.

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

THE STATE OF TEXAS X

COUNTY OF TARRANT X

I, PAM ALFORD, Certified Shorthand Reporter and a Notary Public in and for the State of Texas, do hereby certify that the above and foregoing 78 typewritten pages, contain a full, true and accurate transcription of my stenographic notes taken upon the occasion set forth, and reduced to typewriting by me or under my direction.

WITNESS MY HAND, this 5th day of September, A.D. 1984.

Pam Alford

PAM ALFORD, C.S.R.
Notary Public in and for
the State of Texas.