UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of:

COMMONWEALTH EDISON COMPANY

(Byron Nuclear Power Station
Units 1 & 2)

Docket No. 50-454 OL
50-455 OL

Location: Rockford, Illinois

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Date: Wednesday, July 25, 1984

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY & LICENSING BOARD

In the matter of:	:	
COMMONWEALTH EDISON COMPANY	:	Docket Nos. 50-454 OL 50-455 OL
(Byron Nuclear Power Station, Units 1 and 2)	:	

U.S. District Courtroom
Federal Building
211 South Court Stree
Rockford, Illinois

Wednesday, July 25, 1984

The hearing in the above-entitled matter was convened, pursuant to recess, at 9:00 a.m.

BEFORE:

JUDGE IVAN SMITH
Chairman, Atomic Safety & Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

JUDGE A. DIXON CALLIHAN
Member, Atomic Safety & Licensing Board
U.S. Nuclear Regulatory Commission

JUDGE RICHARD F. COLE
Member, Atomic Safety & Licensing Board
U.S. Nuclear Regulatory Commission

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APPEARANCES:

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MMmm

C O N T E N T S

WITNESSES:	BY:	DIRECT	CROSS	BOARD	REDIRECT	RECROSS
(Resumed)						
Louis O. DelGeorge)	Judge Smith			8749		
Richard P. Tuetken)	Mr. Miller				8757	
Walter A. Shewski)	Mr. Cassel					8807
	Judge Cole			8884		
	Judge Callihan			8885		
	Mr.Miller				8887	
	Mr.Lewis					8891
John Hansel	Mr.Gallo	8896				
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PROCEEDINGS

JUDGE SMITH: Are we ready to proceed?

Is there any preliminary business?

MR. MILLER: None from the Applicant, Judge.

MR. CASSEL: Not at this time, Judge.

JUDGE SMITH: Are we ready for the redirect examination of this panel?

Whereupon,

LOUIS O. DEL GEORGE

WALTER A. SHEWSKI

RICHARD P. TUETKEN

resumed the stand and, having been previously duly sworn, were examined and testified as follows:

JUDGE SMITH: I had some questions that I had forgotten to ask concerning some of the visual weld attributes. Maybe this would be a good time to ask them.

FURTHER EXAMINATION BY THE BOARD

BY JUDGE SMITH:

Q This is Physical Exhibit A. Reading from the top of Physical Exhibit A, we have the first observed defect is porosity. I think that's pretty obvious. It's porous.

A (Witness Tuetken) Yes.

Q The next one is underrun. What do we see about that that makes it an underrun?

A In other words for a linear length of the weld,

the run of the weld, the size of the weld is not that which is specified.

Q So the area covered by the triangle there, the cross-section triangle would be too small?

A Correct.

Q Not enough structural steel there to support it, to do the job?

A Not enough structural weldment to meet the design specified welding requirements.

Q Slag included means there is slag there?

A Correct.

Q Insufficient leg size, it doesn't go far enough for one of the legs of the annulus?

A Correct.

Q Excessive concavity, that's obvious. Excessive convexity. What's wrong with too much convexity?

A It's a fatique concern by the code structural. In our application of structural welds, we don't have fatigue applications.

Q That's in testimony, I believe. Insufficient throat.

A Again, the size of the weld across it. In other words, from the corner of the joint to the plane of the weld is insufficiently large.

Q Excessive undercut. I see there that there is

insufficient welding material.

A Yes, he's really specifically referring to -- you see a depression in the space material. In other words, the structure has washed out and not been refilled.

Q Cold lap, bad start.

A Cold lap --

Q Those are two aspects.

A Two different aspects.

Cold lap, that's another name of lack of fusion, wherein the base material at the toe has not fused, remelted with the base material.

Q What is the toe?

A It is the end of the triangle, as it intersects with the plate. That's commonly referred to as the toe.

Q I see. Bad start.

A Basically it's representing a cavity. It's a bad start.

Q Inadequate penetration.

A Again, lack of fusion on the material.

Q You can see that right at the very beginning. The two angles are connected, but not right where they join.

A Correct.

JUDGE SMITH: Thank you.

Mr. Miller?

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MR. MILLER: Thank you, Judge Smith.

REDIRECT EXAMINATION

BY MR. MILLER:

Q I would like to begin my redirect examination with Mr. Shewski. Mr. Shewski, in testimony yesterday you mentioned a number of audits where there was an extensive review of documentation. When was the most recent such audit?

A (Witness Shewski) The most recent such audit was in the latter part of June of 1984.

Q How many documents total were examined in that audit?

A On the order of 22,000.

Q How many Hatfield documents were looked at in that audit?

A Just under 2,000.

Q When was the -- when was another occasion on which there was a document review by Commonwealth Edison of quality assurance?

A You're talking about the very large extensive audited documentation that was done the last part of 1982. There has been almost every audit documentation looked at to verify. But in that audit there was in the order of very close to 11,000 documents looked at from a period of -- from mid-October to mid-December.

Q And now many of those documents were Hatfield

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documents?

A Just under 3,000.

Q Mr. Shewski, I would like to clarify one matter that goes to two of the attachments that you were examined on yesterday. They are attachments Q and R to your prepared testimony. Is the inspection program that was referred to in those attachments, a part of the reinspection program, Quality Control inspector reinspection program I should say?

A It is not.

Q What are they, sir?

A This is an inspection program which was established to document on weld travelers the complete inspection of all the hangers installed by Hatfield Electric Company. There were two aspects of that effort. One had to do with inspection of the welds and the other had to do with inspection of the configuration of the hangers.

Q Excuse me, Mr. Shewski, I'm referring specifically to Attachment Q and R to your testimony.

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A That has to do with these weld travelers.

Q That's Attachment 2, correct?

A Yes.

Q What does Attachment R have to do with?

A The second one had to do with not having weld travelers and inspections of the combination hangers on which Reliable Sheetmetal installed on their heating, ventilating and air conditioning appurtenances to the cable tray hangers.

Q Now you started to describe weld traveler documentation and the configuration inspection of Hatfield hangers.

I would like to back up just a little bit. Yesterday, under examination by Mr. Cassel, you stated that you did not agree with the Atomic Safety and Licensing Board's characterization of Hatfield documentation.

Do you recall that question and answer?

A Yes, I do.

Q I think it would be helpful, Mr. Shewski, if you would describe in your own words the evolution of Hatfield's inspection and documentation practices over the years, based on your observation of those practices.

MR. CASSEL: Objection. I will note that we, I think, are getting beyond the scope here. On the other hand, if the Board is interested in the information

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for purposes of understanding the basis of his statements yesterday, then I would have no objection. Unless the Board believes that to be an important purpose, I would object on the merits.

JUDGE SMITH: One of the instructions on the remand order was that the Board should not only take new evidence, that we should pause and consider whether our initial findings were correct and should be modified.

We understand that Mr. Shewski would like to explain to us just where we went wrong, and we'd like to hear from him on that.

MR. CASSEL: In that light, I have no objection on that.

MR. MILLER: Mr. Shewski is not going to presume to tell the Board where they went wrong. He really is just going to testify as to facts. I want to make that absolutely clear. There is no adversarial --

JUDGE SMITH: Yes, I understand that, and I don't say it with any charge of bias or anything. I just would like to hear what he thinks about it.

WITNESS SHEWSKI: What I am going to do is explain the history of the documentation and the welding activities on behalf of Hatfield.

JUDGE SMITH: You're talking about welding now?

WITNESS SHEWSKI: Yes, sir.

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JUDGE SMITH: All right.

WITNESS SHEWSKI: Hatfield, over the period of time from when they started on the job up to the present, has been involved with chaning methodology, both in respect to installation and in connection with inspection. Early on, the installation work was done from two drawings, and not necessarily to travelers. Travelers came later.

The inspection activities were done on a sampling basis and were done early to drawings.

BY MR. MILLER:

Q Mr. Shewski, would you stop, if I might just interrupt? Would you explain the significance of the fact that in this early period the inspections were done to drawings?

A (Witness Shewski) In the early days, it was normal practice and industry practice to do inspections to drawings. What they did is, they took the drawing, after the work was installed, all the work was completed on the hangers, they took the drawing out and they spot checked about five percent of the hangers on a component basis, on a total hanger basis, not specifically to a weld, not specifically of a detail.

Similarly, those were installed to a drawing and to a detail and were not processed and controlled and

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documented to travelers early on.

The next phase was that they started using travelers, but we did not change to inspecting every hanger, and not until abou 1981 was it decided, because of the changing philosophy about inspections and documentation, having traceability, did we decide -- and, in fact, I was in on the meeting -- we told Hatfield to thereafter do a hundred percent inspection of all hangers.

Q If I can just interrupt again, prior to this time, this period, were the inspections to drawings, as you describe them, done in accordance with then existing procedures or not?

A They were done to then existing procedures, and the inspection data that was gathered was indicated on the drawing as -- basically as acceptable where they looked.

So in the latter part of 1981 when we decided that we would do 100 percent inspection of all the hangers, that meant also that we had to go back and reestablish the inspections, where they were not available, on all the hangers, as well as establish any traveler cards that were not existing, in order to establish a methodology to handle that activity. Two NCRs were issued. One was NCR-540, which dealt with the weld inspection, and NCR-407, which dealt with the configuration inspection.

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In order to go through and try to collect and assimilate the traveler cards to specific drawings, a computer data management system was established. Part of the problem at that time, too, is that they had changed methods of identifying hangers. In the early years, they identified them by types of hangers, and then they changed to identifying each hanger to a discrete number. So this computer data management system was used to identify the hangers to each respective drawing, and then we used the drawing as a control for all the hangers, and any weld traveler cards, and then we went out in the field and established the inspection data about each hanger.

Today, we are essentially complete with both of those nonconformance reports. All hangers, or essentially all hangers, have been inspected and are very close to being corrected. And to the best of my knowledge, the documentation is complete, and the hangers are acceptable or will be corrected where correction is yet to be done.

Q Mr. Shewski, would you say that the documentation problems that you discussed in your testimony yesterday on cross-examination by Mr. Cassell are more or less severe or serious than the ones that you have just described with respect to these two NCRs?

JUDGE SMITH: Those documentation problems being the series of questions of post-August 1983

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documentation problems?

MR. MILLER: Correct.

WITNESS SHEWSKI: The deficiencies that were identified, that I was just talking about, and all the activities dealing with establishing documentation and establishing the inspection and that the items were acceptable, are far much more important than the isolated cases of deficiencies that were identified in those audits and surveillances. And in this timeframe that this testimony covers, we were, as I said, I think yesterday, we were intensely watching Hatfield. We conducted some 220 or whatever the number was, in that area, of surveillances just since last August to date, and we conducted maybe 14 audits. That is a heavy activity on one contractor.

But we did the other contractors the same thing in this timeframe, because we're coming nearer to completion of plant. But we really didn't find anything seriously wrong, that had serious impact on the plant. We just found glitches, human error things or misunderstandings, things like that, which do not have serious impact.

BY MR. MILLER:

Q Mr. Shewski, do I understand that the hanger inspection program -- well, for what period of time has the hanger inspection program that you described in your earlier answer been in process at the Byron site?

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A (Witness Shewski) NCR-407, which dealt with the configuration inspection, was issued in March 1982, and NCR-540 that dealt with the weld traveler cards was issued in February of 1983.

Q Mr. Del George, just to round out the story, you testified yesterday regarding a recent NRC item of noncompliance involving hanger configurations; is that correct?

A (Witness Del George) Yes, sir.

Q What relationship, if any, does that recent NRC inspection report have to the events that Mr. Shewski just described?

A That inspection report makes reference to the program referred to by Mr. Shewski to validate the configuration details of hangers in what was a backward look, a retrospective look, to assure that configuration had been inspected on previously installed supports.

End 2

Q Mr. Shewski, has Hunter corporation experienced the same type of documentation problems, inspection problems? That evolution that you just described with respect to Hatfield?

A (Witness Shewski) No.

Q Why is that?

A Hunter is a contractor that does its construction under the ASME code. And as a requirement of the ASME code and the requirement to become certified, it has been the case for many, many years that a contractor who was to be certified by ASME must have a system of travelers and a system of inspections that are documented.

As a result, when Hunter came onsite, they went through a survey and it was verified that they did have the traveler system in place, as required, and an inspection and Quality Assurance system in place, and therefore was certified. They must adhere to those requirements, or they would lose their certification and therefore no longer be able to do code work at our station.

Our findings, in connection with Hunter, is that they have been quite good at adhering to their program requirements and they have not gone through virtually any type of evolution relative to the use of the traveler and the inspection concept.

JUDGE SMITH: Do you mind if I ask a clarifying

question here?

MR. MILLER: Not at all.

JUDGE SMITH: As I understand, from somebody's testimony, Hunter is subject to ASME code because it is doing piping-type work?

WITNESS SHEWSKI: Yes, sir.

JUDGE SMITH: And Hatfield, for example, is not, they are under AWS standards?

WITNESS SHEWSKI: That's correct.

JUDGE SMITH: What is the functional difference? Why does one system of codes apply to piping and one system of codes apply to general welding, if I'm correct about that?

MR. MILLER: Judge Smith, I'd be happy to have Mr. Tuetken give an answer. I think also we ought to remember the question and ask it again of the Sargent & Lundy witnesses, too.

JUDGE SMITH: All right. If that's a better time.

MR. MILLER: I think Mr. Tuetken has some information that he can provide. It can be supplemented later.

WITNESS TUETKEN: The ASME code is more than just a welding code. It applies to many aspects of piping installation, of which one subset of that is welding operation associated with adjoining those mechanical materials, piping and hangers, et cetera.

There is no like industry standard that is as

detailed in the electrical area. It's just an industry absence. I guess I would have to relate to that.

AWS, however, is the welding code applied to their welding operations in electrical installation activities.

WITNESS DEL GEORGE: It's also true that the code of federal regulations, 10 CFR 50.55 A requires the application or has adopted the ASME code for purposes of installing pressure piping in nuclear reactor plants. So the ASME code has been adopted by the NRC's regulation for application on piping. I know of no similar provision within our regulations or those regulations applicable to us that have similarly adopted the AWS code.

We, the industry, have historically employed the AWS code for applications of the type that apply to the welding work done by Hatfield, the electrical contractor.

JUDGE SMITH: ASME means American Society of Mechanical Engineers. AWS is American Welding Society?

WITNESS SHEWSKI: Correct.

BY MR. MILLER:

Q Mr. Shewski, finally, based on your knowledge, were Hatfield's practices that you described unusual or different than those that were in place for other electrical contractors at nuclear power plant construction sites?

A (Witness Shewski) No.

Q Mr. Tuetken, I would first like to call your

attention to Attachment Number 1 to Intervenor's Exhibit R-2. Can you tell us, first, by whom that document was prepared?

A (Witness Tuetken) Myself.

Q When did you prepare it?

A I prepared it in preparation for a meeting in order to present this program plan to the NRC, of which that was presented to them on February 3, 1983.

Q In what manner was this document presented to the NRC at this meeting on February 3rd?

A It was presented as our proposed plan of doing sampling to validate previous inspections for these specific contractors. And it was presented as an overhead projector flimsy.

Q Mr. Tuetken, what was the NRC's response to the program plan, as you presented it at the February 3 meeting?

A To the best of my recollection, they accepted the plan. The only modification, I believe, that came out of that meeting was to require that we have the first inspector do a sampling plan, whereas this was identifying the fifth and every fifth inspector.

Q When you use the words, on Attachment 1 to Intervenor's Exhibit R-2, to say "select every fifth inspector" what did you mean by those words?

A The fifth inspector, the tenth inspector, the 15th, the 20th.

Q Now let's see, again, how that was implemented with respect to Hatfield. I'd like you to turn to Intervenor's Exhibit R-4.

JUDGE SMITH: The purpose of Mr. Cassel's examination along this line, as I understood it, was to demonstrate that contractors had an opportunity to control the selection method and that therefore they had an opportunity to skew the sample. Is that what you were trying to establish?

MR. CASSEL: That was the ultimate, Judge, yes.

JUDGE SMITH: Now having gone through that cross-examination and heard the answers, do you still intend to establish that point? And this type of thing, I hope we will be doing throughout the hearing.

MR. CASSEL: I think there were really two separate --

JUDGE SMITH: Do you want time to think about that answer?

MR. CASSEL: No, I think it's a good point that you raise. As a matter of fact, I was trying to raise it myself this morning, Judge, so you may have saved us all some time by getting to it.

I really looked at two points yesterday. One,--

the second one was that listing of Hatfield inspectors, which appeared to be out of order and raised what I thought were legitimate questions. As far as we got down the list and as far as I am aware, Mr. Tuetken explained away the out of sync. Subject to further review of the document, and finding other out of syncs that don't appear to have some sensible explanation, I think I just have to fess up and say this lawyer got skunked yesterday on that one.

JUDGE SMITH: That was a good exercise. We were right along with you all the way and the answers were just convincing and you did very well. But this is what it's for, to find out.

MR. CASSEL: I certainly would have preferred to have learned that earlier. I didn't receive the particular documents until the last minute, so we all went through a useful exercise on that function.

The other point, which was the first point I was getting at, was the issue concerning the opportunity that contractors had to participate in the design development of the program. I don't believe that we've had -- and that's the area which I had the impression Mr. Miller had finished covering and he was going to turn to the second point on Hatfield. Am I incorrect on that?

MR. MILLER: Well, I think with the very few questions I can add to the body of evidence, with respect to

any influence the contractors may have had on design of the program. Very quickly, going through these documents.

JUDGE SMITH: All right, but I would like the parties to remain attentive at all times. If an issue evaporates, let's identify that at the beginning and save us all trouble.

MR. CASSEL: Let me see if I can focus the remaining issue that I see, and I invite Mr. Miller to ask whatever questions he would like, that might illuminate it.

The remaining issue that I see is that while Mr. Tuetken says that in his head what he meant here, in Attachment 1, was to begin with number five and number ten, that's not what Attachment 1 says.

Attachment 1 says take every fifth. The first time we have any piece of paper that says take every fifth, beginning with the fifth, is Mr. Hunter. That's why I raised the question yesterday. Maybe there's an answer to that.

JUDGE SMITH: Okay, that's fine. I really don't expect you to have to defend your position or anyting. I just want, as these matters arise, to everybody to think about whether the issue still is alive and needs to be pressed.

BY MR. MILLER:

Q Let me back up, Mr. Tuetken. Let's go back to Exhibit R-2, Intervenor's Exhibit R-2, which is the

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Hunter letter.

Prior to the time that you received Exhibit R-2 from -- I believe it's from Mr. Somsag -- did you have any conversations with Mr. Somsag regarding the reinspection program?

A (Witness Tuetken) Yes.

Q What, if anything, did you tell him about the way in which inspectors were going to be selected by you?

A Every fifth inspector, starting with the fifth.

Q Mr. Somsag had that precise information prior to the time or after the time that he sent you the letter of February 16th?

A I think you can see, by Attachment 1, they note they received it on February 7th. You can see by the cover, this February 16th letter, the dating of it is post that date, also is pursuant to a meeting that we held with them on February 7th.

Q Did you give the same instructions, that is that it was to be the fifth, the tenth, the 15th, and so on, inspector in order of date of certification to all the site contractors?

A Yes, sir.

Q Now let me just spend a very few minutes on Intervenor's Exhibit R-4. Would you turn to page 7?

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A All right.

Q I would like to call your specific attention to the name, W. Wright, that appears on page 7 of Exhibit R-4; do you see that?

A Yes, sir.

Q Under the column that's headed "Level," do you know what level was indicated on the version of this document that you received from Hatfield for Mr. Wright?

A In the handout that Mr. Cassel presented yesterday, he numbered page 22, which procedurally I'm not sure was in.

Q I don't believe it's a part of the exhibit.

MR. CASSEL: I don't have any objection to discussion based on that page, even though it was not admitted into evidence. The testimony is evidence, unless it's excluded.

WITNESS TUETKEN: Page 22 represents the document in this form as I received it, minus only the notation, "Dick suggested list." On that document, you will see that Mr. Wright was presented to us as a Level I inspector, along with Mr. Lane and others, because the are of inspection here was welding inspection and because, in the strict interpretation which we were taking at that time, the welding inspector must have been a Level II, because a Level I can only record data and cannot make

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judgments.

For the purpose of this program, he was treated as a Level II. As such, I made a notation and changed, in my own writing, the document from a Level I to a Level II and then began the process of selecting everyone -- every first and every fifth inspector.

BY MR. MILLER:

Q So is it correct, Mr. Tuetken -- well, could you identify, for the record, those names as to which you made the change from a Level I to a Level II on Intervenors' R-4.

A (Witness Tuetken) Beginning at the top, W. Wright, P. Lane, R. Mulkey. On the second page, page 8, D. Richards, T. Wells. No modifications on page 9, nor 10.

Q What, if anything, did these alterations -- well, after you made these alterations to the certification level column, did you then count every fifth inspector?

A Yes, as represented by the document, beginning on page 1, I double-asterisized the fifth inspector, Mr. Hoffman, and then sequentially counted every fifth Level II after I made the modifications. The notation to that was provided and is represented on Exhibit R-4, page 10.

I then likewise began the process of identifying the Level I inspectors, beginning with the fifth and

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subsequent every fifth, with a single asterisk. And that note, again, is provided on page 10 of Exhibit R-4.

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Q As you sit here today, Mr. Tuetken, do you have any basis for believing that Hatfield Electric Company presented a list to you arranged so that certain inspectors would either be included or excluded from the selection process?

A I have no knowledge that they would have done so.

Q Assume with me for a second that that was their intent. What was the effect of your changing the level for certain of these inspectors, as you described, on the order in which inspectors were presented for selection in the reinspection program?

A It would have performed a phase shift or disordered the order as presented.

Q Mr. Tuetken, with the alterations that you made to this list, does the selection process conform to program requirements?

A Yes, sir.

Q Calling your attention to Mr. Mulkey's listing, what effect, if any, does the fact that Mr. Mulkey is shown as a Level II twice have on the counting that you did?

A In that process, in showing him a Level II twice, I counted the same individuals as Level II, and in effect, I only went down four individuals at that phase.

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Q So in other words, you made an error.

A I made an error.

Q When did you first become aware of that error?

A Yesterday.

Q After you prepared this list, pages 7 through 10, did you transmit it directly back to Hatfield?

A No. One of the agreements or establishments of the program, in the February 3 meeting, the NRC identified their desire and ultimately requirement that they be allowed to select their own individual inspectors from the chronological listing after the initial selection process. This list was then provided to the Senior Resident Inspector, from which he did his review, identified additional inspectors to be added to the program.

After that event, it was returned and directed to Hatfield, along with the additional listing of the NRC-selected inspectors.

Q Very briefly, turning to Exhibit R-5, whose document is that? Who prepares that document?

A The document was created by the Project Construction Department as a visible tool to monitor the progress of the program, identifying the inspectors selected and their performance rate.

Q Now we will switch subjects. I refer you to testimony you gave yesterday on cross-examination regarding

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the date for completion that you discussed with the contractors. I believe that the documents and your testimony indicate that initially a completion date of July 1st was set by you; is that correct?

A Yes, that was the objective date we had established.

Q Why did you set that objective date, Mr. Tuetken?

A At that point in time, our presently scheduled fuel load date was August 31st. Working toward that end, we would have had to have completed the inspections and had the NRC review completed, and therefore the creation of that objective.

Q What was the significance of that date, as far as you know, to each individual contractor?

A It's purpose was -- my direction -- subsequent to that date, I directed them, as part of that activity, to create the necessary resources and scheduling activities and tasks in order to execute the program by that date.

Q In fact, was the July 1st schedule met?

A It was not.

Q When was the reinspection program actually completed?

A The last elements of inspection were completed in January of 1984.

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Q I would like you to turn now to Intervenors' Exhibit R-8, which is the letter from Mr. Spessard to Mr. Reed.

Mr. Tuetken, when you say this letter on or shortly after March 22, 1983, what did you understand the meaning of that second paragraph to be?

A I did not understand it.

Q Following receipt of this letter, did you have any further conversations or communications with the NRC Staff regarding this paragraph in the letter?

A Yes. It was discussed in a meetin, or an inspection period in which there was a meeting, between myself and Commonwealth Edison in June and also August and September.

Q Focusing on the June meeting, who was there for the NRC?

A Kevin Ward is one I can recall. Mr. Forney. Others I can't remember at all at this time.

Q This is June of 1983?

A Yes.

Q Could you identify Mr. Ward at this point in the record for us?

A Kevin Ward is a specialist inspector, specialist reactor inspector, with Region III status.

Q What is his area of specialization, do you know?

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A My impression of his area of specialization is welding and associated nondestructive examinations.

Q Can you tell us, in this June meeting, what you said to Mr. Ward and what he said to you regarding this second paragraph in Intervenors' Exhibit R-8?

A As I recall, my conversation would go in the line of not understanding the letter. What was his understanding?

Ultimately, I did not know how to classify this paragraph into the program. Ultimately, that we were going to treat all welds as subjective inspections.

Q What did Mr. Ward say to you after you told him you were going to treat all welds as subjective inspections?

A I'm not sure I can recall words, but I was left with the impression that he agreed that that was appropriate.

Q I think you said you discussed --

MR. CASSEL: Objection to the extent that's offered for what Mr. Ward, in fact, said. I have no objection to the extent it's offered for the purpose of showing what Mr. Tuetken's impression was.

JUDGE SMITH: Well, inasmuch as Mr. Ward will be a witness in this proceeding, we're not going to be concerned about the hearsay aspects of it. He is being

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presented, and whether his tesctimony covers that point or not, you will be free to ask him.

MR. MILLER: I would just like to observe for the record that as a position of a party to the proceeding, I think it's an exception to the hearsay rule anyway.

MR. LEWIS: Let me note for the record that Kevin Ward is in the audience today, so additionally he is taking note of the matter raised.

End 4

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BY MR. MILLER:

Q Mr. Tuetken, I think you said you had conversations regarding this paragraph in the letter that has been marked as Intervenor's Exhibit R-8, in August and September of 1983 as well. Is that correct?

A (Witness Tuetken) Yes.

Q Describe the substance of those conversations.

A Basically in August, again a restatement to validate my previous assumption or impression that I left with the same impression in September, we presented to members of the Staff our status of the program, which Mr. Spessard was in attendance. And in presenting the way we identified the data, we received no question, so we believed that we were doing it to their intent.

Q When you say you presented the data, what data are you talking about?

A We presented data of the statistics of the reinspection program, including the statistics associated with welding, identifying how many welds had been inspected and how many had been accepted, and compared them to the 90 percent threshhold.

Q As far as you were concerned, it was clear that all visual weld examinations would be treated as subjective examinations under the program, correct?

A Yes.

Q What reaction, if any, was there from the NRC Staff at this meeting in September?

A None of controversy, one of receiving information and accepting it.

Q Can any member of the panel, including you Mr. Tuetken, tell me whether there has been any other indication of the NRC Staff position on this issue? That is, whether visual weld examinations are to be treated as subjective or objective attributes, under the reinspection program?

A My response to that is by the fact that their Inspection Report 8413, after doing all the previous reviews of other inspections reports on the topic and reviews internally I believe, identified in 8413 that the item of non-compliance and the activities of validating previous inspections was a closed matter to their acceptance by 8513.

Q I would like to turn just briefly to a further examination of the words in Intervenor's Exhibit R-8. The specific ones are the ones that end that sentence, in the second paragraph, which talk about subjective inspection attributes being only those "which do not affect the integrity of the weld."

Mr. Tuetken, would you get up on the table Physical Exhibits A and B, and I want to ask you some questions.

JUDGE SMITH: I would never get those through the metal detected at the airport, so you'll just have to plan on shipping them.

MR. MILLER: You'd have to answer some questions, I'm sure.

(Laughter.)

BY MR. MILLER:

Q First of all, Mr. Tuetken, just to set the background, is there a weld in the plant which resembles Physical Exhibit A?

A (Witness Tuetken) There is no weld in the plant, to my knowledge, that in any way resembles that type of weld. It's a special sample developed for this hearing purpose alone.

Q The purpose was to identify various kinds of deficiencies, correct?

A In one continuous weldment length. It was created to identify all potential cause for rejection.

Q Assume with me that there is a condition of weld porosity on a specific weld. Using Physical Exhibit B, could you demonstrate for the Board and parties how that might appear on an otherwise acceptable weld?

A Well, the weld in its completed condition generally will look as represented by Exhibit B. There will be and can be, in various isolated locations of this weld length,

locations of porosity. They are normally small in quantity and small in nature.

Q And the visual sign of porosity is something resembling a pinhole, correct, on the surface of the weld?

A Correct.

Q Is it possible, in your judgment, to determine whether that porosity affects the integrity of the weld by simply looking at it?

A No.

Q How would such a determination be made, Mr. Tuetken?

A Integrity of the weld, to me, means -- and that's where my response comes from -- is the ability of the weldment to perform its design basis or its intended function. A singular isolated occurrence of porosity can not be determined by an inspector nor any other singular isolated event of undercut, et cetera, can be determined by an inspector to affect the ability of the weld to perform its intended function.

That has to be performed by the analyst or designer of the weldment.

Q Let's just, for the sake of the record -- would your answer be the same with respect to the other discrepancies that are catalogued in graphic form on Physical Exhibit A? Undercut, for example?

A Yes.

Q To your knowledge, Mr. Tuetken, are there conditions in the plant where a weld will have more than one discrepancy on a single weld?

A Yes. A single run of weld may have two conditions of undercut associated with a single weldment. It could have one porosity, one undercut, any combination of the whole series.

Q Now in the reinspection program itself, assuming that there were more than one weld deficiency in a single weldment, how would those count for purposes of the program?

A A weld was counted as rejectable with the presence of one -- only one or any combination of more than one discrepancy.

Q If there were more than one discrepancy, it was still only one rejection, correct?

A Yes.

Q Let's assume that there was a condition on a single weldment of both undercut and porosity. In your judgment, would it have been possible in those circumstances for an inspector to make a determination as to whether or not his inspection of the weld, visually, had found discrepancies which affected the integrity of the weld, as you have used that term?

A No, he could not make that determination.

Q In the presence of two defects, why is that also

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not so?

A Because again, a combination of two defects have to be compared in the total against the weldment's intended design function.

Q Mr. Tuetken, when the inspector -- when the reinspector looked at welds, did he stop his examination when he identified one discrepancy, or did he go on and determine all discrepancies?

A He identified all discrepancies that were present in the weld.

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Q I was going to start with Mr. Del George, but one or two more questions, Mr. Tuetken.

Mr. Tuetken, are there certain types of weld discrepancies identified in the AWS Code, identified as discrepancies in the AWS Code, that do not under any set of circumstances affect the integrity of the weld?

A In my opinion, or the Code's?

Q In your opinion.

A In my opinion, there is nothing that I can recall stated in the AWS Code that --

Q Let me be a little bit more specific, if I can.

For example, an arc strike. Do you know what that is, Mr. Tuetken?

A Yes.

Q Would you describe it for the Board and the parties?

A It is basically a remelting, either on the base material or even sometimes on the weldment itself, of weld deposit occurring from the operation of the electrical --

JUDGE SMITH: That's a "whoops," he's got this torch there and "whoops," it goes off someplace he doesn't intend it to?

WITNESS TUETKEN: That's correct.

mgc 6-2

BY MR. MILLER:

Q Is that the type of discrepancy that would affect the integrity of the weld, as you have used that term?

A In my opinion, arc strikes do not affect the integrity of the weld; however, they are cause for rejection.

Q Would your answer be the same with respect to weld spatter?

A In my mind, arc strikes and spatters are closely synonymous.

Q Now, Mr. Del George, two days ago you were examined by Mr. Learner, and I would like to go back to three issues that were the subject of your cross-examination.

First, I would like to start with Attachment E to your prepared testimony. You were directed by Mr. Learner to page 6 of 7 of Attachment E and examined regarding the averages that are shown there.

First of all, are there comparable averages that are shown in Attachment E for Hatfield and Hunter?

A (Witness Del George) Yes, sir, there are.

Q Where are those located?

A In the case of Hatfiled, they are shown on page 1 of 7 of Attachment E. In the case of Hunter, they are shown on page 4 of 7 of Attachment E, and in the case

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of PTL, they are shown on page 6 of 7 of Attachment E.

Q With respect to Hatfield and Hunter, the averages exceed the acceptance criteria for individual inspectors for both subjective and objective inspection types, correct?

A Yes.

Q Now what significance, if any, do you attribute to these averages of both the ones for Hatfield and Hunter which were above the acceptance criteria for individual inspectors and the one for PTL, which in the case of the subjective inspector type, was below the acceptance criteria for the individual inspectors?

A As I discussed in response to those questions, I attributed minimal significance to the statistic alone.

Q Why is that?

A In my opinion, it does not alone represent a basis upon which judgments can be reached about inspector populations, and these statistics were accumulated for the sample inspector population, and it is a number that can be derived from the results, but alone cannot be used as a basis for prediction as to other inspectors.

Q Well, these numbers were presented by you, but, in your judgment, what is their utility?

A We believed it to be necessary to review the data in this way to determine which attributes, if any,

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had lower rates of passing than others. It played a part in the trend analysis that we conducted for all the attributes.

To the extent an average was less than one of the program acceptance criteria, we focused greater attention to that attribute for purposes of trend analysis.

Q What, if anything, did you do as a result of that, the fact that PTL's average for subjective inspections was less than the program acceptance criteria?

A As is discussed in my direct testimony, we did focus our attention in that area for PTL and did discover two trends which were further evaluated and dispositioned as a part of the program.

Q Now of what use, if any, are these averages in assessing the quality of work that is performed by these three contractors?

A Again, it's my belief that the averages alone provide a minimal basis for judging the adequacy of the underlying work.

Q Why is that?

A As I have described in previous testimony, the data points -- that is, the observed discrepancies which were accumulated for inspectors and which form the basis for this average -- included discrepancies which subsequently, on the basis of engineering evaluation, are

mgc 6-5

not shown to be valid

Therefore, to apply directly these averages to a judgment relative to the underlying adequacy of the work would be inappropriate.

Q I would like to switch now to that portion of Mr. Learner's examination that took you through a rather long list of what I would call concepts or facts. He called them assumptions; later he called them factors, I think, after an objection was sustained.

In his examination, he directed your attention to those concepts or facts, as they appeared at the conclusion or completion of the reinspection program -- do you remember that line of examination?

A Yes, sir.

Q I am going to ask you a series of questions regarding first the assumptions that you made about certain facts or conditions at the time that you were designing the reinspection program. Then I'm going to ask you what those assumptions were. And finally whether the assumption was validated or not validated at the conclusion of the reinspection program.

Now the first one, Mr. Del George, is, did you, at the inception of the reinspection program, make any assumptions about whether there were design-significant deficiencies at the Byron Station?

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A Yes.

Q What was that assumption?

A We made the assumption that there were no design-significant discrepancies at the Byron plant.

Q Did that assumption play a part in the design of the program?

A Yes. As I discuss in my direct testimony, the facts as they existed at the time the program was developed, did not indicate that construction-related design-significant problems existed in the plant. As a result, the effort -- our development process focused on the question that was raised relative to inspector qualifications and was intended to resolve the uncertainty relative to those qualifications.

Q Were assumption relative to the existence of design-significant discrepancies are validated at the conclusion of the reinspection program?

A I believe it has been on the basis of the extensive amount of reinspection work that we did, which did identify in some cases discrepancies, the engineering evaluations associated with those discrepancies have not identified design-significant -- any of design significance.

Q The next assumption that I want to ask you about, Mr. Del George, has to do with the qualifications

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of the individuals who were conducting the reinspection effort.

Did you make any assumption with respect to the qualifications of those individuals when you were designing the program?

A Yes.

Q What was that assumption?

A It was our assumption that individuals who were qualified and certified in accordance with the agreements we had reached with the NRC for the implementation of the applicable standard, ANSI N-4526, that those individuals, if certified in that way, would be qualified.

Q Has that assumption been validated or contradicted by the conclusion of the reinspection effort?

A I know of no facts that have come out of this program to suggest that that was not a valid assumption. Moreover, the oversight of our Construction Department, of our Quality Assurance Department, as well as the NRC, lead me to remain convinced that that was a valid assumption.

Q I would like to turn to the 90-day period within which an inspector's work was reinspected.

Did you make any assumption about the adequacy of that 90-day period when you were designing the reinspection program?

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A It was our assumption that to review work performed over a three-month period or 90 days would provide an adequate basis for assessing the qualifications of the inspector.

Q And has that assumption been validated at the conclusion of the program, do you believe?

A I believe it has.

Q On what do you base that belief?

A The results of the program indicate that the vast majority of inspectors have successfully met the program acceptance criteria as a result of inspections performed by individuals who are qualified, reinspections by individuals who were qualified, and for that reason, I again remain convinced that this was a valid assumption.

Q Did you make any assumptions about the use of the first 90 days of the inspectors' tenure on the site as the time period within which reinspections would be conducted?

A Yes.

Q What was that assumption?

A It was our assumption that if an inspector was, in fact, not qualified, that that fact could be demonstrated by the reinspection of his work immediately after his certification within this first 90-day period.

Q In your judgment, has that assumption been

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validated?

A I believe it has. The program was expected to find discrepancies, and to the extent those discrepancies were extensive, we made judgments about the adequacy of the qualification of an individual.

Inasmuch as the program results have identified individuals whose qualifications are suspect, I believe it was -- it has been demonstrated to be an appropriate way to identify such individuals.

Q Are you aware of any facts, Mr. Del George, which indicate that individuals who work with reinspectors at a point in their tenure on site later than that first 90 days, perform better?

A I am aware of at least one instance where that fact has been demonstrated.

Q Can you describe that for us?

A Yes. In the case of an inspector, a Mr. Wells, there was concern raised about the adequacy of his qualifications under the recertification program -- that is, the program for certification conducted after September of 1982.

As a result of that concern, a reinspection of one month's work, 30 days' work, for that individual was conducted, and the rate -- his performance rate upon reinspection was shown to be, I believe, approximately 99

m 6-10

percent.

As it turns out, this individual was also captured by the reinspection program about which we are talking, and in that case, three months' worth of work was reinspected, and the period of time was the three months immediately after his initial certification at the site. In that case, the results of that reinspection showed a rate of, I believe, approximately 96 percent.

End 6

Q Mr. Del George, did you make any assumption about the representative nature of the eight contractors who were subject to the reinspection program? Representative in the sense that it represented the other contractors onsite who were not subject to the reinspection program?

A With the exception of the three contractors that I have discussed, whose inspectors were certified in accordance with the SNT standard, we made the assumption that the practices employed to certify inspectors to ANSI N45.2.6 by the eight contractors reinspected were comparable to the practices implemented by the other contractors also certifying inspectors under ANSI N45.2.6.

Q Has that assumption been validated, in your judgment?

A I know of no facts that have been derived from this program to suggest that the assumption was invalid. In my view there are overwhelming statistics showing that the inspectors, whose work was sampled, were in fact qualified, from which one can infer that the practices for qualifying these individuals were adequate. Inasmuch as the other contractors, whose work was not sampled, followed the same practices, I continue to believe that that assumption is a valid assumption.

Also, as I indicated yesterday, there were separate bases for validating our opinion, relative to the adequacy

of the underlying work performed by those contractors, which in my view gives added support to the credibility of the initial assumption we made.

Q Mr. Del George, did you make any assumption about the reinspection of the work of the sample of inspectors being valid to draw conclusions about qualifications of the work done by inspectors whose work was not reinspected?

A Yes.

Q What was that assumption?

A It was our assumption that if the results, for the sampled inspectors, demonstrated their qualifications that an inference could be drawn about the adequacy of the qualifications of the unsampled inspectors.

Q Was that assumption validated?

A In my opinion, it has been because, as I said, the vast majority of inspectors whose work was reinspected have been shown to be -- to meet the program acceptance criteria and thereby to be judged qualified. That, I believe, confirms the original assumption that we made.

Q Did you make any assumption, at the beginning of the program, with respect to the similarity of the not recreatable, inaccessible work to that work which was subject to the reinspection program?

A Yes.

Q What was that assumption?

A In the case of the subjective attribute, it was our opinion that all visual welding which comprises subjective attribute was similar in nature, such that that portion of the welding which was accessible would clearly be representative of that portion of the work which was either inaccessible or not recreatable.

In the case of the objective attributes, the nature of the inspection points for those attributes, whether accessible or not, that is whether capable of reinspection or not capable of reinspection, are sufficiently similar such that the results for the reinspected items can be used to draw conclusions about the results for the -- for those items not reinspected.

Q Has that assumption been validated, in your judgment?

A Yes, I believe it has. The validation is obviously through inference. But we have reviewed the procedures for inspection of both the accessible as well as that work which was not reinspectable and we continue to believe that the procedures for the performance of that work are similar enough and the procedures for inspection of that work are also similar. And coupled with the fact that the results relative to the reinspected work were very good, we continue to believe that that was a valid assumption.

JUDGE SMITH: This series of questions, it seems to

me, there is a fault or a void in the logic chain. Well, I just recall the last three, the relationship of the assumptions of the inspected contractors to those that aren't inspected, the relationship of those inspectors who were reinspected to those who were not, the relationship of the attributes which were inspected compared to those which were unavailable for reinspection.

In each instance, you gained no new information about the uninspected inspectors, the uninspected attributes, the uninspected companies, no new information. And yet you say the original assumption has been validated, but only by the same inference which you used to design the program to begin with.

Isn't that correct? You didn't get any new information which validated your assumption connecting the two considerations.

WITNESS DEL GEORGE: Judge Smith, at the inception of the program, we were forced to operate on the assumption that the program for qualifying inspectors was inadequate and that as a result individual inspectors would have been unqualified. The results of the program, in my view, have demonstrated the qualification of individual inspectors and in that way have validated the practices and programs for qualification of inspectors.

So the piece of information that has been acquired

through this program is the demonstration of the adequacy of the program in place, to qualify inspectors prior to September of 1982.

JUDGE SMITH: So what you transferred then, to the uninspected companies and the uninspected inspectors?

WITNESS DEL GEORGE: Yes, sir, on the basis of the practices in place were the same between -- that is, their method of qualifying inspectors, the decisional process that they relied upon, were the same. They looked for individuals who were experienced in the trade for which work was being inspected. They looked for individuals who had certain levels of training and those relative characteristics were equivalent between the contractors.

They weren't identical, but in our view they were equivalent. And once specific programs were demonstrated to be effective, we believed that we could then draw inferences relative to those other contractor programs.

JUDGE SMITH: Okay.

BY MR. MILLER:

Q But of course, the inaccessible and not recreatable inspections remain inaccessible and not recreatable at this time, correct?

A (Witness Del George) That's correct and I admit to the fact that we addressed those through inference.

Q I would now like to turn to any assumption you may

have made regarding a possible bias in the conduct of the program, as a result of having each contractor reinspect its own work? Did you make any assumptions about that at the inception of the program, Mr. Del George?

A Yes.

Q And what was that assumption?

A We assumed that the contractors would not be biased.

Q Has that assumption been validated, at the conclusion of the reinspection program?

A I believe it has and it has been on the basis of the results of oversight audits that have been performed both by Commonwealth Edison and its consultants as well as by the NRC Staff, which has reported in inspection reports that in many cases the judgments being made by reinspectors were, in fact, conservative.

I believe this fact is also attested to by the results of the engineering evaluations that have been conducted relative to the observed discrepancies recorded, wherein many of those observed discrepancies have been shown not to violate design specifications and drawings.

As a result, I know of no product of the reinspection program which compromises our original assumption, relative to bias.

Q Mr. Del George, at the beginning of the program, did you make any assumptions regarding the adequacy of the

90 percent/95 percent acceptance criteria?

A Yes.

Q What was that assumption?

A It was our assumption that those values represented appropriate and conservative threshholds for judging the proficiency of inspectors.

Q Was that assumption been validated in your judgment, as a result of the conclusion of the program?

A Yes, I believe it has.

Q Would you explain the basis for that, sir?

A In this case, the threshholds were used as a basis for making judgments on qualifications. We did, in fact, identify discrepancies through this program. To the extent that we could subsequently draw conclusions about the inspectors, I think we can see that many of the inspectors were -- most of the inspectors passed these criteria. The inspectors generally were clustered closely around these criteria. And in that way, we find some support for their validity.

In addition, the fact that qualified inspectors were performing the reinspections and that, in effect, these values represent correlation factors between original inspectors and reinspectors, we find a very close relationship through that correlation to what were accepted as qualified inspectors.

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I believe that those values were appropriate and conservative.

Q Mr. Del George, finally, did you make any assumption at the beginning of the program about the effect of one or more inspectors failing to meet the inspection criteria?

A I have to admit that we assumed that inspectors would not fail the program, although we also -- in connection with your prior question -- believe that the acceptance criteria, that correlation factor that we had created in the program, was conservative. So that there was the possibility that due to the inherent nature of reinspections and the comparison of results acquired by two different individuals, that there was a possibility that an individual might not pass the acceptance criteria.

Q Did your program, from the beginning, take account of that possibility?

A Yes, it did. The program explicitly provided for expansion criteria, which would react to the failure of an individual inspector.

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Q I think you said it was your assumption or your expectation from the beginning that all inspectors would pass the acceptance criteria; is that right?

A Yes.

Q Turning specifically to Hatfield, Hunter and PTL, was that expectation realized?

A In the case of PTL, there was one inspector who did not pass the program criteria.

Q What effect does this one failure by this one PTL inspector have on the validity of the assumption that you made starting the program?

A Well, as I indicated, it was our expectation that the inspectors would qualify, but we knew, because of the nature of the program that we undertook, that there was a possibility that we would identify individuals whose proficiency would not meet the program acceptance criteria.

The results for PTL, in my view, are consistent with the assumptions that we made at the beginning at the program. And I think, as can be seen from the PTL example, showed the adequacy of the other provisions of the program, which were made to account for the possibility of a failure, which in the case of PTL, resulted in the remaining welding inspectors being reinspected.

Q Mr. Del George, Mr. Learner's examination on the various factors that you and I have been discussing this

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morning, he described each of them from time to time as links in a chain.

Do you recall that analogy?

A Yes, sir.

Q Suggesting that there was some sort of sequential process taking place.

Now all of this was related to a sentence on page 7 of your prepared testimony, which states that "the large volume of inspection data associated with the program does produce a strong inference of the adequacy of construction quality at the site."

Mr. Del George, in fact, the factors that you have described in the previous testimony this morning and in your responses to questions from Mr. Learner, are they arranged sequentially as links in a chain in your reasoning process to get from the results of the reinspection program to an inference of work quality, as stated on page 7 of your testimony?

A I don't see each of those assumptions as representing a single link in a long chain, so I wouldn't agree with that analogy.

Q Would you describe for us how you -- your reasoning process, if you will, how you got from the facts that you described to the inference of work quality on page 7?

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A Well, I believe in my direct testimony, in response to the last series of questions, the logic by which I arrived at that conclusion is developed, and that logic relies on three points, one of which are the results associated with the qualification of individual inspectors and the inferences that can be drawn relative to inspector populations as a whole, as a result of the conduct of this program. That is one basis upon which I have concluded that the work at Byron is adequate.

There is a separate basis, although related, in that notwithstanding the qualification of inspectors, there has been a very large body of data acquired from which we can draw direct evidence of the quality of work conducted at Byron.

So I believe there to be a separate, distinct basis on which a conclusion can be drawn about the adequacy of work quality at Byron.

Third, I have drawn upon my experience with Byron and other plants to review other inspection programs that have been conducted over the course of the Byron project, which, in my view, supplement the data created by the reinspection program and which, because of the fact that the results are similar in the sense that design-significant discrepancies have not been identified, give added support to the conclusion that the work quality

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is adequate.

So rather than a single chain with multiple links, I would characterize my logic as using a similar analogy as being a multistrand cable, that failure of any one does not necessarily result in the failure of the conclusion.

So in that sense, that was the logic, and I believe it's discussed in my testimony, and that was the logic that I followed in reaching my conclusion.

JUDGE SMITH: Do you depend, in part, in your conclusion, on preoperational testing?

WITNESS DEL GEORGE: I don't refer to that in my testimony, but that would certainly give added confidence for purposes of drawing inferences relative to active components and, in fact, some of the attributes that were not recreatable as a part of the reinspection program.

I believe the preoperational test program would also, upon its completion, provide an added basis for assurance.

MR. MILLER: I have no further questions on redirect examination.

JUDGE SMITH: Mr. Cassel?

MR. CASSEL: Judge, I do have some recross. I wonder if I might petition for the mid-morning break?

JUDGE SMITH: Yes, this would be a good time

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for our ten-minute mid-morning break.

(Recess.)

End 8

JUDGE SMITH: Are you prepared to proceed, Mr. Cassel?

MR. CASSEL: Yes, Judge.

JUDGE SMITH: Mr. Cassel, do Intervenors have a new appearance for counsel?

MR. CASSEL: We do, Judge, and that was going to be my first point. Seated to my right, at counsel's table, is Mr. Timothy Wright of our office and Tim has brought with him not only an appearance for for himself, but also the appearance form for Ms. Vicki Judson who is not in the courtroom at the moment but will be appearing later today.

To Tim's right, by the way, is Mr. Charles Stokes, one of Internenor's consultants and witnesses. Mr. Michael Fridkin, here to my left, is one of the law students who has been assisting us to prepare the case. And I think you know Mrs. Betty Johnson, of the Rockford League of Women Voters, who is at her post on the far left.

We have, I think, mailed the appearance forms to the appropriate office in Bethesda, Washington, or wherever it is. Do you want copies of those?

JUDGE SMITH: Just when anyone begins to participate, if you'll make an oral notice of appearance, represent if he's a member of the bar, what bar, and that's it.

MR. CASSEL: Very good, Judge.

And by the way, Tim and Vicki will be the counsel

principally representing Intervenors when we get to the Sargent & Lundy panel.

RECROSS EXAMINATION

BY MR. CASSEL:

Q Mr. Tuetken, I would like you to -- you probably don't need to look at it, but just for your assistance I will leave, I believe it's Physical Exhibit A there in front of you. And to make the record clear, I thought you made a statement before the break that might have inadvertantly suggested that all weld defects which can be shown are shown on Exhibit A.

Just to be clear, does Exhibit A show arc strike?

A (Witness Tuetken) It does not.

Q Or a splatter?

A It does not.

Q Does it show overlap on the leg to the base metal?

A It is showing cold lap at one end. It is showing -- it is not showing overlap on leg to base metal.

Q Is it showing cratering at the beginning and end of the weld?

A It is showing no specific crater. The inadequate penetration, at the end, would represent a crater.

Q So there is a crater if one could detect on there, if one knew what to look for, but it's not labeled?

A Correct.

Q Does it show subsurface porosity?

A No, it does not.

Q And it does not, also, show a crack, does it?

A It does not.

Q And are there also defects in welds which cannot be visually detected and which, therefore, are not shown on the Exhibit A there?

A There are weld defects that cannot be shown visibly, yes.

Q For example, hydrogen embrittlement?

A Correct.

Q And tungsten contamination?

A Correct.

MR. MILLER: I'm going to object. This was offered and received into evidence as an example of visual weld defects. It was -- he's asking about defects that were not amenable to one's vision. It seems to me to be totally irrelevant.

JUDGE SMITH: The question is perhaps, if it tends to be a cross examination of the physical exhibit, goes beyond the scope of its purpose. However, the questions in themselves are adequate with respect to the testimony and that is the inference, that the quality of the work is satisfactory.

MR. MILLER: But Judge Smith, that sample -- nobody

has established at least twice -- was constructed to show types of visual welds --

JUDGE SMITH: Exactly. I don't understand his questioning to be to the contrary. I understand him to be using that physical exhibit as a mechanism to make his point.

BY MR. CASSEL:

Q Mr. Tuetken, are there other defects of the kind that are ordinarily looked for in inspections at Byron, which are not visible in the welds, other than the tungsten and the hydrogen points that we just mentioned, subsurface porosity?

A (Witness Tuetken) As relates to visual inspections?

Q No, no. Which cannot be visually detected. We've been down the list of visually detected defects, some of which you had identified on this exhibit. And there were some others which were not identified on the exhibit. We started -- I mentioned a couple of non-visual defects. Are there other important or principal non-visual defects which relate to the quality of work at Byron which we have not listed?

A There are others, but I can't recall them all at this point in time.

Q Do you recall any other visually detectable defects --

JUDGE SMITH: Excuse me, you asked a question and then I think you dropped it. If you got an answer, I missed it. I don't want to ask to have it read back, but didn't you

ask isn't there examination or inspection methods other than visual inspection?

MR. CASSEL: I didn't intend to ask that question. I intended to ask not the inspection or examination method but the defect which was being looked for, regardless of what method was being used to detect it.

JUDGE SMITH: I misunderstood.

BY MR. CASSEL:

Q There are, of course, other examination methods other than visual which are used to inspect welds at Byron, correct?

A (Witness Tuetken) That is correct.

Q They were not the subject of the reinspection program?

A That is correct.

Q But the quality of any weld at Byron and its adequacy to perform its function would depend both on any defects it might have that could be visually detected, and also on any defects it might have that cannot be visually detected, correct?

A Correct. The methods and techniques I think you're referring to are radiography, ultrasonic examination, liquid penetrant, magnetic particle. And those areas of qualifications were not in question.

Q And the reinspection program, therefore, doesn't

give us any information one way or the other on the defects which could be detected only by those means?

A That is correct.

Q Mr. Del George, I believe Judge Cole yesterday asked you a question about the difference between valid and observed discrepancies. I still don't understand the answer.

Let me explain my difficulty and perhaps you can elucidate. First of all, is the distinction between valid discrepancies and observed discrepancies, as you use it in the reinspection program, applicable both to the subjective attributes which you -- I think -- limited to visual weld inspections and to objective attributes?

A (Witness Del George) Yes, it is. But as I discussed in my response yesterday, the extent to which there is a difference between those two classes, observed discrepancies and valid discrepancies, is more distinct in the case of the objective discrepancies than it was in the case of the subjective discrepancies.

Q My confusion, I think, relates principally to the subjective area. As I understand, in the subjective area, the reinspection program -- and this also gets to Judge Callihan's question about nomenclature and the use of the word discrepancy -- the reinspection program identified as a discrepancy any situation where the reinspectors found a defect in the weld which the original inspector had not found.

After that, in any case, where that had occurred as I understand it, there was a reinspection or an overinspection of the reinspection by the so-called third party inspector. And that overinspection, in turn, disagreed with the reinspector and reinstated, so to speak, some of the welds which the reinspector had rejected.

Now are you saying that even after the third party review of the weld that even some of the unacceptable welds identified by the third party inspector were still not valid discrepancies?

A Yes and that's discussed on page 38 of my testimony, the results being tabulated. It's also discussed in the QC reinspection report and it's the result of the fact that certain -- what has been referred to in the report as cosmetic discrepancies -- do not compromise or do not violate the AWS code or the code to which the observed discrepancies were written up against.

Mr. Tuetken has discussed this morning certain of those types of discrepancies to which can be added convexity which, although the code would identify it as a code rejectable item to the extent it exceeds the code threshhold, convexity does not have significance in the application for which these welds are employed. Weld spatter and arc strike, if not on the surface of the weld, were identified as cosmetic in nature and for that reason there

is a distinction made in the program report with respect to observed discrepancies and valid discrepancies.

And as you can see, there were very few such differences noted. In the case of Hatfield --

Q Let me ask you a particular question about that, because I did note that. In the case of Hatfield, which you were just about to turn to on page 38 -- and this is weld discrepancies -- it says there were 1,986 observed discrepancies. Now that's the number after the third party review?

A That's correct.

Q And of those 1,986 observed discrepancies, 1,978 practically all of them, were valid?

A That's correct.

Q So there's only a very small number in there that are in what, the cosmetic area?

A That's correct.

Q Now in contrast to that situation -- and the numbers on this exhibit, by the way, are also similar for Hunter and PTL, in the sense that almost all of the observed discrepancies for Hunter and PTL in the welds were determined to be valid, correct?

A Yes.

Q And yet, on page 40 --

JUDGE COLE: 37?

MR. CASSEL: No, 44. We just discussed page 37.

BY MR. CASSEL:

Q Now I'm turning to the discussion of cable tray hangers on page 44 and there it indicates that out of 345 connections between structural steel and certain hangers, there were 129 apparent discrepancies. And out of those, the impression is left that only a small number of those apparent discrepancies were valid.

Can you explain how many of the 129 apparent discrepancies discussed on page 45 are valid in the terminology of the program? Are all 91 of the fitup gap discrepancies valid in the terminology of the program?

A (Witness Del George) The choice of words here is probably inappropriate. The phrase valid discrepancies, on the bottom of page 44 and 45 were not intended to be identical to the term as it was used, in the reference to which you directed my attention previously.

The valid discrepancy here -- the context on page 44 or 45 -- was valid in the sense that it could be attributed to an inspection activity. That is, where the procedure in effect at the time such that an inspector should have identified this discrepancy. To the extent those procedures, in effect, should have identified the discrepancy, it was identified as a valid discrepancy.

Certain of the discrepancies identified were, in

fact, not valid. That is, the condition observed met the design specification. Others were the subject of inspection requirements that were not in effect at the time the original inspection was performed, and in that sense were not validly applied as discrepancies against an original inspector.

So that's the context for the use of the word and it's a little different than it was used in the previous section.

Q Is it possible to apply the term valid, as it was used in the previous section, to these discrepancies discussed on page 44?

A I cannot do that. However, as I indicated yesterday the discrepancies which are the subject of this report, as they are discussed on page 44, have been subjected to engineering evaluation and the Sargent & Lundy witnesses may be able to address that point more fully.

end9

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Q In either sense in which you use the word "valid" in the reinspection program, if the weld is in conformance with current design requirements, is it therefore always valid, if it is in conformance with current design requirements?

A Well, I'll answer your question -- maybe I ought to make an observation first.

The discrepancies noted on page 44 did not involve welding exclusively. As a matter of fact, theyare a part of the resolution of NCR-407, which has been discussed by Mr. Shewski, and involved configuration aspects of the hanger supports, and in that regard deal with the size and orientation and configuration of the support, as opposed to weld quality.

Q Does it also include the weld quality?

A No. These results do not include weld quality -- that is, the NCR, which was the subject of

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review which led to the production of these reports -- did not include a review for weld quality. As was indicated by Mr. Shewski, weld quality aspects of the connections were dealt with under NCR-540 as a separate entity.

Q All right. Let's return, then, to the question before you made that explanation.

If an attribute is in conformance with current design requirements, does that always mean, therefore, that

mgc 10-2

it cannot have a valid discrepancy?

MR. MILLER: In what context? In the context of the reinspection program?

MR. CASSEL: In the context in which you use the term "valid" in the reinspection program.

WITNESS DEL GEORGE: The original criteria was used in the performance of the reinspection program as a basis for making observations relative to the quality of a component, to the extent the original criteria were violated or an observed discrepancy was noted. I give an example in my testimony of the typical observed discrepancy, which is subsequently shown not to be valid. And that's typical of as-built dimensions for which the original inspection record and the reinspection record do not agree, where both dimensions may be consistent with the design drawing, but inasmuch as we were trying to validate the performance of an inspector, if the measurements did not agree, that was noted as an observed discrepancy.

The fact that both measurements met the design drawings allowed us to say that the discrepancy was not valid in the sense that it compromised the design.

BY MR. CASSEL:

Q In this example on page 44, out of 345 hangers, 119 had apparent discrepancies.

Is that an unusual ratio of discrepancies of the

mgc 10-3

hardware at Byron? Is that unusually high, or is that common?

A (Witness Del George) It is not common.

Q Do you have any explanation for why there was such an unusually high problem with these hangers?

A Well, let me try to explain, and I think Mr. Tuetken and Mr. Shewski --

Q Anyone on the panel can answer the question.

A The inspection that was conducted of the 345 supports was as a result of the fact that certain hangers were assumed to be appropriately inspected for configuration on the basis of the fact that there was a valid weld traveler in effect for that hanger. That situation existed for a limited -- that assumption was made for a limited number of supports.

For other supports, valid configuration inspections and weld traveler inspection reports existed, so the assumption did not have to be made.

In order to validate that assumption, reinspections were performed of these 345 supports, and certain discrepancies, as discussed here, were identified. So --

Q All that background is set forth in your testimony. The question I am really trying to get at is, if, in fact, it is the case, as you say, that this degree

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of problem almost -- what is it? -- more than one hanger out of every three is unusually high, why was this such a problem area, as opposed to other areas of hardware?

A It was because of the assumption. Inasmuch as an assumption had been made that that configuration was acceptable, if weld detail was acceptable, we, in effect, did not have a record of a configuration inspection. That assumption was made in a limited number of cases and has been proven by these results not to be a good assumption.

We have, in effect, configuration inspections for the remainder of the supports in the plant, so that there is no question about the adequacy of configuration for the remaining supports. And there have been, as a part of the review under NCR-407, a review of over 4000 supports, and those records are now -- have not been shown to be adequate to reflect the condition in the field. And to the extent that any discrepancies were identified, they have been addressed.

Q Mr. Shewski might be the appropriate responder to this, but whoever on the panel desires to respond, do you know how many of those 4000 hangers showed discrepancies.

A (Witness Tuetken) A guess?

Q Well, if you know the answer. If you don't

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know, but you have an educated guess or a basis for answering the question, just indicate what it is. If you don't know, you don't know.

A I am recalling some statistics, an educated guess. I think it's on the order of 200, 200 or so discrepancies were found in the inspections associated with that population, other than these 345.

A (Witness Del George) I think you need to recall the discussion of Mr. Shewski which indicated that in the 1981 timeframe, we recognized the fact that valid configuration inspections for every support did not exist, and as a result, we undertook an extensive reinspection for configuration of those supports.

The fact that we found some discrepancies, in the amount that Mr. Tuetken suggested, is not necessarily surprising, but it does not represent the same percentage that you suggest as being defective. In any case, those supports have all been reviewed.

Q Dr. Cole yesterday asked you, Mr. Tuetken, about the terminology between "inaccessible" and "not recreatable." Let me give you a specific example of a non-recreatable item and ask you if you can explain it.

On Mr. Del George's -- and maybe you don't need to even turn to this, because I think you probably know it in your head -- but in Mr. Del George's Attachment B, which

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is a listing of all the Hunter attributes, on page 7 there are a number of attribute classifications which are entitled "Documentation." Some of those are listed as not recreatable.

In particular, let me ask you to address the example of components -- the documentation for component support, snubber documentation, which is listed as not recreatable.

Does that mean that the document is no longer in existence, or does it mean something else?

A No. As Mr. Shewski explained in response to an earlier Board question, I believe, Hunter, being an ASME contractor, has a rather rigorous attention to documentation and its correctness and adequacy. As such, when an inspector performs the inspection and records the inspection results of an inspection, that document is re-reviewed by another inspector for the purpose of assuring its adequacy. In so doing, the methodology of the procedures are, he assumes that document -- in other words, he's the inspector of record, even though the other inspector has recorded his notations on the document. That is its application in "not recreatable."

Q So the reinspector, if he wanted to, could look at the piece of paper if it's still there, but it's still there under the sponsorship of the second inspector rather

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than the first, and there's no way of knowing what the findings of the first inspector were; is that the problem?

A Not one of not knowing the findings. The findings would still be objectively there. The second inspector, however, may make alterations or additions to the document, and he signs the bottom.

Q And there's no way of knowing how much of that document, then, stems from the second inspector, as opposed to how much of it came from the first inspector.

A In some cases. However, in counter to that, recognize that the same documentation that you refer to as not recreatable undergo the same process and were reinspected for the second inspector.

Q Well, in this listing, it's not I who referred to this as not recreatable; it's your listing which says it's not recreatable.

You are saying that even though it's not recreatable, it's inspected, reinspected in the reinspection program?

A The second inspector may have been the sampled inspector. Therefore, he being the inspector of record, the document is reviewed for accuracy and adequacy against his signed signature.

Q And is there a separate listing on this list of Hunter attributes, some of which are identified as

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reinspected and some of which are identified as not recreatable to reflect the situation you just described where the second inspector's work is reinspected, or is that just a further explanation of this listing here that says "not recreatable"?

A Could you say the first few words of the question?

Q Sure. You just provided some information to us. Is that information available on this table somewhere?

A It is not.

Q So where it says "not recreatable" in this entry, that's only partially true? It's only true with respect to the first inspector, but it is recreatable and was reinspected with respect to the second inspector.

A Correct.

Q Are there any instances of documentation inspections which are listed as not recreatable where the documentation itself no longer exists?

A No, not that I'm aware of.

Q Mr. Del George, yesterday in response to one of Judge Smith's questions, you indicated that all the ASME discrepancies have to be repaired pursuant to Illinois State law, and that that's not true of AWS discrepancies, and that that state law requirement was the reason that Edison went back and rectified any ASME discrepancies that

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were detected; is that correct?

A (Witness Del George) Yes.

Q Was that the only reason that Edison went back and rectified any of the ASME discrepancies that were detected?

A I don't know that it's the only. It is certainly the primary reason.

Q If it hadn't been for the ASME state law, would Edison have rectified those discrepancies?

A We probably would have.

Q For what reasons?

A Because we're an ASME Code stamp holder, and to comply with the ASME Code's acceptance criteria, so as not to potentially allow for the identification of a discrepancy in the future, it's my belief that we would have corrected those discrepancies in any case.

Q Well, whether it's through the Illinois state law or the ASME Code generally, though, the reason you did it was because of the ASME Code and for no other reason?

A As I indicated, that's the primary reason.

Q Are there other reasons apart from the ASME Code for which Edison went back and corrected or rectified the discrepancies that were detected.

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A There's no other driving reason for that.

Q On the AWS discrepancies, were any of those, once they were detected, were any of those rectified?

A Some of them were.

Q Why were some of them rectified?

A Well, we have indicated in the past in discussions with the NRC Staff, that to the extent that we could rework components without -- rework the component to within the schedule for the completion of a particular system, that we would do that. But we would only make those -- we would make judgments as to practicability on the basis of the significance of the discrepancy.

Q I thought that none of the discrepancies that you detected had any safety significance, according to Sargent & Lundy.

A That's true.

Q Then why did you have to go back and fix any of them?

A Because to the extent that we had an opportunity to restore the condition, notwithstanding the fact that that rework wasn't in order, we felt that it was prudent to do it.

Q Why is it prudent if there is no safety signficance to the violation that you found?

A Because it is the position of Commonwealth

mgc 11-2

Edison to build in as much quality in our facilities as we can.

Q Who made the decisions as to which defects would be rectified and which not?

A Again, each of the discrepancies evaluated was determined not to have design significance and could have been dispositioned without rework. In the case of the ASME Code items, it was our corporate decision to repair all of those in order to satisfy what we believe to be our commitment to the ASME Code. And with respect to those others, as I have also indicated, on the basis of practicability of the repair, the Project Construction Department implemented repairs as they were possible within the schedules of the plant.

Q Zeroing in on the AWS discrepancies, the question is, what official at what level made the decision as to which of those would be rectified or which not, and anybody on the panel can address the question.

A (Witness Tuetken) I did.

Q And did you do that on the assumption that you would fix all of them whenever there was time to do it, or did you pick and choose the ones that you were going to fix, based on your judgment as to their safety significance?

A I made the direction to make the repairs based on the most cost-effective method to the solution, that

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either being physical repair in the field or documenting the discrepancy and having it analyzed.

As the program progressed, it became obvious to me that some engineering evaluation was going to need to be done to address the amount of discrepancies, in that I directed certain contractors to not execute the repairs, such that we could hold the state as found in place for further engineering analysis and observation. And it was totally a cost-effective decision and an informational decision.

Q Putting aside for the moment the ones that you said, "Hold off for awhile because we want to reinspect them or be able to verify the reinspections later on," by the end of the program you had decided that some of the AWS discrepancies would be fixed and some not; is that correct?

A That is correct.

Q And my question is, were any of your selections as to which would be fixed, as opposed to which not, based on your judgment concerning their safety significance?

MR. MILLER: Object. I don't believe -- I think the testimony is to the contrary, that none of these have safety significance.

JUDGE SMITH: In the first place, are you satisfied with the term that is being used, because the

mgc 11-4

direct testimony refers to "design significance."

MR. MILLER: I agree, Judge. That's a further objection to the question, unless that term is defined. I don't know how the witnesses can answer it.

MR. CASSEL: I don't need to use the term here.

BY MR. CASSEL:

Q But the point is, did you take safety into account in any way in deciding which of those discrepancies to fix and which not?

MR. MILLER: Judge Smith, I repeat my objection. There's no foundation for the question, because I believe the witnesses' testimony is that none of them had any design significance. That is a defined term that meant that each component was capable of meeting design requirements.

JUDGE SMITH: Yes. But I think the question is appropriate nevertheless. As I understand the body of evidence that we have before us, Sargent & Lundy or whoever ultimately makes the decision that discrepancies do not have design significance. Nevertheless among that group of items, you decided to repair some. And now I think the area of inquiry is, do you see, notwithstanding the finding of design significance, did you see a separate safety reason for the repairs -- "you," as Mr. Tuetken, responsible for making a decision?

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WITNESS TUETKEN: Let me try and answer it by giving you the pathways of my decision.

For those which I elected not to repair or decided not to repair were listed on nonconformance reports that were sent to Engineering for evaluation. On that basis, the conclusion as to their not affecting design significance was recorded, as has been previously stated in this hearing. So per se, my decision was one to not issue a nonconformance and document to Engineering and Edison nonconformance forms for evaluation, but rather to respond to the contractor's nonconformance by directing to repair.

BY MR. CASSEL:

Q The question is, how did you decide -- on what basis did you decide to send some back to Engineering for analysis and others to have fixed and whether that in any way included any factor relating to your judgment concerning potential safety effects?

JUDGE SMITH: In fairness, he's already described some of those bases.

MR. CASSEL: He has, and I really want to zero in on whether safety played any role in the decision to send some to Engineering and to fix others.

WITNESS TUETKEN: Inasmuch as I was already aware that the information was indicating there was no design significance to the information, I don't know how to

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answer your question, other than the fact that it played a role, but I had the intelligence to make the decision in the manner I did.

BY MR. CASSEL:

Q Did you say safety played a role?

A (Witness Tuetken) Design significance, the information coming out of Engineering, the evaluations they were performing were concluding that there was no design significance.

JUDGE SMITH: Let's bound this consideration as we have done before in this proceeding, and we've had to do in every safety proceeding I've ever been in -- that is, we almost always come to a place where the witness is asked to explain why he took an actior, and you wish to put him in this situation by taking an action which might have safety significance. He is thereby admitting that without that action, it would be unsafe, and that isn't the law, that isn't the law of evidence. It's not the law of the Federal Rules of Evidence. It is not an engineering concept.

So let's put it in that context.

MR. CASSEL: Judge, I am not trying to oversimplify things to that extent. I am trying to find out, number one, -- and I think the witness has now in his most recent answer, answered yes -- did safety considerations

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play any part in his decision about which items to fix.

And then my second question was going to be -- and I want to pursue this -- what role did it play? What considerations relating to safety did you take into account?

JUDGE SMITH: If he can answer it, that's fine.

BY MR. CASSEL:

Q Let me first, then, just make sure that I understood your last answer correctly, Mr. Tuetken. If I understood it correctly when you said "it" played a role, you meant safety played a role in your decisions on which items to fix, other than those which had to be fixed because of ASME; is that correct?

A (Witness Tuetken) Let me try and rephrase my response.

Design significance was the level of intelligence I was being communicated. Engineering evaluations were identifying there was no design significance. I don't know how to say it any more than that.

Q Are you saying that you had been told there was no design significance to any of these, and therefore safety considerations played no part whatever in your decision to fix certain items?

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MR. MILLER: I'm going to object.

JUDGE SMITH: Mr. Tuetken is not being really clear here. He gave us some bases. He said maybe he would fix them because it was cheaper to fix them than to have them evaluated. But then as to that class, all of which it has been found had no design significance and as to which he apparently agrees had no design significance, apparently there are some remaining that he nevertheless ordered repaired. And he has never specified the reason for those.

MR. MILLER: Okay. If that's the question, fine.

JUDGE SMITH: I think that that's the question.

MR. CASSEL: That is the question that preceded the most recent question, which was, did safety play any role in those reasons?

JUDGE SMITH: Let's let him give the reasons, rather than putting the reasons to him. Let him give the reasons why he ordered fixes.

WITNESS TUETKEN: No, safety did not play a a significant -- cost-effective resolution of the problem is the decision factor which I used to determine whether we would repair or document and have an engineering analysis done.

JUDGE SMITH: All right. So then I think we see

mgc11-9

where we got off the track. I thought the testimony and the question was directed, that as to any group or set of deviations which were found after analysis to have no safety significance, you nevertheless ordered some repairs.

WITNESS TUETKEN: No. That's an unclear point. Some items were repaired early in the program, and no analyses were done.

JUDGE SMITH: Because it's cheaper, easier?

WITNESS TUETKEN: That's correct, because in that condition, we could not reconstruct data for engineering analyses in order to determine their design significance in the as-found condition. Therefore, some population was not repaired, such that it could be held in state, mapped and evaluated by Engineering.

BY MR. CASSEL:

Q In other words -- let me make sure I've got this straight, because I didn't understand this until just now -- some of the discrepancies detected during the reinspection program were fixed and never subjected to an engineering evaluation as to their design significance?

A (Witness Tuetken) They were fixed. They were evaluated to the design significance, based on the information that was available, but the product form could not be physically reinspected or looked at by engineers.

Q Do you know approximately -- I am looking now

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at one of the tables in your executive summary of the report. We can turn to it, if we need to, but it seems to indicate that there were 7379 observed discrepancies detected during the reinspection program; is that correct?

A That's correct, I assume.

Q Do you know how many of those 7379 observed discrepancies were fixed in the field without being referred to Sargent & Lundy for safety analysis?

A No, I can't answer that question.

Q Do you have an educated opinion as to the approximate proportion of those 7000-plus discrepancies that were never sent to Sargent & Lundy?

MR. MILLER: I think there's some confusion. I don't know that the question has foundation in the sense of matters being repaired without Sargent & Lundy having had an opportunity to evaluate them.

MR. CASSEL: I think we're entitled to have the witness answer the question. If that's incorrect, he can so specify. But I would really like to ask questions of the panel and not of Mr. Miller. If he wants to testify, I don't object to him calling himself as a witness.

JUDGE SMITH: That's not what he's doing. He wants to be very careful that his witness understands the question and that the question has a foundation. That's his job.

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MR. CASSEL: I thought the foundation was just laid by the witness himself stating -- if I'm wrong, I'd like the witness to clarify it -- stating that some of these things were fixed in the field without ever being sent to Sargent & Lundy for analysis.

BY MR. CASSEL:

Q Is that correct, or is that not correct?

A (Witness Tuetken) They were fixed in the field prior to being sent to Sargent & Lundy for analysis. There were those conditions, yes.

The data, however, was still objectively -- was available and objective enough for engineering for Sargent & Lundy to conduct an analysis.

JUDGE SMITH: A trend analysis?

WITNESS TUETKEN: An engineering analysis.

JUDGE SMITH: Why would you pay money to Sargent & Lundy to make an analysis of a repaired item?

WITNESS TUETKEN: Because of this program and this question, the question of significance of the found deficiency. I didn't perceive the need for all this information when the program began and we began making reparis. Then as the program progressed, then I perceived a need for an engineering evaluation of the as-found conditions.

WITNESS DEL GEORGE: Your Honor, it was our

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expectation that questions would arise as to the significance of discrepancies. So we undertook later in the program to do an engineering evaluation of the discrepancies, whether or not they had been repaired, so that we could answer the question about each discrepancy identified.

So it was for purposes of thoroughness and to prepare for potential questions relative to the significance of what we had found.

JUDGE SMITH: Today?

WITNESS DEL GEORGE: Today. That we had undertaken those evaluations after we had already repaired certain aspects of the work.

JUDGE COLE: So how could they conduct an evaluation? A paper evaluation? They didn't go out and look at the deficiency, obviously, because it had been corrected.

WITNESS DEL GEORGE: As to those that had been reworked, they relied upon the discrepancy records that existed, which provided an adequate basis in the case of those items that had been reworked to make those judgments. And those evaluations are the subject of the engineering evaluations reported in the report, and they are discussed in the testimony of the Sargent & Lundy witnesses.

End 11

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BY MR. CASSEL:

Q Is it the case then that each and every one of the 7,379 observed discrepancies were evaluated individually by Sargent & Lundy? The question is to the panel, whoever can answer it.

A (Witness Del George) Each of the discrepancies was evaluated in the way described in the program report. And I am sure that the Sargent & Lundy witnesses can describe in detail how that evaluation was conducted.

Q Let me -- just so, because we're pursuing a line of questioning here with you folks, is it the case that each and every one was individually evaluated by Sargent & Lundy?

A There is an individual discrepancy record for each of the discrepancies which was evaluated in the way described in the program report.

Q Mr. Del George, I think I've asked you the question twice and you haven't answer it either time.

A I have. I said each was evaluated.

Q Was each individually evaluated?

A Each was individually evaluated.

Q By Sargent & Lundy?

A That's correct, in accordance with the methodology described in the program report. And they were evaluated -- certain of them were evaluated in different ways. If you

will recall the discussion in the program report, there were three categories of evaluation.

Q Including the kind of evaluations which Dr. Cole just referred to, consisting of evaluations of the paper relating to a deficiency which had already been fixed?

A Yes.

Q Mr. Tuetken earlier answered, I believe, that he did know the answer -- he did not know the number of these 7,379 that had been fixed before subsequent evaluation by Sargent & Lundy. And I had asked earlier the question and I'd like to ask it again, since it wasn't answered since Mr. Miller had a comment. Do you have an educated opinion as to what proportion of the 7,379 were first fixed, before the paperwork was sent to Sargent & Lundy?

MR. MILLER: I do believe that the witness responded to that question.

MR. CASSEL: If he did, I didn't hear it. I'd be interested to know.

JUDGE SMITH: I can't be helpful. I don't know.

MR. MILLER: Go ahead, Mr. Tuetken.

WITNESS TUETKEN: I don't know that I can make an educated guess. I can make a guess, that's all.

BY MR. CASSEL:

Q You have no idea how many items were fixed before --

MR. MILLER: I'm going to object. The witness has

answered the question. He said he is willing to speculate, if that's what Mr. Cassel wants on the record. I don't think that is going to add anything to the record. I will object to a question to ask him to speculate.

JUDGE SMITH: If, as Mr. Tuetken says, he does not have information he would regard as reliable, I don't see what you would do with it.

MR. CASSEL: I'd like to find out what information he has and doesn't have.

BY MR. CASSEL:

Q Do you have any information which would enable someone, who attempted to assess this, to begin to develop what the number was? For example, can you recall the number of days you spent ordering items to be fixed? Did you spend a whole week looking at lists of deficiencies and saying fix them? Did it take six months to fix them? Do you have any basis at all for giving us an idea whether 700 were fixed, seven were fixed, or 7,000 were fixed?

MR. MILLER: I believe the information is available from the Sargent & Lundy witnesses, if that's what Mr. Cassel wants.

MR. CASSEL: It may or may not be and Mr. Tuetken is on the stand now. If he has that information --

MR. MILLER: But he's already told you, all he can do is guess.

MR. CASSEL: I'm testing that assertion.

JUDGE SMITH: What are you doing? Are you testing Mr. Tuetken's memory, his competence, or are you seeking information?

MR. CASSEL: I'm seeking information.

JUDGE SMITH: If you're seeking information, he's told you that he has no information that is reliable, then this Board doesn't want to rely upon it, so let's seek it from the best source. Mr. Tuetken, I believe, will probably be available later this week if you really need the information and it's not available from Sargent Lundy, I'm sure it will be produced.

Unfortunately, I've lost the track of your examination. I don't know what you're doing. I'm having difficulty making rulings here.

MR. CASSEL: The track right here, Judge, is just because I think it was a legitimate question about the reliability of any subsequent paper analysis to the safety significance of items that have already been fixed. I'm trying to find out whether the magnitude of that problem relates to one item, 700 items, or 7,000 items. And I'm sure that Mr. Tuetken could give us some helpful information on that.

JUDGE SMITH: I would say Mr. Tuetken is the better judge of that. Having heard this discussion, Mr. Tuetken, and

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having considered the information, I'm sure you have been pondering it. Can you give us any information you think is reliable and helpful?

WITNESS TUETKEN: I can give you information. You can perceive it sa being helpful. I believe, using his number of 7,000, irrespective of what the number is, the closest I could approximate is 50 percent was repaired prior to evaluation. I couldn't be more specific than that. I'd have to review some information.

MR. CASSEL: Thank you. I think that gives us a helpful initial indication, subject to further specificity if it's available.

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BY MR. CASSEL:

Q Mr. Tuetken, of those items that were fixed before being sent to Sargent & Lundy, were all of those items only AWS items or were some of them also ASME items?

A (Witness Tuetken) Maybe I'm confused. Are we only talking about welding, weld discrepancies in the program or all discrepancies?

Q Well, the 7,000 figure of course referred to all discrepancies, at least as I understand the report.

A That's correct. Now you're asking me a subset of that?

Q Let me try to rephrase the question and be more specific. Of those items which were repaired before the

paperwork was sent to Sargent & Lundy, were some of those items discrepancies pursuant to the AWS code?

A No. I think all the AWS code items -- I have to think of one contractor. I have to go back and check some items. I think all the AWS items were evaluated for weld mapped to the population required and forwarded to Sargent & Lundy. I can't be more specific.

Q Were some of the items which were repaired before the papers were sent to Sargent & Lundy discrepancies in relation to the ASME code?

A All ASME code items were repaired prior to sending the paperwork to engineering. Let me correct that. If not all, most.

Q Yesterday, in response to a question from Judge Smith, I believe Mr. Tuetken you indicated that the over-inspections of the welds, in the reinspection program, were done in part by the Daniels Construction Company, which you said had no other work at Byron. Is that correct?

A You said overinspections or third party inspections?

Q I was using the two interchangably, but let's say third party inspections to be precise. The third party review of the welds that had been rejected by the reinspector.

A Some of the personnel were Daniels employees and Daniels has no contract for work performance at Byron, other than this service.

Q Does Daniels have other contracts for work for Commonwealth Edison?

A For construction activities?

Q Yes.

A Building actities you're referring to?

Q Yes.

A Not that I'm aware of.

Q It's not a contractor at Braidwood?

A As I clarified it, not for building activities. They are a contractor at Braidwood, doing inspection activities, or going to be doing inspection activities.

Q So they are not yet doing any inspection activities at Braidwood, and have not done any up to this date?

A You're asking me a question I don't know the facts to.

JUDGE SMITH: I'm wondering about the relevance of it. There is no objection, but there is a time consideration.

MR. CASSEL: I just wanted to make a point clear for the record, that we have a contractor who may not have done any specific work at Byron, but is not an independent outside contractor in the sense that they are not also doing work for Commonwealth Edison.

BY MR. CASSEL:

Q Do you know whether Daniels is doing or has done other work for Commonwealth Edison, briefly?

A (Witness Tuetken) Work of any type? I don't know, to be honest with you.

MR. LEWIS: Your Honor, I would interject that I don't know what definition of independence Mr. Cassel is using. It doesn't track with any definition that is contained in the Chairman's letter that we discussed yesterday.

JUDGE SMITH: Let's go on. This hasn't been going anyplace. I believe that's not in evidence, you know, that definition.

I think we are capable of applying the meaning of the word, given the facts.

BY MR. CASSEL:

Q Mr. Tuetken, I would like to zero in to see if we can't clear up, once and for all, what role -- if any -- the Hunter Corporation played in developing the program. Now your Attachment 1 to that Hunter February 16th letter says every fifth inspector. And you have testified when you say that you mean every fifth, beginning with the fifth?

A (Witness Tuetken) Correct.

Q Do you recall specifically whether when you discuss that concept with Hunter on or about February 7, when the meeting was held, you specifically said beginning with the fifth or you just said every fifth inspector, because in your mind that meant beginning with the fifth?

A Every fifth inspector, beginning with the fifth.

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Those same words, I believe I recall, were stated in the meeting with the NRC Staff on February 3rd. It's from that wording that we requested that we add the first inspector, then the fifth, then the tenth.

Q All right. Now I believe you also testified yesterday that you had had a number of conversations with a number of the contractors during the period that you and the team were designing the reinspection program, is that correct?

A Correct.

Q Did you ever ask a contractor to express an opinion on any of the items of the program design, during the time when you were developing it?

A Not an opinion, no.

Q Did you ever discuss with them any of the elements of the program design, other than simply telling them this is it?

A I asked, in certain cases, how difficult it would be to do the records research to determine the inspector's first 90 days, only from a perspective of understanding what its operation would be.

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Q And that's your complete answer to the question, that the only discussion you had was telling them that this is the program?

A That's all I can recall.

Q Now you also testified yesterday and today that -- correct me if I'm wrong -- in the initial meeting with the contractors, which the evidence now indicates was on February 7th not later in February as you had thought during your deposition, you did in fact provide a timetable for completion of the program, namely July 1? Is that correct?

A Yes.

Q And at the time that you provided that July 1 time table, did you have any -- to use your word -- intelligence as to whether that timetable was realistically achievable with the level of personnel available to perform the reinspections?

A No, I did not.

Q And in fact, some of the contractor's reinspection programs were not completed until long after July 1, is that correct?

A That is correct.

Q Were any of them completed by July 1?

A I can't recall of any. I think most of them were finishing up in the time frame of August, July or August.

Q And that was, even though the contractors were

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having weekly meetings with Edison and being urged to complete their program expeditiously --

MR. MILLER: I'm going to object. I don't know that there is any testimony in the record that they were being urged to complete their --

MR. CASSEL: That's a question which I am asking the witness.

MR. MILLER: That was the premise of your question.

JUDGE SMITH: Let's transform it into a question.

BY MR. CASSEL:

Q Were you urging the contractors, during the weekly meetings and otherwise, to complete the reinspection program expeditiously?

A (Witness Tuetken) Urging? I guess that's a way to characterize it, yes.

Q Don't you think then it was likely that, given the magnitude of the task which could not be accomplished by the deadline, even with your urging expedition, that some of the contractors, when they were asked to do this reinspection program in February, would have felt under pressure to hurry it up?

A The results don't appear to indicate that. There may have been some impression of pressure.

Q Now, Mr. Del George, in Mr. Miller's recross I believe you testified that the results of the reinspection

program shows that the vast majority of the inspectors who were reinspected met the acceptance criteria of 90 percent/95 percent. Is that correct?

A (Witness Del George) Yes.

Q The total number of inspectors in the population of inspectors, from which the sample was taken from the eight contractors, was 356, correct?

A I believe that's correct.

Q And of those 356 who were sampled, 110 were in fact reviewed in some way or another during the reinspection program, is that correct?

A Yes.

Q Do you know how many ofthe 110 passed the 90 percent and 95 percent criteria?

A I don't recall. I can speak to that point, however, for Hatfield, Hunter, and PTL.

Q Is it not the case that at least 18 of the 110 did not meet either 90 percent or 95 percent?

A I'm sorry, I can't recall.

JUDGE SMITH: Mr. Cassel, how far along are you with your recross?

MR. CASSEL: I think I am well down the road, Judge.

JUDGE SMITH: I was depending somewhat upon hunger to control the hearing.

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MR. CASSEL: I have no preference, whenever you would like to break, Judge, that's fine with me. Do you want to break now or do you want to break later?

MR. MILLER: Judge, wouldn't it be a good idea to conclude with this panel prior to lunch break?

JUDGE SMITH: I don't know. When will it be, do you believe?

MR. CASSEL: It's about 12:15 now, on my watch, and I'm sure I will finish -- I would anticipate that I will finish certainly before 1:00 and I hope well before 1:00.

JUDGE SMITH: I think we should break. What is the impression? Is an hour long enough for a break for the parties who have to prepare? It is sufficient for us. Or would you prefer an hour and 15 minutes?

MR. CASSEL: I'll be candid, Judge. Yesterday and the day before I needed all the time you could give us. I've done my cross plan for Mr. Hansel. I don't need more than an hour.

MR. MILLER: An hour will be fine.

JUDGE SMITH: All right, then, we'll just take an hour.

(Whereupon, at 12:15 p.m., the hearing was recessed, to resume at 1:15 p.m., this same day.)

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AFTERNOON SESSION (1:15 p.m.)

JUDGE SMITH: You may proceed, Mr. Cassel.

Whereupon,

LOUIS O. DEL GEORGE

WALTER A. SHEWSKI

RICHARD P. TUETKEN

resumed the stand and, having been previously duly sworn, were examined and testified further as follows:

RECROSS EXAMINATION (Cont.)

BY MR. CASSEL:

Q Mr. Del George, before the break, I asked you if it was not the case that at least 18 of the 110 inspectors who were selected for reinspection failed to meet either the 90 percent or the 95 percent criteria. And you indicated that you did not know.

Would you turn, please, to the reinspection report Exhibit V-1?

A (Witness Del George) I'm sorry, Mr. Cassel, I don't have a copy of the report.

Q I'm sorry.

(Document handed to the witness.)

For the record, throughout these hearings, whenever I refer to the reinspection report, it's the same reinspection report that was identified, at some length, on the record earlier.

Turn, if you would, Mr. Del George, to Exhibit V-2, in the reinspection program report, which appears at the end of Chapter 5 and before Chapter 6. And specifically, to Table VE-2 of Exhibit V-2, which is the table for inspectors performing subjective inspections.

The fourth column from the left-hand side of the page is entitled QC inspectors did not pass threshhold. Does that mean people who did not score either 90 percent -- well, in this case people who did not score 90 percent?

A (Witness Del George) Yes.

Q And the number at the bottom of that column is eight, correct?

A That's correct.

Q And the next column is entitled qualification indeterminate and it has a note that indicates if an inspector had no inspections beyond three months and did not meet the program acceptance criteria, that he was placed in that category of indeterminate, correct?

A That's correct.

Q And by not meeting the program acceptance criteria it meant that during his first three months, he did not score 90 percent on subjective?

A That's correct.

Q And there are ten inspectors in that category, are there not?

A Yes.

Q Adding the ten and the eight, is it not clear that there were at least 18 inspectors, out of the 110 who were sampled, who failed at least a 90 percent criterion?

MR. MILLER: I object. Mr. Cassel has elicited from the witness very precisly what the columns mean and now he's mischaracterizing prior testimony.

MR. CASSEL: I'm not mischaracterizing. I'm not even characterizing any testimony. I'm asking the witness a fact.

MR. MILLER: There is no foundation for the question, Judge. Mr. Del George was asked to precisly describe the two columns, what they mean. He has done so and Mr. Cassel's premise in the question is directly contrary to Mr. Del George's answer.

JUDGE SMITH: Well, I had difficulty with the question which led to the number ten in the fifth column, so that's -- I think -- where you are concerned about the premise?

MR. MILLER: Yes, sir.

JUDGE SMITH: So I would like to hear that question and answer again.

MR. CASSEL: Sure, Judge.

BY MR. CASSEL:

Q Mr. Del George, the people that Edison, in its

table, has chosen to label as indetermine were, in each of these ten cases, people who did not score 90 percent for those inspections which they did and people who also did not have the total minimum number of inspections required for you to count them in your program results, is that correct?

A (Witness Del George) Yes, in that certain inspectors did not meet the 90 percent criteria after the first three months and had no further work upon which to make a judgment, relative to the adequacy of their performance. In that sense, they did not qualify as a failure under the program. They did, however, not meet the acceptance criteria of 90 percent at the end of the first three months.

Q And there were ten such inspectors, according to this table?

A Yes.

Q Adding these ten to the eight who failed even after the three months, is it not a fact that of the 110 inspectors who Edison looked at in the course of this program, 18 of them at least failed to achieve a score of 90 percent on subjective classifications?

A To the extent --

MR. MILLER: I really do object because I believe that Mr. Del George's testimony is just to the contrary, with respect to the inspectors in the indeterminate category.

MR. CASSEL: I thought he just answered --

JUDGE SMITH: I thought that his answer the first time and the second time is among the ten -- is it your testimony that among the ten, all of them failed the 90 percent goal for the first three months?

WITNESS DEL GEORGE: Yes, sir.

JUDGE SMITH: And that there was not sufficient inspections in the next three months for those to be included?

WITNESS DEL GEORGE: Yes, sir. The program provided for reinspection of the subsequent 90 day period to validate the uncertainty created in the first 90 days. Since these individuals had no further work, that validation could not be accomplished.

JUDGE SMITH: So your quarrel is with the use of the word fail?

MR. MILLER: Correct.

MR. CASSEL: The question I asked, using fail in the lay sense of the term -- I don't even need to use the word fail -- did not attain 90 percent. Do you want to say it that way?

MR. MILLER: At the conclusion of 90 days. That's absolutely correct. That's a fact.

MR. CASSEL: I'm not asking with regard to any time period. If you want to redirect your witness, with respect to a time period, that's fine. I'm just asking, out

of 110, how many did not attain a minimum score of 90 percent. And the answer, I believe now, is 18, is that correct?

WITNESS DEL GEORGE: With the qualification that you expressed in your discussion, there are 18 who did not meet the 90 percent criteria at the end of the first three months.

BY MR. CASSEL:

Q Now out of this 110, how many did not have a sufficient quantity, if you know, to meet the minimum quantity requirements for -- to be reported as an inspector who either passed or did not pass?

JUDGE SMITH: Are we clear on the segment? On the first three months, the first 90 days or the second 90 days or any time?

MR. CASSEL: Well, I believe -- let me try to be clearer on that.

BY MR. CASSEL:

Q It's my understanding that in order for Edison to decide that it could say that an inspector had either passed or failed, you required that he have a minimun of 50 inspections for certain contractors, and 25 inspections I believe for PTL and Peabody. Is that correct?

A (Witness Del George) I believe, as I indicated before, the criteria of 50 inspections or 25 inspections was

created to allow us to go beyond the initial 90 day period to accumulate sufficient inspections to provide a basis of making a judgment relative to the qualification of inspectors.

Q Maybe I'm not being clear. That's not the question I asked. The question, right now, is a very simple one. Was it necessary for an inspector to be given either a pass or a fail by Edison? Is it necessary for that inspector to have a certain minimum number of inspections?

A No, that was not a program requirement.

Q All right, then, referring to footnote 2, here on the table, one of the elements for inclusion in the category of indeterminate was an inspector having no inspections beyond three months. Is that correct?

A Yes.

Q Now of the 110 inspectors, do you know how many of them had no inspections beyond three months?

A I'm sorry, I don't recall.

Q In your opinion, Mr. Del George, would it be likely that those inspectors who had no inspections beyond the first three months were what might be characterized as relatively short term employees of the contractors, as opposed to those inspectors who had a longer period of inspections and were longer in terms of their employment with the contractor?

A Yes.

Q And in your opinion, would it be likely or would it not be likely that the people who we just described -- and I'll refer to them as the short term inspectors, if you will -- in your opinion, would it be likely or would it not be likely that the short term inspectors on the average would not perform as well as the inspectors who remained with the contractor for a longer period?

A I don't think I have sufficient information to make a judgment on that. I don't have an opinion.

Q Now in Mr. Miller's questioning, regarding your various assumptions and whether they were validated, one of the assumptions he asked you about -- and I will try to be accurate, and if I in any way mischaracterize either the question or the answer, please correct me. I believe one of the assumptions he asked you about was whether you assumed that there were any -- at the outset of the program -- that there were any significant design significant deficiencies at Byron.

I believe you testified you assumed, at the outset, that there were none. Is that a fair restatement of your assumption, at the outset?

A Yes.

Q I believe you also testified that you believed the conclusions of the program validated that assumption, based

on the extensive number of inspections which were reviewed and the finding that none had design significance. Is that also correct?

A Yes.

Q Now isn't it a fact, Mr. Del George, that the sample sizes differ among the various attributes, which happen to have been reinspected at Byron?

A Yes.

Q Isn't it the case that for some of the attributes at Byron, sample size was zero in the reinspection program?

MR. MILLER: Could we have a definition of reinspection program?

BY MR. CASSEL:

Q Let's take it in two stages, first the reinspection program as it was reported in February?

A (Witness Del George) Yes.

JUDGE SMITH: I'm curious why you felt that was necessary, Mr. Miller?

MR. MILLER: Because, sir, the supplement which I believe Mr. Cassel is about to ask him about had expanded populations in some of the categories, where there were small populations in the written report.

MR. CASSEL: Mr. Miller and I are right on the track, Judge.

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BY MR. CASSEL:

Q Now turning to the June supplement to the report.

A (Witness Del George) I don't have it before me.

Q I didn't mean in terms of a specific page. I think you probably know the answer without having to look at it. For those categories which were reinspectable, that is no reason why they couldn't be reinspected, but it just so happened that there weren't any reinspections in that category as of February. In fact, by June, in response to Mr. Laneys' criticism, you went back and did some reinspections in those categories. Is that not correct?

A No, that's not correct.

Q Well, take out the report in response to Mr. Laneys. Is that correct?

A It is, in fact, the case that supplemental inspections were performed which, when added to the data base that had been accumulated through January of 1984, provided information relative to certain attributes where no information had previously existed?

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mgc 15-1

Q Is it the case, then, by June there was no attribute that was recreatable or reinspectable for which the sample size was zero?

A I don't believe that's true.

Q Do you know of any exceptions?

A There were -- I believe this is addressed in Attachment B to my testimony. There were certain hanger reinspections classified as Type II or Type IV inspections which could be recreated, but which were not captured in the reinspection program.

Q Even at the June stage of the program?

A That's correct. And the reason is that those inspections had not been performed until after September of 1982.

Q And in addition to those attributes for which the sample size was zero, the sample size was also zero for any attributes which were not reinspectable or were inaccessible, correct?

A Again, you're speaking with respect to the February program report, the February '84 program report?

Q We can try it in both stages, if you like, but let's try it in February. I thought the answer was the same in both February and June.

A The answer is no -- let me be sure I have it, the question in mind.

mgc 15-2

There were no -- there was no data available to be recorded in the February 1984 report relative to inaccessible or not recreatable items. The feature of bolt torquing was addressed in the supplement. That was a feature identified in the original program report as not recreatable. It was recreated for purposes of evaluating the adequacy of the bolt torque, but it could not be assigned to individual inspectors and so, for that reason, couldn't be consolidated with the original program report data.

Q Fine. With the exception of that category, however, the inaccessible or not recreatable attributes had a sample size of zero, is that correct, in the reinspection program?

A With that noted exception, yes.

Q Would the differences in the sample sizes for the different attributes, including some with sample sizes of zero, mean that the confidence level with which you could state your inference that the hardware at Byron has no significant design deficiencies would vary from attribute to attribute?

MR. MILLER: Excuse me. Could we have a definition of terms. Is "confidence level" used in that question in a statistical sense? That is, as a statistician would use it?

mgc 15-3

MR. CASSEL: That's a fair request.

BY MR. CASSEL:

Q As it is used in the report. Do you recall the use of the term "confidence level" in your reinspection program report?

A (Witness Del George) As it's used in the report, that was a statistically based confidence level.

Q Let's start with that one, then.

Using that definition, is it not the case that the confidence level with which you can state that there are no -- or you can believe that there are no hardware deficiencies at Byron varies from attribute to attribute, depending on the sample size?

A No.

Q Why is that not the case?

A Because of the way in which the calculation was performed, was to determine the reliability at a specific confidence level, which was in each case specified at the same level. That reliability that could be projected was based on the sample size.

Q I stand corrected.

Would not the reliability differ from attribute to attribute, based on the difference in the sample size?

A The sample size would be one parameter that would affect that result.

mgc15-4

Q And now stepping outside the technical definition of statistics, to the extent to which your assumption that there are no design-significant deficiencies in the hardware at Byron is true, does that not vary from attribute to attribute, depending upon the extent to which inspections of that attribute were actually looked at in the reinspection program?

A No. And the reason for that is that I did not rely on a statistical basis to draw the conclusion that I reached relative to the adequacy of work. And I believe I went through the specific logic that I employed in reaching that conclusion earlier today.

Q Just to be clear, then, you are equally confident, are you, with respect to each of the hardware attributes at Byron, that there are no design-significant deficiencies, regardless of the extent to which they were actually reinspected in the reinspection program?

A I believe that those attributes are adequate, and I have not attempted to refine that definition any further.

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Q With respect to your assumption concerning attributes that were not recreatable or inaccessible, I believe you testified in response to Mr. Miller's question that you assumed, in the case of the subjective attribute of visual weld inspections, that they are basically

mgc 15-5

the same inspection activity, whether they are done in the reinspectable portion of the plant or done in an unreinspectable location; is that a fair statement of your assumption?

A Yes.

Q In order to believe that the quality of the visual weld inspections in the unreinspectable portions of the plant is the same as the quality that you detected in your reinspection program in the open portions of the plant, do you not also have to make an additional assumption concerning the performance of the inspectors who did those visual weld inspections in the inaccessible portions versus the accessible portions?

A Yes. And I believe I discussed -- I may not have, but it's my belief that those welding activities were performed by the same people and inspected by the same people, whether the activity was, at the time it was performed -- whether it is now accessible or inaccessible for reinspection.

Q And you need to make an assumption, do you not, that those same people, to the extent that they were the same people, conducted themselves in the same manner when conducting a nonreinspectable inspection?

A Yes.

Q Mr. Miller also asked you whether you were aware

mgc 15-6

of any facts that would shed light on the question of whether individuals did better after their first 90 days, in terms of their inspection performance. You gave the example of Mr. Wells.

Do you recall that testimony?

A Yes.

Q Mr. Wells was a case where he scored, I believe, 96 percent in the first three months and then 99 percent in the expansion period.

A That's my recollection.

Q Do you recall any other instances --

A Well, before we continue, I think it's probably inaccurate to refer t the second period as the expansion period. There were two separate timeframes within which those reinspections were performed. They were unrelated.

Q I see. Are you aware of any other instances that would shed light on the question of whether inspectors, in fact, did better or worse over time at Byron?

A There were a few other inspectors in the program whose work did not pass the acceptance criteria at the end of the first three months, whose work was subsequently reinspected for an additional three-month period. And my recollection is, although I can't speak to individual inspectors, my recollection is that with the exception of

mqc 15-7

those individuals who were shown in the program to fail the program criteria, that there were additional individuals who passed with the second three-month period of inspection.

Q Did you, as part of your review of the reinspection report, ever attempt to tabulate or calculate, to the extent the data was available for subsequent periods, whether the inspectors did worse or better over time?

A Other than the table to which you referred me earlier, Table V-E-2 and, I believe, V-E-1 in the QC reinspection report, I did not perform any other tabulations.

Q Let me refer your attention in the reinspection program report to the appendices, and specifically to Appendix B, Table B-8 -- excuse me -- Table B-6 on page B-8 of Appendix B.

A I have it before me.

Q Now this table contains data on a quarterly basis -- that is, for every three months -- on how a number of inspectors performed during their first three months and then during their second three months, and I believe there is at least one case of -- more than one case, several cases during their third three months; is that correct?

A I don't believe that's an accurate statement. To the extent that a second expansion period is identified,

mgc 15-8

that identifies, I believe, the follow-up to the inspector having failed the acceptance criteria after the first two periods, in which case 100 percent of his remaining work was inspected.

Q I see. So where it indicates Expansion 1, that means an additional three-month period, and where it indicates Expansion 2, that means all the rest of his inspections, whether it was three months, six months or whatever.

A That's correct.

Q Did Edison, as part of its reinspection program analysis, to your knowledge, tabulate the results of these differing time periods to see whether the inspectors, in fact, did better or worse over time?

A (Witness Tuetken) Edison did, yes.

Q And do you have the results of those tabulations here with you, Mr. Tuetken?

A I do not.

Q When you performed those tabulations, did you include a tabulation not only of the number of inspectors who did better over time versus worse over time, but also of the number of inspections done by inspectors who performed worse time, rather than who performed better over time?

Let me break the question down. It's a bit too much for one.

mgc 15-9

Did your tabulation count the number of inspectors who, in fact, got better over time and compare that to the number of inspectors who, in fact, got worse over time? And I suppose there's a third category, inspectors who stayed the same.

A I did a number of things with that. That, I think, was one of them. I don't recall at this point.

Q So you did that, but you don't recall the results of the tabulations?

A Correct.

Q Do you recall, when you did those tabulations, was it after the reinspection program report of June was published or before?

A June?

Q Yes.

A Before June.

Q Was it before February?

A It was before February. It was December or January, I believe.

Q But that data was not included in Edison's report on the reinspection program?

A The data can be derived from the statistics presented.

Q It can be derived, but the results of your tabulations were not included in the report.

mgc15-10

A They were not.

Q And did you also tabulate not only the number of inspectors who got worse over time versus those who got better, but also the number of inspections done by those inspectors who got worse over time as compared to the number of inspections done by those inspectors who got better over time?

A I don't remember.

A (Witness Del George) It's probably also worth noting in that you have not identified the contractor to whom reference is made in the table that we are discussing. It is the contractor, Powers-ASCO-Pope which the program report identifies as having a program which we could not conclude was effective. And to the extent that conclusion was reached, you will also recall that 100 percent of the inspectors for that contractor at the outset were sampled and where inspectors were found not to meet the program acceptance criteria, 100 percent of their work was reinspected.

Q I understand that. But the data with respect to Powers-ASCO-Pope contains more information concerning more inspectors who did -- whose work was inspected after the first three months than does the data that's available with respect to any of the other contractors in the program, correct?

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A That's correct. But it's not clear to me that inferences of the type that you suggest can be drawn, inasmuch as this contractor's program was found to be ineffective.

Q That's correct. It would be a question as to whether one could draw an inference from this data to the other contractor.

A That was the point I was trying to make.

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MR. CASSEL: I have no further questions of the panel, at this time, Judge.

JUDGE SMITH: Do you have recross examination?

MR. LEWIS: Yes, I do.

RECROSS EXAMINATION

BY MR. LEWIS:

Q I can't remember exactly now whether it was Mr. Del George or Mr. Tuetken who made some of the comments that I have marked here, so I will address it to either one of them. There was discussion earlier today about situations where an AWS weld discrepancy was identified and was then physically rectified before submitting the matter to Sargent & Lundy for evaluation. Do you recall that discussion?

A (Witness Tuetken) Yes.

Q Would you describe for us, in those situations, was the weld literally replaced and redone? Is that what happened?

A In most cases it was just local repair.

Q Local repair to some aspect of the weld?

A Correct.

Q When the matter was referred to Sargent & Lundy were they provided with data which indicated what the condition was of the weld, before it was remedied?

A Could you restate your question?

Q Was Sargent & Lundy provided with data which

indicated what the condition was of the weld before it was remedied?

A Yes, in varying degrees.

Q Bearing in mind that you work for Commonwealth Edison, not Sargent & Lundy, was that information provided in a manner that an evaluation could be conducted of the design significance of that weld before the remedy was applied to it?

A I believe so.

Q Is there any way in which Sargent & Lundy would not have been able to conduct as effective an evaluation of the significance of the design discrepancy of that weld, because it was fixed, as compared to a situation where they had before them a weld that had not been fixed?

MR. MILLER: Judge, I do have to object that this seems to me to be something peculiarly within the knowledge of the Sargent & Lundy engineers who conducted the evaluations and not Mr. Tuetken.

MR. LEWIS: Fair enough. I recognize that and I don't want to take him beyond what he's able to testify. I will hold that for subsequent questioning.

BY MR. LEWIS:

Q Mr. Del George, as I recall, you earlier testified that it was your understanding that each of the 7,000 -- I believe it was -- weld discrepancies -- and I believe now

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we're talking about Hatfield weld discrepancies.

A (Witness Del George) No. There were a total of 7,000, thereabouts, observed discrepancies identified in the entire program which is related to eight contractors, one of who was Hatfield. And that 7,000 plus discrepancies included both objective and subjective discrepancies.

Q Thank you for that clarification.

I believe your testimony was that each of those discrepancies was individually evaluated by Sargent & Lundy. Do I correctly remember your testimony?

A That's correct.

Q Are you familiar with the testimony of Mr. McLaughlin? Have you seen the testimony of Mr. McLaughlin?

A Yes, sir.

Q I will show this to you after I read it to you. On page 6 of Mr. McLaughlin's testimony, in response to the question "How were the discrepant AWS welds produced by Hatfield and Hunter evaluated in the reinspection program?" He states "The sampling plan, as in the case of Hatfield--" and then he goes on and says or a 100 percent evaluation plan as in the case of Hunter --

A Yes, I understand those words and I would defer to Mr. McLaughlin to explain his own testimony. But it is my understanding that each of the discrepancies, as is discussed in the program report, was evaluted to

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determine the extent to which the calculations that were performed as a part of that sample analysis were captured by or bounded by the detailed calculations associated with the sample.

So it was in that sense that I made the statement that each of the discrepancies was evaluated.

Q Thank you.

Could you tell me if a discrepancy was identified in an AWS weld and that discrepancy was then remedied physically, was the discrepancy nevertheless reported as part of the statistics of the reinspection program?

A Yes, it was.

Q With respect to the quality of the remedied or reworked weld, after the rework was done to those welds, would they then have been subjected to some type of inspection?

A Yes.

Q And I gather they would also have been available for inspection by the NRC?

A Yes.

Q I would like to ask you a question that was prompted by some testimony of yesterday. And that is as follows, there was discussion previously about the fact that generally if an item had been reworked, it could not be subjected to the reinspection program unless you had a

reworked inspection report, an inspection report on the rework, and you knew who that inspector was. Do I correctly remember that testimony?

A Yes.

Q Were there situations in which an original inspector noted a discrepancy but the discrepancy was dispositioned "use as is" and a reinspector then had occasion to reinspect that type of documentation in that situation?

A (Witness Tuetken) I know of one. And the reinspector found it rejectable.

Q Let me see if I correctly understand the question I asked now.

(Laughter.)

The original inspector -- because I want to see if you were answering the same thing I asked. The original inspector noted a discrepancy and then it was dispositioned "use as is" which I think is the disposition that normally Sargent & Lundy would be involved in, if I'm correct?

A Normally.

Q And so when you said that the reinspector found it rejectable, do you mean that he agreed with the call made by the original --

A He agreed with the call made by the original inspector and he found it unacceptable. He goes out and

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reinspects it, identifying that it's unacceptable to the drawings without the benefit of the knowledge that the item had been accepted as is. There was no notation on that specific form. It was an observed discrepancy in the program.

Q I take it, in that situation, the "use as is" disposition would stand?

A Yes.

Q I'd like to get a clarification with regard to another matter. There was discussion about situations where a weld is found to have more than one aspect in which it is discrepant, for lack of a better term. Did you say that -- I think maybe it was Mr. Del George, I'm not sure -- that in that situation it was recorded in the reinspection program as one discrepancy?

A Yes.

JUDGE SMITH: Let's back up there. The question is if a weld has more than one aspect in which it is discrepant, it is recorded as a single discrepancy? And your answer is yes?

WITNESS TUETKEN: Yes.

MR. LEWIS: That is what I understood his testimony to be, but I wanted to get clarification.

BY MR. LEWIS:

Q Mr. Del George, you were led through a series

of questions earlier today by your counsel regarding your assumptions and then subsequently the validation of those assumptions by the results of the reinspection program. Let me ask you, in answering those questions, were you describing in fact the thought pattern you went through as you entered into the reinspection program?

A (Witness Del George) The sequence of questions clearly did not represent a thought pattern that I went through. But those items that were discussed as assumptions at the time the program was developed, were issues that were considered by myself and my colleagues at the time -- point in time when we were developing the program.

Q You were viewing them as assumptions, is that how you were looking upon them?

A We never characterized those aspects of our discussion as hypotheses or discussions -- excuse me, asumptions in a statistical sense. They are issues, however, that we addressed in our discussions and we have labeled them as assumptions today for purposes of correlating to the discussion earlier in this proceeding.

Q Would it be accurate to also describe what you talked about this morning, assumptions, as certain engineering judgments that you engaged in at the outset of the program?

A Yes.

Q With respect to certain of these matters, that you were questioned on this morning, one that I would like to go over with you is you stated that the degree of repeatability or corroboration by reinspectors with the results of the original inspections, provided to you some validation of the validity or acceptability of the 90 percent and 95 percent acceptance criteria. Did I correctly understand you to make those statements?

A I reached that conclusion in my remarks.

Q Well, I'd like you to lead me through your thought process on that one, a bit, if you could. It's not readily apparent to me how the degree of corroboration by the reinspector speaks to the validity of the acceptance criteria. Perhaps you could explain that?

A As I recall the question, it asks whether or not the acceptance criteria of 90 percent and 95 percent were appropriate. My testimony addresses, and I tried to express my own view as to the fact that those criteria were established as threshholds which would -- which allowed for a judgment as to the qualification of an inspector. To the extent that -- so the question then becomes how do you make a judgment on the adequacy of your initial choice?

If the results of the program had shown that there were very large numbers of discrepancies identified, many significant -- that is design significant discrepancies

identified, then an argument can be made that the threshhold was too low. It's my view that the results, taken as a whole, based on the fact that there were no design significant discrepancies identified and the fact that for many -- I continue to believe the vast majority of inspectors were shown to meet these acceptance criteria -- it's my view that that plays a part in validating the propriety of those levels.

And that's what I was attempting to say in my earlier comment.

Q Go back, for a moment, to the question that I asked you about, situations where you repaired an AWS weld, and then subsequently gave it to Sargent & Lundy for evaluation. What was the principal purpose of your giving it to Sargent & Lundy for evaluation, if you had already made the repair that you felt was necessary?

A Our principal purpose was in producing a complete record upon which a judgment could be made, relative to the adequacy of the inspection activities that had been subjected to review. Were we to have just repaired those welds or other discrepancies that were repaired, we would have been able to argue that we had left no design significant discrepancy unrepaired in the plant.

But we would have had to rely on another level of inference as to the question of whether there were any

other or whether those, in fact, represented design significant discrepancies.

So it was our judgment that a prudent engineering approach was to do an engineering evaluation of those discrepancies as well to determine, notwithstanding the rework, whether a design significant discrepancy had gone undetected after inspection.

end16

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Q In other words, you did it partly to test the results of that reinspection to see what it showed you about what were the conditions observed by the reinspector.

A Yes.

JUDGE SMITH: Is that correct, or is it to test the validity of the original inspection?

WITNESS DEL GEORGE: If Mr. Lewis had said reinspection, I did mean to answer, in response to the question --

MR. LEWIS: I misspoke.

WITNESS DEL GEORGE: The original inspection. It would test the original inspection.

BY MR. LEWIS:

Q You also stated that one of your assumptions at the outset -- you described it as one of your assumptions at the outset of the reinspection program -- was that there were no design-significant deficiencies in the plant, and you used that as one of the considerations in designing the program; is that correct?

A (Witness Del George) Yes.

Q Was the program, however, put together in such a way as to focus on design-significant, as opposed to non-design-significant attributes, or was it rather organized in terms of inspectors looking at the work of

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the work of selected inspectors.

MR. MILLER: I'm going to have to object to the phrase "design-significant attribute." We had a lot of discussion about design-significant deficiencies and discrepancies, but the scope of this program was all safety-related work. There was no non-safety-related work encompassed within the program at any time. So the distinction Mr. Lewis posed in his question, as I understand it, really lacks foundation.

MR. LEWIS: I'll restate it. I think the point I'm trying to get at is perhaps somewhat simpler than I was able to state it.

BY MR. LEWIS:

Q I am trying to explore whether or not you feel that the program, as you entered into it, was in part designed to establish whether or not there were design-significant deficiencies in the facility by the contractors in question?

A (Witness Del George) It was -- I had the recognition and I believe that my colleagues also recognized the fact that the program we were developing would speak to the question of whether design-significant discrepancies had been left in the plant.

The original concern that was raised, however, did not have associated with it a clear indication that

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design-significant discrepancies had been detected. And for that reason, reinspection was required.

Therefore, our primary focus was not on identifying design-significant discrepancies.

Q But once you had identified discrepancies, you did do an evaluation to determine their design significance?

A That's correct.

Q Is that an accurate way of portraying it?

A Yes, sir.

Q You described in your testimony the engineering evaluations undertaken by Sargent & Lundy of discrepancies identified in the reinspection program.

Are you generally familiar with the testimony that I am referring to?

A Yes.

Q Was this Sargent & Lundy evaluation, as you understood it, the equivalent of an evaluation to determine whether or not to accept an item, component, whatever, use as-is, accept as-is? Is that the type of evaluation you are talking about?

A Yes.

MR. LEWIS: Those are all my questions.

JUDGE COLE: Just one question, really, for clarification.

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FURTHER BOARD EXAMINATION

BY JUDGE COLE:

Q Could you turn to Exhibit V-2, page 1 of 2 in the reinspection program report?

(The witness complies.)

You were asked some questions by Mr. Cassel concerning the number of inspectors that failed to meet the 90 percent requirement, and I believe you answered that 18 failed to pass it at the three month level; do you recall that, sir?

A (Witness Del George) Yes, sir.

Q I ask you to look at Table V-E-2 and see if that is not -- if that's a correct answer.

A No, sir. On inspection, there would have been 20.

Q That would include the two that failed at three, but then passed at the six months.

A Yes, sir, and I think I made a reference to that back in another question from Mr. Cassel.

Q Okay. I didn't recall that reference. But 20 is the answer at the three-month level.

A Yes, sir.

Q Thank you. We are just having a discussion about the use of the word "fail," and whether all 20 could be put in the category of having failed. It's just that

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they failed to meet whatever requirements there might have been at three months.

A Yes. Your characterization is an accurate one. As we discussed the word "failure" before, it did not make the distinction between the point in time in which that judgment was made at the end of the first three months or the end of the second three months.

JUDGE COLE: Okay. Thank you.

JUDGE CALLIHAN: Just one clarifying question as to the small sample.

BY JUDGE CALLIHAN:

Q Yesterday we discussed discrepancies defined as actions by inspectors, rather than hardware misforms. I understood you to say a few moments ago that there is in the record, in your records, an instance of a finding upon reinspection of a hardware deficiency when the or where the initial inspection also showed that deficiency.

To say it differently and chronologically, an item was called deficient by the inspector and was confirmed as being deficient by a reinspector.

A (Witness Tuetken) Correct.

Q Am I quoting you correctly?

A Correct.

Q Why do you think that deficiency wasn't caught upon inspection and repaired?

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A The second deficiency? The second inspection?

Q No. The first. It was found deficient on the first inspection.

A It was found deficient. It was evaluated by the nonconformance report to be found acceptable and can remain unchanged. The reinspector did not have that intelligence when he reinspected the item and the drawing again, and he found it deficient, so it was recorded as an observed discrepancy.

Q Who made the judgment whereby the alleged deficiency on the part of the first inspector was not attended to?

A Sargent & Lundy, the architect engineer.

Q Was this a clerical matter?

A Clerical matter. The records that the reinspector used did not link itself to a nonconformance report which existed, which accepted that component.

Q So the initial discrepancy on first inspection was not remedied and was not caught, so to speak, because of some clerical deficiency; is that what you just told me?

A No. It was remedied and caught, but the inspection report itself did not have notated on it the fact that another document, a nonconformance report, through its evaluation had found the condition acceptable.

Q So it's a paper error.

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A Yes.

JUDGE CALLIHAN: Thank you.

NBU

MR. MILLER: Let me just as a very few questions.

FURTHER REDIRECT EXAMINATION

BY MR. MILLER:

Q Let's go through the sequence. There was an original inspection and a nonconforming condition was identified by the inspector.

A (Witness Tuetken) Yes, sir.

Q A nonconformance report was issued, correct?

A Yes, sir.

Q Sargent & Lundy did whatever engineering evaluation was necessary to satisfy themselves that, in their professional judgment, they thought it was acceptable, correct?

A Yes, sir.

Q And the disposition on the NCR came back -- what? -- use as-is?

A Yes.

Q Reinspection now occurs. What documents, if any, does the reinspector have which tell him about the condition of this component?

A He has the original inspection report with all the previous information blanked out, so he doesn't know

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what was originally seen in this inspection. He is then required to inspect it per the drawing to identify that component.

Q The original inspection report had on it a reference to the nonconformance report, which dispositioned the original inspector's finding of noncompliance?

A It did not. It was an as-built activity under the Hatfield --

Q You are going to now have to explain what an as-built activity means.

A One of the items in the inspection was to do conduit as-builts. In that activity, an installation was found to be outside the drawings, and the reinspector wasn't given the original results.

JUDGE CALLIHAN: So the absence of that noncompliance report or the absence of appropriate notation on some report did not alert the contractor, whomever it was, to go fix something?

WITNESS TUETKEN: No. It didn't alert the reinspector that the condition was acceptable, had been dispositioned "accept as-is."

JUDGE SMITH: Your testimony in response to Dr. Callihan's questions agreed with him that a paper error had been made?

WITNESS TUETKEN: Yes, sir.

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JUDGE SMITH: Is that your studied testimony? Because as you go through it with Mr. Miller and as I heard your original testimony, there was no error identified.

WITNESS TUETKEN: Error identified in?

MR. MILLER: Let me try.

Mr. Tuetken, I believe your response to one of Dr. Callihan's questions was that there was a clerical error that caused this problem. I suppose we'll find it in the transcript tomorrow. I'm just trying to -- Judge Smith and I would both like to know if there was such a clerical error in the process that you have now described in response to my question.

WITNESS TUETKEN: Maybe I don't understand the question.

JUDGE SMITH: Let me try it again real simply.

An item was found in noncompliance by an inspector. Why was that item not repaired or made acceptable at that time?

WITNESS TUETKEN: At the original inspection, the item was found to not meet the drawing requirements. A nonconformance had been created, was subsequently created. Sargent & Lundy had evaluated the condition and found it acceptable; it could stay unchanged.

The reinspector, being given the original report, void this information, was comparing the

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as-installed condition again to the drawing, which had not changed. His tolerance was still -- this drawing had still remained as-is, because the nonconformance had accepted it as installed.

The thing that created the problem with the second inspector is, the information on the report that coupled the original inspection to the acceptance by an NCR was not available to him to make that determination that the original condition was acceptable.

JUDGE SMITH: By design, by program design.

WITNESS TUETKEN: Yes.

JUDGE CALLIHAN: Thank you.

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MR. LEWIS: I have one additional set of questions which I had not seen during my recross. If I may briefly, with your permission.

FURTHER RECROSS EXAMINATION

BY MR. LEWIS:

Q There are two other matters I wanted to clarify, as to the testimony by this panel. Mr. Del George, you earlier testified that the numbers of 50 for the contractors in the inspection program, with the exception of PTL, and 25 PTL as to the minimum number of inspections required to include a reinspector in the reinspection program.

You testified, regarding that number, and I believe your testimony was that it was not a program requirement. What did you mean by saying it was not a program requirement?

A (Witness Del George) The program to which I made reference was that defined in the February 23, 1983 letter from Mr. Stiede, S-T-I-E-D-E, to Mr. Keppler. That letter and the program it described did not discuss a minimum quantity requirement. You will recall, from Mr. Tuetken's testimony -- I believe there was a discussion of interpretation one -- it's contained in one of the interpretations that is appended to Mr. Tuetken's testimony -- the minimum quantity criteria was established after the program had been agreed upon with the NRC.

And it's purpose was to expand the 90 day limit

beyond 90 days to provide what we judged was an adequate minimum quantity of inspections upon which conclusions could be reached relative to the performance of an inspector. Absent that criteria, an occasion could arise wherein the first 90 days after certification no work had been done.

Q Were there any occasions in the reinspection program where you did count, as one of the inspectors reinspected someone who had less than 50 inspections?

A There were one or two such individuals -- my recollection is that Peabody, the contractor who had very few inspection items, and all of his inspectors were reinspected -- comprised part of that number. Peabody being tested against the 25 criteria.

Q I'm excluding the 25 criteria. I mean those to whom the 50 would be applicable criteria.

A I don't have a specific recollection.

Q And I don't have it right at hand either.

A And Mr. Shewski's testimony makes reference, in Attachment M, to three inspectors that did not have the minimum quantities. Without reviewing the program myself again, I can't recall offhand how many there might have been. It was not very many.

Q I would like to ask you, in testimony today, you referred to -- you were asked a question by Mr. Cassel regarding whether it was correct that for an inaccessible or

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non-recreatable attribute the number in the reinspection program would necessarily have been zero. And I believe you agreed with that statement. Do I correctly remember it?

A Yes.

Q Is non-recreatable or inaccessible a separate attribute category?

A No, it isn't.

Q Rather, wouldn't the situation be that you would have some inaccessible and non-recreatable items within an attribute category but also have accessible and recreatable items within that same attribute category?

A That is true, although certain attributes as a class might have been entirely inaccessible. For example, receiving inspection, I believe, was identified as an attribute class which was not recreatable.

Q And therefore not included as one of the attributes stated in the reinspection program?

A That's correct.

Q Thank you.

JUDGE SMITH: Anything further.

(No response.)

JUDGE SMITH: Gentlemen, you may step down.

(Witnesses excused.)

JUDGE SMITH: Shall we take our mid-afternoon break, and then we will begin with the next witnesses?

(Recess.)

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JUDGE SMITH: Are we ready?

MR. CASSEL: Judge, before we begin the cross-examination or direct examination of Mr. Hansel, Mr. Hansel testified at his deposition that, prior to preparation of his testimony, he had certain correspondence concerning his review of the program at Byron, between himself and Isham, Lincoln & Beale, the law firm which retained or communicated with Mr. Hansel with reference to providing testimony in this case.

Intervenors asked for a copy of that correspondence, and Edison declined to provide that correspoondence on the ground that it was covered by the work product privilege, even though Mr. Laney's correspondence, which was directed at Edison rather than Isham, Lincoln & Beale was, in fact, produced.

I believe that under the Federal Rules of Civil Procedure, as very recently amended to deal specifically with this type of problem, and specifically Rule 26(b)(4) entitled "Trial Preparation, Experts," the information should properly be produced. The Advisory Committee note to Section (b)(4) states, and I'll just quote three sentences which I think are relevant, in part: "These new provisions of Subdivision (b)(4) repudiate the few decisions that have held an expert's information privileged simply because of his status as an expert," end quote, and

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then they cite some cases.

Continuing, quote, they also reject as "ill-considered the decisions which have sought to bring expert information within the work product doctrine," end quote, and then they cite another case.

I believe that's exactly what Edison's lawyers are trying to do in this case, is to bring Mr. Hansel's information within the work product --

JUDGE SMITH: Excuse me. Didn't you say the disputed document is a letter from the law firm to the expert?

MR. CASSEL: No. I'm asking for letters from Mr. Hansel to the law firm, letter or letters; as I recall, it was more than one. And I'm not asking for any letters of information from Isham, Lincoln & Beale.

MR. GALLO: That's the nature --

MR. CASSEL: Is the only correspondence, letters from you to him?

MR. GALLO: Judge, can we go off the record?

(Discussion off the record.)

JUDGE SMITH: Back on the record.

MR. CASSEL: Judge, I've just been advised by Edison's counsel that the only information contained in the letters from Mr. Hansel relates to his billing. I don't need that. Based on that representation by Edison,

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I don't see any need for you to resolve the issued.

JUDGE SMITH: Are we ready to proceed now with Mr. Hansel's testimony?

MR. CASSEL: Yes, Judge.

Whereupon,

JOHN L. HANSEL

was called as a witness on behalf of the Applicants and, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. GALLO:

Q Mr. Hansel, would you state your full name for the record, please?

A John L. Hansel.

JUDGE SMITH: Mr. Gallo, before you proceed, Dr. Callihan brought to my attention earlier that the observers of this hearing and any hearing who do not have a copy of the direct testimony don't know much about what's going on for awhile. So we decided to ask that there be some oral testimony describing a little bit more who the witness and very briefly the nature of his testimony.

MR. GALLO: Do you want a statement from counsel on that?

JUDGE SMITH: Anything, any means by which that can be communicated to the observers.

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MR. GALLO: Judge Smith, Mr. Hansel is an independent consultant hired by Commonwealth Edison through Isham, Lincoln & Beale for the purpose of independently reviewing the reinspection program in the context of whether it was sufficient and adequate for the purpose of determining whether or not the inspectors, who were the subject of reinspection in that program, were qualified.

Mr. Hansel undertook this duty in the early part of this year, and his testimony describes how he set about to familiarize himself with the issues involved, how he undertook to interview the people who knew about the reinspection program, and how he undertook to review the records of five of the contractors which were the subject of the reinspection program.

He then, on the basis of his review and evaluation, drew conclusions with respect to the validity of various elements of the reinspection program.

One element was whether or not a representative sample of inspectors was selected for the reinspection program.

A second element was whether or not the acceptance criterion or passing criterion of 90 and the acceptance criterion of 95 was adequate.

His testimony also addresses one or two other

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elements of the reinspection program. He then discusses in some detail the fact that there were aspects of the reinspection program, such as the examination and disposition of the discrepancies by Sargent & Lundy to look at the documentation used by Sargent & Lundy to implement their program for disposition, and he ultimately draws a judgment and a conclusion with respect to the adequacy of the reinspection program for the purpose of determining whether or not, in his opinion, the inspectors who were reinspected were, indeed, qualified at the time that they conducted their inspections.

Judge Smith, with that brief summary, unless there is some further clarification sought, I would propose to continue with my direct examination.

JUDGE SMITH: I'm sure the cross-examination will develop the details of his testimony. I might explain to those who are not familiar with this type of proceeding, that unlike a regular court proceeding, the witness' direct testimony is prepared in advance in writing and is bound into the transcript. All of the parties have it early, so about all that is seen in the hearing room is the cross-examination.

Would you proceed?

MR. GALLO: Thank you.

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BY MR. GALLO:

Q Mr. Hansel, would you state your business address for the record?

A Evaluation Research Corporation, 1755 Jefferson Davis Highway, Arlington, Virginia.

Q Have you had occasion to prepare testimony with respect to the reinspection program conducted by Commonwealth Edison?

A I have.

Q Do you have a document in front of you entitled "Testimony of John Hansel"?

A Yes.

Q Does that document consist of 23 pages and an Attachment A?

A Yes.

Q Is this the testimony you prepared for this proceeding?

A Yes.

Q Are there any additions or corrections to that testimony?

A Yes. I would like to make three.

Q Take them one at a time slowly.

A Page 5, at the bottom of the page, the third line from the bottom, I would like to scratch "systems" and replace that with "communications process."

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I would like to scratch the word "were" and replace it with "was."

Q How would that line now read, Mr. Hansel?

A "I also reviewed the communications process that was utilized for a weekly exchange of information between contractors, Edison construction management, Edison QA, and Sargent & Lundy.

Q Proceed to the next correction.

A Page 7, the very first line at the top of the page -- that's a continuation of a sentence on the previous page.

The change I would like to make is between the word "first" and "inspector." I would like to insert "and fifth." And then between the word "and" and "every", insert the word "then."

That sentence would now read, "I reviewed the roster of inspectors to determine if the selection was made in accordance with the sampling plant, i.e. the first and fifth inspector, and then every fifth inspector thereafter."

Q And finally the last?

A The final one is on page 10, the fourth line from the top, the changes are very similar, if not identical to the previous one.

After the word "first", I would like to insert

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"and fifth" inspector, and after the word "and", insert "then."

That sentence would now read, "For these contractors, the first and fifth inspector, and then every fifth inspector thereafter were selected from the roster of inspectors."

Q Does that complete your corrections, Mr. Hansel?

A Yes, it does.

Q Is your testimony, as corrected now, accurate and complete, to the best of your knowledge and belief?

A Yes.

MR. GALLO: Judge Smith, at this time, I would like to enter into evidence the testimony of Mr. John Hansel and have it inserted into the transcript as if read.

I will hand a corrected copy of this testimony to the reporter for that purpose.

JUDGE SMITH: Are there objections?

MR. CASSEL: No objection.

MR. LEWIS: No objection.

JUDGE SMITH: The testimony is received.

(The prepared testimony of Mr. John L. Hansel follows.)

End 19

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-454
COMMONWEALTH EDISON COMPANY	)	50-455
	)	
(Byron Station, Units 1 and 2)	)	

Testimony of Mr. John Hansel

Q.1. Please state your full name and place of employment for the record.

A.1. My name is John L. Hansel. I am employed by Evaluation Research Corporation located in Arlington, Virginia. I am Division Director of the Energy and Environmental Sciences Division, and Deputy to the President. My duties include management of the Division which is involved in low-level waste management studies and technology transfer, energy conservation programs/studies, and energy management services for Oak Ridge National Laboratory and Bonneville Power Authority. I also provide consultant services to several utilities in the area of quality assessment and quality assurance. Similar services have been provided to the NRC, DOE and NASA.

Q.2. Please describe your educational background and work experience.

A.2. I received a Bachelor of Science degree in 1965 from

Rollins College (Winter Park, Florida) in Mathematics and Science, and a Masters of Science degree in Systems Management and Engineering from the Florida Institute of Technology in 1968. I am certified by the American Society for Quality Control as a Certified Quality Engineer. I am currently President of the American Society for Quality Control.

My professional career and work experience includes 30 years of experience in the quality control and quality assurance fields. For 27 of those years, I have been involved in large complex aerospace and energy programs. For example, I was employed for 14 years (1965-1979) with Rockwell International as Director of Quality Assurance of NASA's Space Shuttle Orbiter and the Apollo and Saturn Programs.

I served as a consultant to the Kemeny Commission in their investigation of the Three Mile Island accident. My task was to evaluate two components and one system to determine how much conservatism (margin) was included in the design. I was also asked to compare TMI with the aerospace industry to determine if certain advanced technologies in the assurance sciences were being used at TMI, i.e., reliability methods/tools, sneak circuit analysis, transient analysis, fault trees, etc. In 1983, I was also selected by the U.S. Nuclear Regulatory Commission to serve on an independent review panel, which was established to provide an overview

of a study conducted by the NRC and consultants to evaluate NRC's approach to quality and to recommend improvements.

I have also published several papers and am the author of the Quality Engineering Course for the American Society for Quality Control. A more detailed presentation of my professional qualifications is set forth in Attachment A.

Q.3. Are you familiar with the Reinspection Program conducted at Commonwealth Edison's Byron Station?

A.3. Yes, the Byron Reinspection Program is documented in a report, dated February 1984, and it was prepared by Commonwealth Edison Company. At the request of Commonwealth Edison Company, I performed an independent survey and evaluation of the Byron Reinspection Program, including its organization, approach and adequacy.

Q.4. Can you explain your understanding of the purpose of the Byron Reinspection Program?

A.4. The primary purpose of the Reinspection Program was to develop a plan to assess and determine the qualifications of Quality Control Inspectors who were employed by several contractors involved in construction of the Byron Station. This objective was met by reinspecting previous QC inspections

and by analyzing any discrepancies (differences between the original inspection and the reinspection) to determine what their significance might be. The data collected from this process was then used to draw inferences about the qualifications of the total population of inspectors on a contractor-by-contractor basis. The data was also used as one basis for determining the quality of the construction work.

Q.5. Why was the Reinspection Program initiated?

A.5. As a result of a Construction Assessment Team inspection which was conducted during the Spring of 1982, NRC raised a question concerning the adequacy of the Byron construction contractors' procedures for certifying their Quality Control Inspectors. In accordance with ANSI Standard N45.2.6. (1978), Commonwealth Edison initiated a Recertification Program beginning in June, 1982 to review and revise, where necessary, the contractors' procedures to comply with NRC's interpretation of this Standard. This action solved the immediate concern; but it did not provide assurance that the inspectors who performed the QC inspections prior to June, 1982 were qualified. Consequently, Edison developed and implemented the Reinspection Program to answer this question. The results of the Program and certain supplemental reinspections address the question of work quality at Byron.

Q.6. Please explain the manner in which you conducted your survey and evaluation of the Byron Reinspection Program.

A.6. As a first step, I held discussions in early February, 1984 with Edison personnel to gain an understanding of the problem and events leading up to the start of the Byron Reinspection Program. I read the background documentation dating back to June 30, 1982 to gain a good understanding of the Program.

I then selected five contractors for review. To assure a broad coverage of safety-related work, I chose contractors who had performed work on mechanical systems, large and small bore piping, electrical systems, HVAC controls, and process and instrumentation. The contractors were Johnson Controls, Inc., Hunter Corporation, Hatfield Electric Company, and Powers-Azco-Pope. The selection of these four contractors represented approximately 70% of all safety-related work. I also selected Pittsburgh Testing Laboratory, the independent testing lab/agency, to understand their role and interaction with other contractors.

I visited the plant site where I reviewed Edison's direction to the contractors concerning the Reinspection Program, contractors' responses and memoranda and the systems for recording reinspection data that had been established. I also reviewed the ~~systems that were~~ communications process was utilized for a weekly exchange of information between the contractors, Edison construction management, Edison Site QA and Sargent & Lundy.

Q.7. What was the focus of your review with respect to Hatfield, Hunter and Pittsburgh Testing Laboratory?

A.7. As was the case with respect to all five contractors, I interviewed representatives from each of the contractors mentioned and I conducted an audit of their records on a sample basis as follows:

a. I reviewed internal procedures documenting that the contractors' efforts on the Reinspection Program were compared with Edison's instructions to assure consistency.

b. I obtained copies of the rosters used to select the inspectors as candidates for reinspection. I checked the rosters for accuracy to determine what types of inspections the inspectors were certified to perform. I then made a crosscheck of these records against a random selection of personnel folders to verify that the inspectors were inspecting only those attributes for which they were certified.

c. I reviewed the roster of inspectors to determine if the selection was made in accordance with the sampling plan i.e.,

the first and fifth inspector and then every fifth inspector thereafter. I also reviewed these lists to assure that additional inspectors were added if the sample size required expansion.

d. I reviewed the design requirements to be utilized for the reinspection to determine if, as provided in the Reinspection Program, the requirements were equal to or more stringent than those used for the initial inspection.

e. I reviewed the processes that were used to determine what inspections had been conducted by a specific inspector in his first 90 days of employment after certification. I conducted a sample audit of this process.

f. I reviewed the qualifications of a sample of those persons conducting the reinspections. I checked to verify that no one was reinspecting their own work. I also looked at the assignment of the reinspection inspectors to assure that an individual inspector's work was being reinspected by more than one inspector,

and that random assignments were being made.

g. I reviewed the contractors' records of the Reinspection Program to verify that accurate and verifiable records were being maintained.

Q.8. Have you completed your evaluation of the Byron Reinspection Program?

A.8. Yes. My evaluation of the Reinspection Program serves as the basis for my testimony.

Q.9. What is the purpose of your testimony?

A.9. My testimony addresses a number of issues concerning the Byron Station raised by the Appeal Board and the Licensing Board in their orders of May 7 and June 8, 1984, respectively. Specifically, I discuss my evaluation of the basic framework of the Reinspection Program, the methods used to implement the program and its results as applicable to the Hatfield Electric Corporation, Hunter Corporation and Pittsburg Testing Laboratory. I also address whether or not the integrity of the Reinspection Program may have been compromised because

the reinspections were conducted by the contractors' personnel, rather than by an independent organization.

Q.10. What aspects of the Program's basic framework did you evaluate?

A.10. I evaluated all of the significant elements of the Reinspection Program. I reviewed:

a. the method used to select the QC inspector candidates for reinspection;

b. the rationale used to select the portion of the candidates' work to be reinspected; and

c. the acceptance criteria used to determine inspector qualification.

Q.11. I will be asking you a series of questions about these three elements of the Reinspection Program beginning with the first item. What method was used to select the QC inspectors for reinspection?

A.11. The Reinspection Program covered the QC inspectors of eight contractors who were involved in construction work

at the Byron site. The inspectors for six of the contractors, including Hatfield, Hunter and PTL, were selected on the basis of a sampling technique. For these contractors the first and fifth inspector thereafter were selected from a roster of inspectors. The roster for each contractor contained a complete list of the names of all inspectors employed on the job.

Q.12. Should not all of the QC inspectors have had their work reinspected rather than using a sampling technique?

A.12. No, a 100% reinspection effort was not necessary because a properly structured sampling plan will achieve reliable results. A sampling plan can be developed that permits sound judgments to be drawn with respect to the total population based on the sample results.

In this case, we are considering inspection repeatability or agreement between the original inspector and the reinspector. The sample of inspectors was selected on a random basis. The sampling plan was designed to include at least 20 percent of the original inspectors. This number was increased by the NRC. The selection of these additional inspectors included those whose work the NRC considered suspect. This combined sample was large and it provided a sufficient amount of data to draw reliable inferences about

the total population of inspectors. Moreover, an inspector was not selected as a candidate for reinspection unless he or she had participated in a minimum number of inspections. In such an instance, the next inspector on the roster was selected for the program. Based on these factors, I consider the sampling plan adequate to yield reliable results.

Q.13. Turning now to the second element of the Reinspection Program -- how much of each inspector's work was subject to reinspection?

A.13. The first 90 days of each inspector's work was reinspected. In other words, the inspections performed by the inspectors during the first 90 days of their employment were subject to reinspection.

Q.14. Is the first 90 days of work sufficient to evaluate inspector qualification?

A.14. Yes, it is. The first 90 days covers the time when an inspector would be most likely to make mistakes. He has just completed his training. He is new to the job and he still is in the process of learning the specifics of his new assignment. In other words, the inspector is still at the lower end of the learning curve. Therefore, a conservative bias was factored into this element of the Reinspection Program. The bias is conservative by concentrating the

reinspections during the period of time when the inspectors were most inexperienced. The result, contrary to Edison's interest, would reflect more discrepant inspections than would be the case if inspectors' work were selected for reinspection randomly from their entire work experience.

Q.15. Why select 90 days in lieu of a longer period of time, for example six months?

A.15. The same line of reasoning applies. The QC inspector is new on the job, and will be more prone to make mistakes early. The longer he is on the job, the better trained he should be. He will advance on the learning curve through experience and instructions from supervisors and other inspectors. If you were to select a six-month base, you would tend to make it easier for him to meet the acceptance criteria based on this learning process. Results from the later time period (three additional months) would tend to mask any problems and improve his chances of meeting the criteria. Conversely, a shorter period of time likely would not produce meaningful results because of the requirement that each inspector perform a minimum number of inspections.

Q.16. Turning now to the third element of the Reinspection Program -- what were the acceptance criteria used to determine inspection qualification?

A.16. The reinspection of QC inspections was divided into two categories, inspections involving objective attributes and those involving subjective attributes. For inspections involving objective attributes, the acceptance level was set at 95 percent, that is, 95 percent of the inspected work had to be determined acceptable in order to qualify the original inspector. The types of inspections included in this category, such as dimensions that should not change and verification of materials and shape, are repeatable and require very little exercise of judgment by the inspector.

For inspections involving subjective attributes, the acceptance level was set at 90 percent. These attributes were designated as subjective because they require the exercise of a great deal of judgment and interpretation by the inspector. Visual weld inspections are an example of this type of inspection.

Q.17. Do you believe these criteria were set at a proper level?

A.17. Yes. Both acceptance criteria were set high enough to identify any problem areas. In fact, the criterion for subjective attributes is high based on my experience. I was somewhat surprised that the level for subjective attributes had been set at 90 percent. There are usually too many variables involved and human beings are not nearly as predictable

as one might think in performing inspections. Studies have been conducted by human factors' experts in an attempt to fully understand and quantify the results that one should expect from subjective-type inspections.

In the 1960's, Drs. Harris and Cheney conducted studies to evaluate the repeatability of inspection results by different inspectors. The results of their work was published in 1969 in a book entitled Human Factors in Quality Assurance. They had a number of inspectors inspect the same hardware (with built-in discrepancies) in an attempt to correlate the results. Their studies concluded that an agreement rate of only 65-75 percent should be expected on a complicated piece of hardware containing many attributes. Although the hardware which was the subject of the Reinspection Program is less complex, I would have thought, based on these studies, that Edison nevertheless would only achieve agreement in 70-80 percent of the reinspections.

Q.18. What action was taken if the original inspector's work did not meet the acceptance criteria?

A.18. If the acceptance criteria were not met for the first three-month period, his work was suspect. In such cases the reinspection period was expanded for an additional three months. If the original inspector failed this

additional three-month period, that inspector was then considered to be unqualified and all of his work was reinspected. When this occurred, the original sample (number of inspectors who would have their work inspected) was increased by 50%. Edison selected additional inspectors who were certified in the same discipline as the inspectors who had failed. This practice allowed them to focus on areas where qualification was questionable.

If an inspector did not have inspections beyond that first three-month period, then the next inspector on the list was substituted. However, the reinspections conducted were maintained as a part of the overall data base.

Q.19. Are the results reliable in view of the fact that the reinspections of each company's inspectors were performed by personnel employed by the same firms?

A.19. Yes, Edison had provided specific direction to the contractors on this issue. Provisions were made to assure that no one inspector would be allowed to reinspect his own work. I questioned each of the contractors and I was assured in each case that they had taken steps to prevent this from happening. I also conducted a sample audit on a random basis to look for any inconsistencies and to determine if

any inspector had inspected his own work. I also looked for random assignment of the reinspectors. I did not observe any patterns that would indicate the presence of a buddy system or any attempt to game or alter the results. Due to the completeness of records and recording formats, I was able to review a large sample of the records. I did not observe any discrepancies in the records.

Q.20. Do you believe that adequate measures were taken to assure that the standards, drawings and specifications used for the reinspection were the same as that used for the initial inspection?

A. 20. Yes. Edison and the contractors took steps to assure that the engineering requirements used for reinspection were the same or equal to those used for the initial inspection. For objective attributes it was relatively easy to recreate the reinspection requirements. This was not the case for subjective attributes. Specifications had changed. The training and inspection checklists used for the initial inspections had been developed to an earlier set of engineering requirements. Additionally, in several instances the contractors were unable to produce copies of the initial set of requirements or checklists. I found one case where they could not clearly identify the appropriate criterion. In that instance, a current interpretation was applied by Hatfield for cable pan

configuration. Where it was not possible to reproduce the initial engineering evaluations or if questions were raised concerning the applicability of those requirements, the contractors utilized current requirements. In general, I found the current and original engineering requirements to be similar and as rigorous as their predecessors.

Q.21. Were all categories of work reinspected?

A.21. No. Some work was not reinspected because it was either inaccessible or non-recreatable.

Q.22. Was the work properly categorized as either inaccessible or non-recreatable?

A.22. Yes. In my review I looked for evidence of this, and found good documentation when work was placed in these categories. I observed that good reasons had been recorded as to why a certain inspector's work could not be reinspected. While I was on site, I observed an Edison audit team auditing these conditions as well. The audit included an inspection of the hardware to determine if in fact the work was inaccessible.

Q.23. Is there concern that a QC inspector might inspect either non-recreatable work or work soon-to-become inaccessible

less rigorously because he knows that the inspection cannot not be reinspected?

A.23. No. I have never experienced that phenomenon. I can see no benefit or motivation for an inspector to want to do anything less than good work. The inspectors that I have known and managed all took great pride in their work and usually were unconcerned about having anyone check their completed inspections for accuracy.

Q.24. Why were third party Level III inspectors used to perform additional inspections of visual weld discrepancies?

A.24. It was necessary for subjective attributes to assess the disagreements or differences between the results of the inspections by the original inspectors and those of the inspectors performing the reinspections to assure the accuracy of the final results. Based on the uncertainty of subjective-type inspections, it is well that Edison and the NRC agreed to the use of a Level III third-party inspector. The results of such inspections are based in substantial part on judgment and they are best evaluated by more experienced and qualified personnel. This practice fits my experience in that I have been accustomed to using quality engineers when an expert opinion was required to resolve differences in inspectors' opinions as to what constitutes a discrepant

condition. This is not to say that the original inspectors did a poor job of inspection; rather, the inspection requirements are not always well-defined and are often open to interpretation.

I reviewed the approach taken by the third-party inspectors who reviewed visual weld reinspections and the adequacy of the related documentation. I interviewed a third-party inspector and reviewed his records, several weld maps, and the records of two other third-party inspectors. This review was to gain an understanding of their role, criteria for inspection, and the methods used for dispositioning the nonconformance reports. I spent several hours with a Level III inspector inspecting some of the "worst case" welds to gain an insight as to the quality of the hardware. My review indicated that the third-party Level III inspectors did an excellent job of evaluating these discrepancies under difficult working conditions.

Q.25. How were the discrepancies discovered during the reinspections by Hatfield, Hunter and PTL reconciled?

A.25. As discussed in the testimony of the Sargent & Lundy witnesses, the discrepancies were reviewed, evaluated, catalogued and dispositioned in accordance with established procedures. Some discrepancies were dismissed as minor

irregularities or were determined not to be discrepancies. Others were dispositioned after being subjected to detailed engineering evaluations; and finally some discrepancies were dispositioned by an evaluation based on engineering judgment.

Q.26. Do you have an opinion concerning the validity of the engineering evaluation methods used by Sargent & Lundy?

A.26. I visited the Sargent & Lundy offices in Chicago to understand how they were conducting an engineering evaluation of various types of discrepancies for both objective and subjective inspections. I had previously reviewed a number of weld maps to assure myself that the third-party review process was effective, and that the maps would serve as a good tool for the engineers to use in their evaluation of the weld discrepancies. I discussed the engineering approach and justification for dispositioning certain types of discrepancies and the records that were being maintained of the as-built configuration and engineering calculations to verify design margins and factors of safety. I was quite impressed with the documentation that was being maintained. The records that I reviewed provided a sound basis for determining the level of detail and attention that was being given to the dispositioning process. Based on these reviews, I am confident that good engineering practices and judgments were being used.

Q.27. What role did Edison's QA Department play in the Reinspection Program?

A.27. The Edison QA Department was directly involved with the Reinspection Program. They attended the weekly coordination meetings between Edison, Sargent & Lundy and the contractors. They also utilized Pittsburgh Testing to reinspect some of the work that had been reinspected for a comparison of the results. Edison QA personnel were also involved in 3 on-site audits and numerous surveillance inspections during the Reinspection Program.

Q.28. Were the results of the Reinspection Program accurately reflected in the February 1984 Report?

A.28. Yes. I reviewed the various data recording formats and calculations being performed by Edison for inclusion into the final report on the Reinspection Program issued in February, 1984. The purpose of this review was to assure an accurate transfer of data from the contractors to Edison, and to form an opinion of the adequacy of the data to support the conclusions that were to be drawn.

Q.29. Did you form an opinion concerning the validity of the

conclusions that were presented in the Reinspection Program Report?

A.29. Yes. The Reinspection Program was designed to assess the adequacy of early inspection certification programs and to determine if the contractors' procedures were adequate to assure the assignment of qualified inspectors. As mentioned earlier, it is not necessary to reinspect all of the prior work to make these assessments. I feel that the sampling process was properly designed to provide a sound assessment of the early certification procedures and to identify any problems or concerns. Edison monitored the program closely to assure that it was properly implemented, and Sargent & Lundy provided good support by conducting the engineering evaluation of discrepancies. The approach was sound, cost effective and well managed by Edison and the contractors.

The results were impressive. All Hatfield and Hunter inspectors whose work was reinspected passed the acceptance criteria for both objective and subjective attributes. All of PTL's inspectors passed the acceptance criterion for objective attributes. One inspector failed the acceptance criterion for subjective attributes. This resulted in an expansion of the sample to include all PTL inspectors whose work was accessible and who were qualified to perform visual weld inspections.

The number of inspectors whose work was reinspected, the amount and type of work reinspected, and the requirement for sample expansion provided a valid basis to draw conclusions about the qualification of the overall population of inspectors and more specifically for each contractor. Thus, I believe that Edison through the Reinspection Program has provided reasonable assurance that the QC inspectors who performed inspections at Byron Station beginning with the construction of safety-related work in 1976 through September 1982, were qualified.

ATTACHMENT A

JOHN L. HANSEL

PROFESSIONAL EXPERIENCE SUMMARY

Mr. Hansel's professional career encompasses 30 years of experience in the management of large complex programs for major energy and aerospace projects. His management and technical experience covers a wide range of projects, such as the Apollo and Space Shuttle programs, where he was responsible for reliability, quality assurance and safety; the Mark VI reentry vehicle program at Cape Canaveral, where he managed project conformance activity; the Department of Energy's Gas Centrifuge Enrichment Plant Project, for which he served as Project Director to the System Support Contractor, and the Three Mile Island investigation, where he participated in a Special Study Team.

Mr. Hansel recently served on an independent review panel commissioned to study and make recommendations for improvements to the Nuclear Regulatory Commission quality assurance controls that are levied on utilities for the construction of nuclear power plants. He has published numerous papers and articles on reliability, safety and quality control, and is currently serving as President-Elect of the American Society for Quality Control. Additionally, he received the National Aeronautics and Space Administration's Astronaut recognition award for sustained superior performance in support of the Apollo and Space Shuttle programs.

PROFESSIONAL EXPERIENCE CHRONOLOGY

EVALUATION RESEARCH CORPORATION, Oak Ridge, Tennessee

Mr. Hansel is currently the Principal Consultant for Evaluation Research Corporation. In this capacity he provides clients with a full range of consulting services including management assessments, development of quality and reliability programs, management audits and specialized services in development of design assurance programs.

SYSTEM DEVELOPMENT CORPORATION, Oak Ridge, Tennessee (5 Years)

Position: Project Director, System Support Contract, GCEP Project

Responsibilities: Systems management/engineering and project management/control services, including cost and schedule reporting and analysis for all GCEP contractor; configuration management, computer services, quality assurance, logistics and data management.

PROFESSIONAL EXPERIENCE CHRONOLOGY (Continued)

Position: Associate Project Director for Project Control
Responsibilities: Management of all project control activities, including quality and reliability engineering, logistics, value engineering, inspection, test and checkout, site activation and plant start-up, schedules, budgets and financial reporting.

Position: Manager, Special Projects and Studies
Responsibilities: Studies involving test plans for the gas centrifuge machine, development of manufacturing schedules, and specialized technical studies involving the centrifuge and plant equipment. He also served as a Consultant to the President's Commission on the accident at Three Mile Island.

ROCKWELL INTERNATIONAL, Palmdale, and Cape Kennedy/Canaveral, Florida (14 Years)
Position: Director of Quality Assurance on the Space Shuttle Orbiter and Apollo/Saturn Programs
Responsibilities: Quality assurance, reliability, and system safety on all launch and spacecraft equipment and facilities. He also participated as a team member for the Rockwell corporate audit organization in the conduct of audits on major groups and divisions.

GENERAL ELECTRIC, Cape Canaveral, Florida, and Cincinnati, Ohio (10 Years)
Position: Supervisor, Engineering Test
Responsibilities: Managed jet engine/rocket engine test facilities.

PRATT & WHITNEY (2 Years)
Position: Supervisor, Engineering Test
Responsibilities: Managed jet engine/rocket engine test facilities.

EDUCATION

M.S., Systems Management/Engineering, Florida Institute of Technology, Melbourne, Florida

B.S., Mathematics and Science, Rollins College, Winterpark, Florida

PUBLICATIONS

Mr. Hansel's publications include the following:

Quality Planning - The Basic First Step
System Engineering Applications in the Nuclear Industry
Quality Engineering Course for the American Society for Quality Control
Quality Assessments - How to properly utilize reliability data

PROFESSIONAL REGISTRATIONS/AFFILIATIONS

Professional Quality Engineer - California
President-Elect, American Society for Quality Control
Certified Quality Engineer - ASQC

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MR. GALLO: The witness is now available for cross examination.

JUDGE SMITH: Mr. Cassel?

CROSS EXAMINATION

BY MR. CASSEL:

Q Mr. Hansel, you have been patiently sitting through a couple of days of cross-examination. Were you aware, prior to the clarifications provided by Mr. Tuetken in response to cross-examination, of the actual selection methods -- being the first and fifth and every fifth, rather than as stated in your testimony, the first and every fifth thereafter?

A I was aware of the actual selection process, yes.

Q So is it just an effort to state more precisely what you already knew?

A Yes.

Q You began your career, Mr. Hansel, as an instrument technician with General Electric in 1953, correct?

A Yes.

sp Q And you obtained your BS degree from Rawlings College in 1965?

A Yes.

Q Except for service on the two committees mentioned in your resume, is it correct that your only nuclear experience consists of your work in this case, which you

began in approximately February and worked for Pacific Gas & Electric on Diablo Canyon, which you did during approximately February to April of this year?

A Would you clarify what you mean of the two? I didn't hear the front end of your question.

Q Your resume refers to a service on a study team relating to TMI and a panel concerning NRC quality assurance requirements. Other than your membership on those two committees, do you have any nuclear experience, other than your work this year from Edison on Byron and from PG&E on Diablo?

A It's correct, except with one correction. TMI was not a committee. That was an extensive work assignment.

Q It was referred to, in your resume, as a study team.

A Yes.

Q Are you an expert, Mr. Hansel, in the field of statistics?

A No.

Q Are you an expert in the field of human factors?

A No.

Q When did you first see Byron?

A It was either late January or early February.

Q When were you first contacted by Edison's lawyers for assistance in this case?

A Late January.

Q Was that following the initial decision by the Licensing Board?

A I believe it was.

JUDGE CALLIHAN: Excuse me, Mr. Cassel. May a year be attached to the January and the February, just for the sake of the record?

THE WITNESS: Yes, sir. 1984.

JUDGE CALLIHAN: Thank you.

BY MR. CASSEL:

Q And was your work basically for the purpose of providing information that would assist Edison in obtaining its license from the NRC?

A That was not the context of our original discussion.

Q Did it become the context of your discussions?

A I was to eventually be involved in it to the point where I was to assist them, yes.

Q And at the time that you were first contacted, they had just been denied a license?

A Yes.

Q Do you know how many reinspectors there were in the reinspection program at Byron, Mr. Hansel?

A How many reinspectors?

Q That's right.

A I believe there were 110.

Q Would you agree that there were 100 original inspectors who were reviewed and that there were 152 reinspectors?

A I'm sorry, I misread your question. I'd like to back up. Would you please restate it?

Q Surely. How many reinspectors were there in the program?

A I do not know that.

MR. CASSEL: Mr. Miller, would you stipulate that the program report indicates that there were 152 reinspectors -- Mr. Gallo, I'm sorry.

MR. GALLO: I'd have to look to refresh my memory myself, so maybe you'll be kind enough to lead us right to it.

MR. CASSEL: I can't find it at the moment. Let's pass it by. But let me ask the next question, Mr. Hansel.

BY MR. CASSEL:

Q Of the entire number of reinspectors who participated in the reinspection program at Byron, how many of them did you personally interview?

A None.

Q Now you did speak with one of the third party review inspectors from Sargent & Lundy, is that correct?

A Yes.

Q But that was the only one of the third party inspectors with whom you spoke?

A Yes, and I reviewed the records of two others.

Q Is the question of whether the sample size in the reinspection program was adequate a statistical determination, Mr. Hansel?

A I don't think so.

Q Let me just read you, quickly, perhaps I misunderstood the testimony at your deposition. I'll be happy to show it to you if you would like. Do you have a copy of your deposition transcript there?

A In my briefcase.

Q If you need to refer to it, we can do that.

MR. GALLO: Let me get it for him. Can the witness get his transcript?

JUDGE SMITH: Certainly.

BY MR. CASSEL:

Q If you would refer to page 30 of your deposition transcript, Mr. Hansel, in the middle of the page I asked you a question and you gave an answer. And I would just read out loud the last sentence in my question and the first sentence of your answer.

Question: What are the components or elements of a properly structured sampling plan? Answer: Well, based upon the size of the population, you need an adequate

number and that is a statistical determination.

Do you stand by that testimony, Mr. Hansel?

A Yes, but after I read the deposition, I was misled by your question. You were asking me what are the components or elements of a properly structured sampling plan. You did not preface that with a sampling plan for reinspection program. So I began to give you the answer associated with a well structured sampling plan.

Q Well, your direct testimony does refer to a properly structured sampling plan, does it not?

A It does.

Q Let's find out exactly what the distinction is here, because it's not clear to me. If I ask you what are the elements of a properly structured sampling plan, is your answer that one of those elements is that there must be an adequate sample size and that is a statistical determination?

A As applied to a normal sampling plan, not necessarily for the sampling plan associated with the reinspection program.

Q Why was this one not covered by the general rule?

A I think in the particular case, as was applied in the reinspection program, they needed to have a number that was large enough to cover a sufficient amount of work. They selected that number and felt it would fall within the first

90 days. I think there were other considerations, other than just a sample size, that would determine how that sampling plan should have been structured.

Q I wouldn't quarrel with that, but that's not the question I'm intending to ask. The question is simply whether the sample size adequacy is a statistical determination? Is your answer to that yes or no or it depends?

A Repeat the question, please?

Q Is the adequacy of the sample size a statistical determination?

MR. GALLO: Clarification. Is this for purposes of the reinspection program that we're talking about?

MR. CASSEL: I've asked the question generally. If there's a general answer --

THE WITNESS: I was about to come back the same as Mr. Gallo. Are you talking in general, or for the reinspection program?

BY MR. CASSEL:

Q I think I have three questions. First, in general; second, for the reinspection program for purposes of sampling inspectors; and then third, for the reinspection program for purposes of work quality.

Let's start with in general.

A Would you repeat the question, please?

Q Is the adequacy of the sample size a statistical

determination?

A For a normal sampling plan, yes.

Q With respect to the sampling of inspectors at Byron?

A It was not totally necessary. It could be used as a means of merely verifying or validating your original sample definition which is, I believe, the way Edison used it.

Q And for purposes of the work quality at Byron, would you say the sample size is a statistical determination, or not?

A I believe, in the case of Byron, that the data that was collected provides adequate information for you to draw inferences about the total populations. That's the question.

Q That's not the question. The question is whether the adequacy of the sample size, with respect to the actual things being reinspected -- in this case, inspections -- was a statistical -- is a statistical determination?

JUDGE SMITH: That wasn't your question.

THE WITNESS: You have lost me.

JUDGE SMITH: I think you have changed your question.

MR. CASSEL: I didn't intend to, but I think I may inadvertantly have, Judge.

BY MR. CASSEL:

Q For purposes of determing work quality at Byron. Edison has testified that that wasn't their principal purpose, but that after the fact they decided that this program enabled them to make an inference on that point. They had a sample size for inspectors, one in every five. They also had different sample sizes for the hardware. Some hardware they inspected one out of ten. Other attributes were subject to inspection. They inspected a different proporation.

In each case, you had a sample of the total population of inspections which had been done. And my question is whether the size of that sample was adequate is a statistical determination.

MR. GALLO: Objection, I don't understand the question because it's a multiple part question. He's talking about the use of sampling with respect to the selection of inspectors, with respect to the selection of work, with respect to a number of evaluations, as I understand the question. I don't know how this witness could answer the question in that context.

MR. CASSEL: It was a multiple statement, but there was only one question at the end. And that is whether the adequacy of a sample size of the inspections being reinspected is a statistical determination.

MR. GALLO: By his own statement, Judge Smith, it seems to me -- by his long preface to his question -- he has conceded in his question that a sample size was not used for work quality. Inferences were made from samples used for other purposes. So the question really has no validity on that basis, no foundation in this record.

JUDGE SMITH: The basis problem that the Board has is that the question doesn't remain still long enough to know whether it's an appropriate one or not. You seem to be back from the very beginning now, and that is was the sample size adequate for the reinspection program and inferentially for the purposes for which it was designed. We seem to be back to that.

In the interim, you went to the next step and that is was a sample size, as I understand it, large enough to support the inference that the quality work was satisfactory.

Where are you now?

MR. CASSEL: You are a step beyond me, Judge. I'm not asking whether the sample size was large enough. I'm only asking whether, with respect to all the attributes that were reinspected, whether the determination of whether the sample size was large enough is a statistical determination. Is that a statistical judgment one way or the other, in order to answer that question.

JUDGE SMITH: All right. I stand corrected on that

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interpretation of your question. But in your explanation of your question to the witness, didn't you depart and go into regular production inspections and in production inspection sample sizes?

MR. CASSEL: If I did, I didn't intend to. I'm only talking about the inspections that were covered by the reinspection program.

JUDGE SMITH: Okay.

JUDGE COLE: Mr. Cassel, are you asking is it a statistical determination, or should it have been a statistical determination?

MR. CASSEL: I'm asking is it, in the sense that he stated it is a statistical determination in his deposition testimony. I could also ask him should it have been.

JUDGE SMITH: In the meantime, we have an objection.

MR. GALLO: I don't know what the question is, Your Honor.

JUDGE SMITH: Would you mind just starting? I think that the discussions we've had have been helpful in describing what your direction is. Now with that, would you begin again with a new question?

end20

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BY MR. CASSEL:

Q Is the question of whether the sample size of all the attributes and classifications that were reinspected at Byron is adequate, one which calls for a statistical determination?

MR. GALLO: Objection. The question is misleading. The attributes were not selected per se by a sampling process. They were a byproduct of the process for selecting inspectors.

JUDGE SMITH: On that, I think you are correct, and I think the witness understands that, and I don't think Mr. Cassel is trying to suggest to the contrary.

But now you are asking after the fact, is it a statistical consideration? Really, you should be asking it the way Dr. Cole suggests, should it have been?

MR. GALLO: I have no objection to that question.

MR. CASSEL: I'm not sure the poor witness, at this point, knows.

BY MR. CASSEL:

Q Should it be a statistical determination?

JUDGE SMITH: Should it have been?

THE WITNESS: To do what?

MR. CASSEL: No, I don't think it's a question, "should it have been," because that wasn't the purpose of

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the program. I'm looking after the fact.

BY MR. CASSEL:

Q After the fact, should it be a statistical determination?

JUDGE SMITH: To look back and see if it was valid. Looking back from this point in time to see if the reinspection program accomplished its purpose, is that a statistical consideration?

MR. CASSEL: No. Because its purpose was with respect to inspectors, and he's already answered on that. He doesn't think it needed a statistical determination.

I am asking whether after the fact, if you look back and ask the question which Edison has asked and Mr. Del George has testified to, that we have such a large amount of work here, that we can draw inferences about work quality.

What I'm asking him is whether, after the fact, if you look at the size of the sample for each attribute and classification that was, in fact, reinspected, is the determination of whether that sample size was adequate for each attribute properly a statistical determination? Should it be at this point in time?

JUDGE SMITH: You have no objection to that question?

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MR. GALLO: I have no objection.

THE WITNESS: If he is saying, was the amount of data collected sufficient enough to allow you to draw an inference about the total population, if that's your question, I think I can answer it.

BY MR. CASSEL:

Q That's more general. I asked for each attribute and each classification.

A Let me restate it my way, if I may.

Q Surely.

A Again, sufficient data was collected in the reinspection program which was aimed at inspectors. If sufficient data was collected by each attribute and you had some idea of what the total population for that attribute was, could or should you, then, use statistics in order to draw an inference about the total population? Is that the question?

Q No. Could or should you use statistics to determine whether sufficient data was obtained from the population for each attribute?

A I don't know.

Q Mr. Hansel, your direct testimony, I believe, indicates that you believe visual weld inspections involve a great deal of judgment; is that correct?

A Yes.

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Q Would you explain why you believe visual weld inspections involve a great deal of judgment?

A Well, you have, as indicated this morning and yesterday in the testimony of Mr. Tuetken and with the examples, you have a number of different types of possibilities for a defect or a discrepancy. Inspectors can look at those various types of defects differently.

My experience with inspectors has been that they are not always that predictable, and that they basically are a product of their past and their training, and that they will not always see the same defect the same as some other inspector did. They may not even see the defect, and they may see others that the previous inspector did not.

So I think it's a highly subjective type of inspection.

Q But even though you believe that the type of activity involved was highly subjective and involved a great deal of judgment, you did not see any desirability of bringing in an outside firm that was not directly involved in the Byron work to do the reinspections, rather than have the contractors reinspect their own work?

MR. GALLO: Objection. There's no foundation for that question. There is no logical linkage between the subjectivity or lack of subjectivity of weld inspections

mgc21-5

with whether or not you need an independent contractor.

JUDGE SMITH: Your question does assume that the judgment involved -- your question would require him to accept the premise that the amount of judgment involved suggest at least the need for independent evaluation.

MR. CASSEL: I think you are correct in that, Judge, so let me back up one step.

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BY MR. CASSEL:

Q Mr. Hansel, do you believe that the question of whether an outside firm ought to be brought in to do the reinspections, rather than have the contractors reinspect themselves, depends in part on whether the nature of the work is highly subjective and involves a great deal of judgment?

A I don't think that that has anything to do with it. There are other considerations.

Q In your opinion, there was no need to bring in an outside firm to do the reinspections, rather than have the reinspectors reinspecting themselves?

A That's correct.

Q Now it was the case, of course, that no individual was permitted to reinspect his own work.

A That's correct.

Q However, wasn't it also the case that each of the reinspectors was reinspecting the work of his fellow

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employees for the contractor involved?

A That's correct.

Q And he was reinspecting work which he, himself, had been doing only shortly before the reinspection program began, in the sense that he was doing that type of work, if not that specific inspection.

A That type of work.

Q Do you know the numbers of inspectors in the QA/QC departments for each of the eight contractors at Byron at the time the reinspection program was begun, in approximate terms?

A No. You know, I saw a list, but I don't remember the numbers per se.

Q Do you have a copy of the reinspection program report there with you, Mr. Hansel?

A Yes.

Q Would you refer, please, to Page Roman numeral III-5?

A I have it.

Q And specifically Table III-2. Doesn't Table III-3 show you for each year the number of QA/QC inspectors for each of the contractors in the reinspection program?

A Yes. Are you referring back to your previous question, then?

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Q Yes, I am.

A I thought you asked me at the time of the reinspection program.

Q That's right, and for the year 1982, for example, it shows Blount Brothers had two inspectors in its employ during the year 1982, which is the most recent year we have here before the program was begun; is that correct?

A I believe, and I can stand corrected on this, but I believe that those numbers indicate the number of inspectors that were inspected as a part of the total that was certified that year, so that number would not be representative of the total number of inspectors. It's the number of people certified that year. For instance, Blount certified two people in 1982. One of the two was reinspected.

Q In that event, do you believe -- are you certain that that's the case?

A I'm certain that's what it is.

MR. CASSEL: Just so the record will be clear, if there are any Edison people or counsel in the room that want to make it clear, I'll be happy to stipulate. The table itself does not make crystal clear --

THE WITNESS: The note at the bottom states -- explains the X/Y, the number of inspectors reinspected versus the total number of inspectors certified.

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MR. GALLO: The witness is doing quite well, Mr. Cassell, so I don't think we need any --

BY MR. CASSEL:

Q You interpret that to mean that was the number of inspectors certified in a given year/

A Yes, sir.

Q From this table, is it not possible to see that most of the contractors involved in the reinspection program had relatively small numbers of inspectors in their employment at any given time, including at the time the reinspection program was begun?

A I cannot gather that from this table.

Q Let's take a look at Blount Brothers. The total in this table for the years 1976 through 1982 is only 28 inspectors certified, was it not?

A Would you repeat the question?

Q Yes. For Blount Brothers, which just happens to be the first company listed there, in the column entitled "Total," it indicates 28 inspectors certified over the years 1976 to 1982.

A Yes.

Q Does that suggest to you that the number of inspectors employed by Blount Brothers for 1976 to 1982 cumulatively totaled 28?

A It shows that there were a total of 28 people

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certified from the year 1976 through '82.

Q Do you know approximately how many of those were employed at the tim -- by Blount at the time the reinspection program was begun?

A I do not know.

Q Do you know whether the numbers of inspectors employed by the contractors at the reinspection program -- at the time the reinspection program was begun was such that these people would basically know each other, worked together?

A Who would know each other?

Q The reinspectors would know each other.

A I'm certain everybody who was on board at that time knew each other.

Q Within each contractor?

A Yes.

Q So they knew, when they were doing these reinspections, that they were reinspecting the work of a person that they knew and that they worked with.

MR. GALLO: Objection. It mischaracterizes the witness' testimony. He answered that questions that the reinspectors knew each other. As far as I know, none of the reinspectors reinspected their own work. So the inference he is drawing on his follow-up question is not supported by the record in this case.

mgc21-10

MR. CASSEL: I believe it's either Mr. Tuetken or Mr. Del George who has testified -- and I think you would agree with this, Mr. Hansel; tell me if you don't -- that when the reinspectors went out to do the reinspections, they were given either a Xerox copy or some other record of the original inspection, the weld traveler card or whatever, with the initials of the original inspector on the card, such that they would know who the original inspector was.

BY MR. CASSEL:

Q Is that your understanding, Mr. Hansel?

A Not totally. That was so in some cases.

Q Wasn't it so in most cases?

A I don't know that.

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Q In your review of the program at Byron, did you attempt to make a determination of whether that was, in fact, the case?

A Yes.

Q And you were unsuccessful in that effort?

A I found, in my review, sufficient material and evidence that led me to believe that the reinspector, unless he had been around for a long time, and the initial inspector had been around for a long time, that they would know each other, that they would recognize those names and initials.

In some cases, with some contractors, they were numbers. I'm not sure every reinspector could memorize the numbers. In some records, there were no identifying marks that were given to the reinspector, that would lead them to who the previous inspector was.

MR. CASSEL: Judge, if I could just have a minute, I would like to find the statement -- I believe it's Mr. Tuetken's testimony -- and ask the witness whether he agrees with it.

(Pause.)

JUDGE SMITH: Page 21?

MR. CASSEL: Thank you, Judge.

BY MR. CASSEL:

Q Mr. Hansel, do you happen to have a copy of Mr. Tuetken's direct testimony?

A Yes, I do.

Q Would you turn to page 21 of Mr. Tuetken's testimony?

A I have it.

Q At the top of the page he states, answer 33, "In most cases the reinspectors were aware of whose work they were reinspecting." Do you agree with that?

A I guess the key words are in most cases. I found, as I indicated in my previous response, I found situations, a number of them, where they did not.

Q All right then. In most cases, is it not the case -- going back to the question that Mr. Gallo objected to -- that the reinspectors knew that they were reinspecting the work of people they knew as their fellow employees?

MR. GALLO: Objection. He answered that question. He said that was not his experience, based on his review. He quarreled with the characterization most cases.

MR. CASSEL: I don't believe that accurately characterizes what the witness just said. I don't think he quarreled with the testimony. He said the key words were in most cases.

JUDGE SMITH: Objection to the question aside, I wonder where we're going. Is it possible Mr. Tuetken was referring to a different subset of inspectors, of contractors, than Mr. Hansel?

THE WITNESS: Judge, if I may help? Again, when

you say in most cases, you're looking at a total population of inspections of about 203,000 plus. I looked at five of the eight contractors and I saw varying degrees of how much information was given to the reinspectors. In some cases, I saw where there was no information that would lead them as to who had conducted the initial inspection.

I don't know what in most cases means. I saw that I saw randomness there. I would say I saw probably in more than 50 percent of the cases, but I can't quantify.

BY MR. CASSEL:

Q Without zeroing in on the quantification, because I don't think we need to do that. The question I'm trying to get at is whether we didn't have a reinspection program here in which basically certain individuals, human beings, were being asked to and, in fact, did reinspect the work of their friends and coworkers as part of the reinspection program.

MR. GALLO: I have to object to that. There's no linkage between the identification and knowing the name of the inspector and knowing whether or not the reinspector is a personal friend of the inspector. That's an improper inference being drawn by counsel in his questions.

MR. CASSEL: The answer, I think, can adequately deal with that, Judge. The witness either has a view on that or he doesn't.

MR. GALLO: Counsel is trying to trick him into

that view and it's my job to prevent him from tricking him into doing anything.

JUDGE SMITH: He's not going to be tricked. Counsel has a right to make the point. The witness, indeed, has a right not to be misled by questions. However, I think we can accomplish both purposes with a little bit of patience.

Would you restate the question, please?

MR. CASSEL: Surely.

BY MR. CASSEL:

Q Mr. Hansel, isn't basically what we have in the reinspection program at Byron -- please state anything in my question that you disagree with -- a situation where a number of, in this case 152, whatever number it was, individual human beings were being asked to reinspect the work of their fellow employees in a situation where there were a relatively small number of employees working for each contractor? They probably all knew each other and many of them were friends.

A Well, let me just talk about one contractor, to give you an idea. In fact, I'll talk about the three contractors, the three in question.

In the case of Hatfield, at the time of the reinspection program, there was only one -- only five inspectors total who were still on board that were there

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at the time of the earlier inspections. So you had practically a whole new population of people doing the reinspections.

In the case of Hunter, the material -- the identification number was what I guess they call -- well, it was a number. I forget the exact nomenclature. And the reinspector would have to remember the other fellow's number to relate back to a specific person.

In the case of PTL, they brought in outside help for the reinspection program. So there was very little possibility in these three contractors that we're talking about, for them to inspect their own work, or even that of their friends.

Q You say PTL brought in outside help? In other words, the reinspections for PTL were not done by PTL employees?

A They brought in PTL employees from other sites.

Q So Byron site employees of PTL were not involved in the reinspections of PTL --

A Byron PTL work force was supplemented by other PTL employees from other nuclear sites.

Q Do you know, in the case of the five Hatfield inspectors, whether any of them were, in fact, selected for reinspection?

A One of them, I believe.

Q Now the reinspections were also done by people who were in the employ of the particular contractor involved, in each case then. Is that correct?

A Yes.

Q And again, tell me whether you agree or disagree with any of the inferences in my question, but isn't it the case that these inspectors knew that if -- or certainly had reason to believe -- that if their contractor did not perform well or if his inspections did not show up well in the reinspection program, that that might cause adverse economic consequences for the contractor, such as up to and including potential loss of contract at the site?

A I doubt if those individual inspectors thought about that particular aspect. They were more interested in looking out for themselves.

Q Wouldn't they -- the instructions that they received came directly from the contractor's management, not from Edison's management? Isn't that true?

A That's correct.

Q And you don't think that the contractor management people would have communicated any of their concerns to the workers about the reinspection program?

A I didn't find that at all. In fact, I found a pretty good spirit about the program. Get on with it, get it accomplished. But they really didn't feel like much was

going to be found.

Q You spoke to the management level people for the contractors, right?

A Yes, management and supervision.

Q And they knew that you were an outside independent expert coming in to do an assessment of the validity of the program at the time you spoke to them, right?

A Yes.

Q You didn't speak with any of their reinspectors, did you?

A No.

Q Mr. Hansel, are you aware of the general economic status of the nuclear construction industry at this time?

MR. GALLO: Objection, irrelevant.

MR. CASSEL: I think the relevance will be clear in a moment, Judge.

BY MR. CASSEL:

Q Isn't it a fact --

JUDGE SMITH: Based upon his representation, I will defer your objection.

BY MR. CASSEL:

Q Isn't it a fact that there are no new construction orders in the nuclear industry at the present time and the foreseeable future and that, in fact, many construction jobs all over the country and in this region are being

canceled?

A I don't know that for a fact. I guess I read the papers, the same as everybody else. But I know of no new orders.

Q Excuse me?

A I know of no new orders for plants.

Q And you've read about the cancellations at Marble Hill, Zimmer, Midland, on and on?

A Yes.

Q And this is pretty common public knowledge, that you would think the employees of contractors at a nuclear site like Byron, which has just been denied at the official level a nuclear license, would be aware of at the time they are conducting their inspections -- I better withdraw that question as a false premise.

They did not have an initial denial of the license, but it's general information they would have been aware of at the time they were conducting reinspections, that the nuclear industry is in trouble, in terms of job orders and economic opportunities for contractors.

A I'm sorry. I've missed your question in all of that. Would you repeat it please?

Q Sure. At the time these reinspectors were doing the reinspection work for the contractors, beginning in approximately March of 1983 and carrying on into late 1983,

that was a time it was pretty common knowledge such that they would have known that the nuclear industry is in trouble. New orders are not coming in and existing orders are being canceled all over the country.

MR. GALLO: Objection. The question calls for speculation on the part of the witness. He has to step into the minds of the many reinspectors and determine what they might have known or not known, what they might have thought about, what they do.

JUDGE SMITH: Let's let him get to his point as easily as possible. I agree that the question, standing alone, is quite objectionable. But the direction he's going should be made. I guess if he wishes to, I'd like to see him facilitated in getting there.

Your point is -- I guess where you're going, and I'm not looking at your cross-examination plan -- where I guess you're going is the men are concerned, have economic concerns that probably -- you are suggesting that they would feel that this was about the only job that they have, that they can't go to another job.

Therefore, they have an economic pressure to make sure that their boss -- their employer -- does not lose this contract. Is that your point?

MR. CASSEL: I think that maybe states it a little more forcefully than the evidence would support, but that's

the direction of it, yes, Judge.

JUDGE SMITH: Okay.

MR. CASSEL: I'm really asking the witness whether he agrees with that.

THE WITNESS: Let me try. First off, the inspector is going to be concerned about himself. I'm sure that they are well aware of the economic situations within the nuclear power industry. If he were to leave here when this work is finished, he's going to want a good recommendation no matter where he goes. If there's no more work in this particular area, in the nuclear power industry, it would be with some other form someplace else doing something. He'll need a recommendation.

JUDGE SMITH: May I suggest, Mr. Cassel, that the same consideration applies to virtually all of us employed in this room and we're all going to do our job very well. I just don't think it's worthwhile beating that issue.

MR. CASSEL: I don't mean to beat it at all, Judge. This is the first time the witness has had to comment on it. But I think it is a factor which different people may evaluate and assign a different weight to it.

JUDGE SMITH: Okay.

MR. GALLO: Did the witness have a chance to complete his answer?

THE WITNESS: I would like to make a point. That is

that I think that inspector; number one, he's a professional himself and I think that he has a reputation to maintain. And he wants to maintain a good reputation. I don't think he's going to do anything to hurt himself that will prove favorable to his company. He's not going to jeopardize himself. I don't run across that.

I think it's just not an inspector's way of operating. So I don't know if I've answered you or confused your, but I think I know where you're heading and I don't agree with what you're trying to get to.

BY MR. CASSEL:

Q I think that's a fair statement of your view on the subject. Now Mr. Hansel, would it not have been possible to give the reinspectors whatever document they were given without showing them the initials or the name or whatever of whoever the first inspector was, so that that element of potential influence on their reinspection could have been removed?

A Again, you have lost me. Was it possible to give them a piece of paper to work to that would not have had initials? Is that the question?

Q Sure. Wouldn't it have been quite simple for Edison to have instructed its contractors to white out the initials or the name of the original inspector, so that there's no chance that that knowledge might influence the

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activity of the reinspector?

A I would assume so. Through a coding system of some nature, they could probably do that.

Q And wouldn't it also have been possible for Edison to delete from the original record, by whiting out or whatever means, the information as to what finding was made by the original inspection, to remove the possibility that that would influence the reinspector's judgment?

A I believe that that was done in a number of cases.

Q That was done with respect to the dimensions of as-built data, correct?

A Yes.

Q Tht was pursuant to the request from the NRC, but generally it was not done?

A That's correct.

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Q Would it not also have been possible for Edison to design the program in such a way that the reinspectors did not know what score would be needed to obtain a passing grade, be it 90 percent or 95 percent?

A I suppose so. It's pretty hard to keep that kind of information, you know, protected.

Q In fact, there was not really even any need for Edison to advise the contractor managements of what score would be regarded as passing or not.

A Well, it depends on when you get people involved in the program and how well you want to communicate it. I just don't like to send people out on a ghost hunt without having sufficient understanding of what I'm after and the program I'm after. If somebody is going to conduct a program of this extent, I would think you'd want to give them a little information.

Q Wouldn't it have been better, Mr. Hansel, to remove information that was not needed to conduct the reinspections, but which might inadvertently or otherwise influence the judgments or the reinspections?

MR. GALLO: Objection. Form of the question. No agreement between the witness and counsel as to what information is needed or not needed. The implication in his question is that all the items enumerate by Mr. Cassel are not needed. The witness just testified to the contrary.

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BY MR. CASSEL:

Q In order to perform the reinspection properly, there was no need for the reinspector to know the name of the original inspector, was there?

A No.

Q There was no need for the reinspector to know the results of the original inspection, was there, in terms of the finding?

A No.

Q There was no need for the reinspector to know that 90 percent or 95 percent was required to get a passing grade, was there?

A I doubt that most of the inspectors knew that, and if they did, unless they were very good bookkeepers, I doubt if they kept track of it.

Q As to what they do, that's speculation on your part, since you didn't speak with them, right?

A That's correct.

Q Now that we have established that --

JUDGE SMITH: Has the evidence established that a reinspector, a single reinspector, is assigned to the work of a single original inspector?

MR. CASSEL: Oh, no, Judge. The evidence has not established that.

JUDGE SMITH: So assuming that he was aware of

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that significance in passing, he wouldn't know how a particular original inspector was doing as the reinspection evolved, would he?

MR. CASSEL: No, but the employees of the contractors who did the tabulations in the contractor's office before they sent it to Edison, as Mr. Tuetken testified yesterday, would know before they sent the information to Edison whether they had a pass or a fail on their hands.

JUDGE SMITH: Right. But you just asked the question in the context of the reinspector having that information.

MR. CASSEL: That's a valid point.

BY MR. CASSEL:

Q Would it not have been better and less likely to produce results which could be questioned on these various points to delete this information from the original record, so that there would be no question that it had influenced the judgment of the reinspectors?

A I don't necessarily think so. Again, we've got a situation here that I think Edison had confidence in their contractors. They knew those contractors. They had faith in them. They had daily communications with them. I don't see any need for a lot of secrecy. I think the thing was above-board, and I didn't see any evidence of

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anything.

Q You didn't think there would be any chance that the reinspectors' knowledge of the results of the original inspection would in any way influence the reinspectors' judgment?

A Again, a lot of these inspectors were gone. There was a lot of turnover. You may have a given inspector, he may have his work reinspected by anywhere from two to seven, eight, nine, ten people. I saw cases of all the way up to as many as nine reinspectors for one person.

Now that reinspector that is assigned on a particular day, again unless the communications network is really good, he doesn't know what's going on and what that one inspection called that he's going to make that day, what the effect will be.

Q You are, I think, now, if I'm not mistaken, referring to the question of the reinspector's knowledge of the identity of the original inspector.

A Did I miss it?

Q The question I asked -- and I realize that we've been going back and forth here pretty fast -- was, do you believe that the reinspector's knowledge of the results, the finding of the original inspection, would ever have influenced the reinspector's judgment?

A No. Again, my familiarity with inspectors and

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how they operate, these fellows knew that they were getting a lot of attention, that they could potentially be reinspected themselves by the NRC or by somebody else, somebody like myself, or by an Edison auditor. So it's not in their favor or -- you know, it's not to their good to have that information, to cause them to want to do anything different.

Q And you are providing these opinions on the basis of your personal experience in the field?

A Yes.

Q Are you aware of any studies or data on the question of whether the knowledge of the results of the original inspection tends to influence the judgment of the reinspector, especially in a highly judgmental reinspection?

A No data. Just through years of interface with inspectors, watching them work.

Q Are you aware of any studies or data on the question of whether knowing the name, the identity of the original inspector, tends to have an influence on the reinspector, especially in a highly judgmental reinspection?

A No. Again, I think we're back to the same point.

Q Are you aware of any studies or data on the

mgc23-7

question of whether personally knowing the person who is being reinspected tends to have any influence on the judgment of the reinspector in the situation of a highly judgmental reinspection?

A No.

Q Your testimony at page 14 refers to a pass rate of 65 percent to 75 percent.

MR. CASSEL: While you're pulling that out, let me interrupt for just a moment, Mr. Hansel, to introduce Ms. Vicki Judson, on of my co-counsel to the Board -- Dr. Cole, Judge Smith, and Dr. Callihan -- and to counsel for the parties.

BY MR. CASSEL:

Q At page 14 of your direct testimony, Mr. Hansel, you refer to a pass rate of 65 to 75 percent on a complicated piece of hardware containing many attributes.

Did you not testify at your deposition that that referred to a very complicated piece of hardware that included electrical/mechanical -- electro-mechanical type devices, very compact, a number of wire harnesses, a number of pieces of plumbing in the individual black boxes or components?

A I did. But the point I did not bring out at the deposition is the wide variability of these types of inspections.

mgc 23-8

Q Let's focus on -- we'll give you an opportunity to say whatever you'd like. Let me pursue a series of questions here.

The particular piece of hardware that you were referring to there was something out of an Apollo spacecraft or something connected with a space mission.

A Yes. An auto-navigation system.

JUDGE SMITH: Did you say photo-naviagor?

THE WITNESS: Auto-navigation.

BY MR. CASSEL:

Q Are you aware of any data indicating the extent to which that 65 to 75 percent pass rate is affected as the piece of hardware being reinspected becomes less complex?

A I have another piece of data included in the same reference, and for the benefit of the Judges, it's in Dr. Harris and Cheney's book published in 1960. There is a wide variability in inspection accuracy. In fact, the estimates go all the way from 20 percent to 80 percent on their first inspection, the 20 percent being associated with the most complex pieces of hardware, such as what I referenced in my deposition, the 80 percent being some of the simpler types of pieces of hardware, printed circuit boards, solder joints, electrical connectors, these kinds of things.

mgc23-9

I would rate the visual weld inspection in that 70 to 80 percent range, up in that area, 65 to 70 percent. It's not a number you can tie down. There's nothing I could find that specifically relates to visual weld inspections. But based upon my knowledge of the Cheney and Harris work, I'd place it in the 65 to 80 percent range.

Q Your testimony, your direct testimony, indicated 65 to 75 percent for that very complicated piece of space gear, yet you just said 20 percent for something that complicated. Do you have an explanation?

A Yes, I do.

Q What is it?

A I finally got back and got a copy of Harris and Cheney. It's been awhile. They did these studies in the late '60s. The 65 to 75 agreement range is after a number of inspections by different inspectors on the same piece of hardware, and that's a cumulative result for a complex piece of hardware.

Let me make sure I've made my point clear. For a complicated piece of hardware like that, you may only get agreement in maybe 20 percent of the cases. That's the worst case, on the low, low end.

After repeated inspections of up to six inspectors, maybe by that point in time, it was still only

mgc23-10

found to be 75 or 80 percent of the total defects in there. That's on a complicated piece of hardware.

JUDGE SMITH: Excuse me. I'm confused about what you're comparing, and maybe this would be a good time.

On a complicated piece of hardware, are you talking about the totality of the piece of hardware with all of its attributes?

THE WITNESS: Yes, sir.

JUDGE SMITH: All right. So a complicated piece of hardware would have many, many attributes to be inspected.

THE WITNESS: Yes, sir.

JUDGE SMITH: And that's how you would get a low, low rate.

THE WITNESS: Yes, sir.

JUDGE SMITH: The simpler it becomes, the higher the agreement rate.

THE WITNESS: Yes, sir.

JUDGE SMITH: If you have a very simple single attribute, just chance, if you have a pass/fail will give you 50 percent, wouldn't it?

THE WITNESS: Yes.

JUDGE SMITH: Do you intend your percentages to relate to single attribute inspections?

THE WITNESS: If we take a single attribute --

mgc23-11

in this case, as Edison did -- to be a visual weld, then you take that particular inspection -- and I've not counted up all the potential defects -- but if you take that particular inspection with that many defects, potential defects on a weld, you now have a much larger change of not reaching agreement.

It's not a complicated piece or hardware, per se, but you'd have a lot of chances of error in repeatability and agreement between inspectors. That's why I brought the data out.

I hope I've helped you clear it up.

JUDGE SMITH: So a single attribute can have multiple facets, I guess, for disagreement and agreement.

THE WITNESS: Form a purely practitioner's viewpoint, Edison misused the word "attribute" in this program. I would treat an attribute as one inspection characteristic to look for under run. I would count that as one attribute. They have an attribute like a hanger, cable restrain, pipe restrain, these kinds of things, of which there may be a number of inspection elements or potential defects that you have to inspect for.

So we're not talking the agreement rate of one attribute, per se; we're talking that number multiplied by the potentials of error.

mgc23-12

BY MR. CASSEL:

Q Mr. Hansel, I think you were in here -- strike that.

You are aware, are you not, that all it took to have a weld categorized as discrepant in this program was to have any single discrepancy on it.

A That's correct.

Q Any single discrepancy, that would count as a discrepant weld.

A Yes.

Q And the results in terms of agreement and disagreement on the welds were reported in terms of whether the weld was accepted or rejected, not in terms of whether they agreed on porosity or undercut or any of those other things, correct?

A Yes. As far as counting purposes on this program, we're counting one for one.

Q Isn't that, in effect, pretty close to a single attribute inspection where all you have to do -- in fact, it may be even better than a single attribute inspection, because all you have to do is have the reinspector and the inspector, either one, fine any single defect and they have to reject the weld. It gets counted as a reject, correct?

A Yes.

mgc 23-13

Q Now this Harris and Cheney book that you referred to, do you know when that was published?

A 1960.

Q 1960. Are you aware of any studies or data on pass/fail rates of reinspection situations that postdate 1960?

A Only from my own experience.

Q Only through your own experience. Are you aware of any formal studies or collections of data that have been assembled and analyzed since 1960?

A Yes. The American Society for Quality Control published a document, and I don't know the exact date, that had some data in it.

Q Are you specifically familiar with what that data was?

A Very generally. I have seen it, did not spend a lot of time on it.

End 23

241b1

Q Now in your testimony, you also state that you believe that reinspection of the first three months only for each inspector, with the exceptions that are built into the program, but basically the first three months for each inspector, was a conservative bias in the program. Is that correct?

A Yes.

Q What was the basis for your belief that selecting the first three months was a conservative choice?

A Well, again, I would think that if an inspector is going to make errors or even a craftsman is going to make errors, it's going to be after their initial hire and certification unless they've had experience, then you wouldn't see much difference.

If you have somebody who's coming into a new company, they need to become familiar with their drawings and their specifications, their training programs. I would think they are more prone to make mistakes or misjudgments than they would be later.

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Q That's based simply on your judgment and experience?

A Yes.

Q Are you aware of any studies or data concerning whether reinspectors -- excuse me, whether inspectors subject to reinspection turn out to do better or worse, over time?

A Yes.

Q You are aware of such studies?

A They're not documented, but I'm familiar with -- I wouldn't call them studies. Again, it's actual experience.

Q This is your own actual experience?

A Yes.

Q Are you aware of any formal published studies which collect and assemble data and analyze performance of inspectors over time is revealed in reinspection programs?

A No. I'm not familiar with any other reinspection program.

Q Did you examine any data from Edison's program that revealed the extent to which inspectors got better or worse over time, as they were being reinspected at Byron?

A I'm sorry. Would you repeat the question?

Q Did you examine any data from Edison's program that revealed the extent to which inspectors in fact got better or worse over time, as they were reinspected?

A No, I was really not looking for that because, again, I was looking for the worst case to determine if, in fact, their certification programs were working. So I wanted that early sample. I didn't look beyond that to see if they got better.

Q In the course of your reviewing the program, I assume you had discussions with Mr. Tuetken?

241b3

A Yes.

Q Were you aware that he had assembled the data from the program, prior to publication of the report, analyzing the performance of inspectors over time?

A No.

Q You never asked him about that?

A No.

Q Did you take into account the possibility that in a type of work activity involving a very repetitive, sometimes even boring activity, that inspectors simply may become less enthusiastic and less diligent about their jobs over time?

MR. GALLO: Objection, lack of foundation for the assumptions made in the question. He needs to ask whether or not he agrees that the inspector's job for the first 90 days involves boring work.

MR. CASSEL: I asked him did he take into account that possibility. If he didn't, he can state why he didn't.

JUDGE SMITH: Overruled.

THE WITNESS: Would you restate the question?

BY MR. CASSEL:

Q Did you take into account the possibility that inspectors performing repetitive work, some of which might even be characterized as boring, tend to become less enthusiastic and diligent about their work over time?

JUDGE SMITH: You don't have to accept that premise, but if you do accept the premise and you took it into account or did not, you answer the question.

MR. GALLO: I'm going to object on different grounds, Your Honor. I don't know what he took it into account for. The question doesn't specify. It's vague and unanswerable in that form. He'd take it into account for what purpose?

JUDGE SMITH: I think it's clear. It's in the context of his earlier testimony, as to performance over time. At least that's my understanding.

MR. GALLO: Does counsel agree with that?

MR. CASSEL: Counsel agrees with that, although the question was really generally worded, whether he took it into account for any purpose relating to his assessment of the program.

JUDGE SMITH: Otherwise that would be irrelevant.

MR. CASSEL: That's the relevance of it.

THE WITNESS: I did not take it into consideration. Again, I have never experienced that.

BY MR. CASSEL:

Q Again, if I state anything in my questions that you disagree with, please feel free to disagree with it. I'm not trying to put words in your mouth here, I'm merely trying to get your views on these issues.

Q Did you take into account the possibility that inspectors, during their first three months, might receive a very heightened level of supervision from the supervisory people at the contractor, and therefore tend to do pretty well in some cases. But then, later on, not receive as intensive supervision and therefore perhaps not do as well?

MR. GALLO: I object again. This witness is entitled to know what the questioner has in mind, with respect to his continual phrase "taking into account." There is no premise for his question, upon which a rational answer can be given. The question, as to form, is improper. It should not be allowed.

JUDGE SMITH: The context of each of these questions, as I understand them -- and let's have an understanding among all the parties and the witness. The context of each of these questions is in arriving at his conclusion that performance, over time, does not deteriorate as you suggest, did he take into account certain factors.

Now the difficulty, with the question and the form, is that it invites him to accept, as a premise. So really what you should do, I suppose, to touch all the bases would be first to establish that in the first three months inspectors are, in fact, supervised.

But I don't think that this witness is going to

foolishly or mistakenly accept a premise he doesn't agree with. So I don't really think we have a lot of chance for problems here, so long as everyone understands that you don't have to accept any premise to any question that you disagree with and that, in fact, in the past you have disavowed those premises.

So I really don't see a problem, long term problem, Mr. Gallo, although your objections are literally correct.

MR. GALLO: Your Honor, I don't intend to be difficult, but this witness is hired to provide his expert opinion with respect to the reinspection program and that's what he's here to testify for, not to screen the unsupported premises of counsel's questions. That's not his function.

And I think it's unfair to put him to that test. I think, under the rules of jurisprudence, counsel is supposed to frame his question properly and not leave it to the witness to sort out the improper from the proper. And I think it's unfair to the witness to continually put him to that test.

JUDGE SMITH: It's going to be a long day.

MR. CASSEL: If Mr. Gallo wants me to go inch by inch, by the book, not including any assumptions in my questions, we can do that but I really think it's unnecessary. Mr. Hansel knows what I'm talking about. He has his opinions,

which he can express.

BY MR. CASSEL:

Q The focus of all of these questions, Mr. Hansel -- lest anybody have any doubts -- is your conclusion in your testimony that sampling the first three months, rather than a later time period, was a conservative bias. There's no doubt about that. You understand, that's what these questions relate to?

A I do.

Q Now, did you take into account -- and if you didn't, tell us why not, including any disagreement with the premise -- the possibility that inspectors might be more closely supervised and therefore tend to do better in their early months on the job?

A I did not find that to be the case. I didn't take it into consideration because what I did find was that most of these inspectors had been around for some two, three, four months for training and indoctrination before they were ever allowed to go conduct the first inspection. They had already had that hand-holding. They had already had the interface with supervision and management.

Q So you don't believe that they did have any closer supervision during their first three months of inspection than they did in later periods?

A I do not.

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I might go back just a second. There could have been some more experienced inspectors who came from other locations, that were certified sooner but they weren't certified until they knew that contractor's procedures and were familiar with the current drawings and specifications.

Q Do you know how many inspectors that were employed at Byron by the eight contractors, Mr. Hansel; the number is 356, isn't that correct?

JUDGE SMITH: At what point in time?

MR. CASSEL: In total, the total period of time covered by the reinspection program.

THE WITNESS: There were 356 inspectors employed by the eight contractors prior to September '82.

BY MR. CASSEL:

Q That's the period covered by the reinspection program?

A Yes.

Q Now do you know how many of those 356 inspectors --

JUDGE SMITH: I think you'd better repeat the question.

BY MR. CASSEL:

Q We just agreed that there were 356 inspectors for the eight contractors during the time period covered

mgc25-2

by the reinspection.

I was just about to ask, Mr. Hansel, if you know how many of those 356 inspectors were short-term employees who were only conducting inspections for the contractors in question for three months or less?

A I do not know that.

Q Did you make any effort to determine that?

A No.

Q Did you make any effort to determine the turnover rate of inspectors for the contractors at Byron?

A No.

Q Did you make any effort to ascertain whether short-term employees that were there for only a brief period and then left for whatever reasons, tended to perform less well than employees who stayed on for longer periods of time?

A No. Again, I was looking at the methodology and the approach to the reinspection program, and whether or not those early certification practices were adequate.

Q Well, it was the case, was it not, that in counting the results of the program, Edison did not include inspectors who failed to have inspections beyond the first three months and treated them as indeterminate; isn't that correct?

A I'm sorry? Repeat again?

mgc25-3

Q Isn't it the case that in counting the results of the program with respect to inspectors, that Edison treated as indeterminate any inspector who had less than three months' worth of inspections? Is that the case, as you understand it?

A I think you gave me two questions.

Q Is it your understanding of the program that when Edison counted up the results of the inspectors, so many, you know, achieved 90 percent; so many didn't, that it did not include inspectors who had less than three months of inspections, and instead characterized them as indeterminate?

A I think Mr. Del George testified earlier that he was aware of three who had less than that required number in the first three months. I am aware of one.

JUDGE SMITH: There is a disconnect here.

THE WITNESS: Did I answer the wrong question, or did I not hear the right question?

JUDGE SMITH: We're talking about inspectors with less than three months, not a quantity of inspections.

MR. CASSEL: That's right.

JUDGE SMITH: In the first place, I don't recall any testimony that they were put into an indeterminate category.

Mr. Del George, you are still here. You are

mgc25-4

still under oath. Can you help us with that? What did you say?

MR. DEL GEORGE: Your Honor, my recollection is, when we discussed that question, I had indicated that to the extent an individual did not meet an acceptance criteria of either 90 or 95 percent after three months, and that individual had no further work from which to validate the then current judgment as to his qualifications, he was classified as indeterminate, and he was listed in the table, Table V-E-2 or subject to the attributes to which reference was made when I gave testimony.

JUDGE SMITH: It wasn't your testimony that individuals with less than three months were in that category? It was not?

MR. DEL GEORGE: That's correct.

THE WITNESS: I must have misheard the question.

BY MR. CASSEL:

Q Do you recall that out of the 110 inspectors who were sampled, were included in the sample, I believe -- and we can refer to the table if we need to -- 10 feel into that indeterminate category?

A Yes, as best I remember the discussion earlier.

Q Did you make any effort to determine how many of the total of 356 inspectors were persons who had no

mgc25-5

greater than three months' worth of inspections at Byron?

A I did not.

Q Did you consider the issue of whether short-term employees might not do as well as long-term employees, and whether their exclusion from counting in the program results would therefore --

MR. GALLO: Objection. I'm sorry. He hasn't completed his question.

BY MR. CASSEL:

Q -- would therefore present a misleading impression of inspector quality at Byron?

MR. GALLO: The question is vague in its form, because long-term and short-term are not specified.

MR. CASSEL: Let's talk short-term as three months or less. Long-term is anybody who's there more than that, just to specify what we're talking about.

THE WITNESS: You're going to have to give me the question again. I think you want to know -- when a person is hired, he doesn't plan on working there for just three months.

Could you give me the question?

BY MR. CASSEL:

Q Let me try it this way. One might suggest that short-term employees leave either because they are disenchanted with the work or the employer is disenchanted

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with them. Then there are also other reasons that have nothing to do with performance of their work.

Would you not think it likely that short-term employees on the whole --

JUDGE SMITH: Define.

MR. CASSEL: By "short-term," I'm talking about three months or less in their inspections.

BY MR. CASSEL:

Q -- might tend to do worse than employees who stayed on longer, which almost by definition means that they and their employer were sufficiently mutually satisfied with each other that they didn't terminate the relationship?

MR. GALLO: Objection. This is a hypothetical situation we're talking about.

JUDGE SMITH: Well, I guess it is, because I don't believe -- the testimony, as I recall it, is we do not pick up the short-term, as you've defined them, in the sample.

MR. CASSEL: Mr. Del George is here. Why don't we ask him? I thought, Mr. Del George, that short-term people would be picked up and counted as indeterminate; is that correct?

MR. GALLO: I think that's an improper conclusion by Counsel. The term "indeterminate" was used with respect to inspectors who, at the end of 90 days,

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didn't reach the proper pass threshold and then moved into an inspection category of a second 90 days and did not have enough inspections in that second 90 days to continue. Therefore, they were classified as indeterminate.

MR. CASSEL: I'd like to get a clarification on that.

Is that correct, Mr. Del George?

MR. GALLO: He's not on the witness stand, Your Honor. I don't understand this ability of Counsel to throw questions in any direction he sees fit.

JUDGE SMITH: We're trying to find a convenient way, other than waiting until tomorrow, looking at the transcript to try to figure out what happened to clarify the record.

MR. GALLO: Would you like Mr. Del George to take the stand with Mr. Hansel?

JUDGE SMITH: I don't see any particular need for it. He's been sitting there. He's been very helpful. If you object, Mr. Gallo --

MR. GALLO: I just find the procedure unusual. I guess Mr. Del George will be on his toes, because he may get a question at any time.

JUDGE SMITH: If Mr. Del George can't answer a question, he is free to say so. He can relax. He has worked very hard.

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MR. CASSEL: As a matter of fact, I think Mr. Gallo --

JUDGE SMITH: We have now before us the question of the short-term, who you have defined as a person with less than three months.

MR. CASSEL: Three months or less.

JUDGE SMITH: Oh, three months or less. All right. Well, you ruin the whole thing when you do that, because I think you're going to have to divide it between the three-month and the less-than-three-month person.

MR. CASSEL: I just want to divide it wherever Edison divided it. I don't recall whether it was three months or less or less than three months, but we can get a clarification on that. It's only the difference between 89 days and 90 days.

(The Board confers.)

End 25

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JUDGE SMITH: Mr. Del George, the Board got involved in this, too, because we have confusion about the record. As you arrive to your sampled inspector, your first, fifth, and every fifth thereafter, and you came to one who had less then a minimum number of inspections and he was skipped. Less than the minimum number of inspections he was skipped. Is that correct.

MR. DEL GEORGE: No, sir.

JUDGE SMITH: All right, that's not correct.

(Laughter.)

JUDGE COLE: You have 356 inspectors involved in the reinspection program. Is that correct, sir? Your original total?

MR. DEL GEORGE: Yes, sir.

JUDGE COLE: Were there any, among that 356 inspectors, that did not have at least three months of inspection work to their credit?

MR. DEL GEORGE: Yes, sir. I believe so.

JUDGE COLE: Were any of those among the 110 that were selected?

MR. DEL GEORGE: Yes, sir.

JUDGE COLE: What did you do, how did you characterize those who did not have the minimum -- at least three months of inspection work to their credit?

MR. DEL GEORGE: To the extent an individual had

more than the -- let me start again.

An individual was selected for sampling in the way Mr. Tuetken described, on the basis of the first inspector certified, the fifth, the tenth, and every fifth thereafter. If that individual had no work, a substitution was made for that individual at the initial point in the program, and that substitution -- as I recall -- was the next inspector certified in time.

JUDGE COLE: All right, sir. Your definition of no work, what does that mean, sir?

MR. DEL GEORGE: He had no inspections capable of reinspection.

JUDGE COLE: If he had one inspection, did he qualify?

MR. DEL GEORGE: There was no instance of that type, so I can't answer.

JUDGE SMITH: Say he had 45.

JUDGE COLE: Or five.

MR. DEL GEORGE: I know of no instance of that.

JUDGE SMITH: Is it we're naming the wrong numbers?

MR. DEL GEORGE: It's not that we're naming the wrong numbers. It's just that there were very few individuals who had that few reinspectable inspection points. It was only in the case of Peabody where my recollection is that it was only in the case of Peabody where there was only one inspector

who had less than 25 inspection points. And in the case of Peabody, we looked at every inspector capable of reinspection and we looked at every inspection point associated with that inspector.

So having gotten past the contractor Peabody the remaining contractors, the vast majority of their inspectors had greater than the 50 percent -- excuse me, the 50 item minimum. And so the question really didn't present itself for consideration.

So that leads me back then to the point relative to three months. As I have discussed previously, if an inspector had inspection work greater than this 50 or 25, his data was accumulated and reported in the program data base. For Hatfield, Hunter, and PTL, that data is attached to my testimony as Attachment E.

To the extent that an individual, for the first three month period, passed the program acceptance criteria, that is the ratio of his acceptable work to his total reinspected work was greater than 90 percent or 95 percent, he was captured in the data base from which we evaluated the acceptability of the qualification program for that contractor.

In the event an individual was found, at the end of the three month period -- or during the three month period -- to have a ratio of acceptable work to total reinspected

work less than one of the program acceptance criteria, that individual was considered suspect subject to additional inspection in the next three months.

If there was no additional inspection, then that individual was identified as an indeterminate inspector and each of those people, the results for each of those people was tabulated in the program report considered as part of the program report, but no inference was drawn relative to his qualifications because we couldn't validate the judgment that could be reached at the end of only three months.

JUDGE COLE: All right, sir.

One more question. Among the 110 that were actually included in the reinspection program, is it correct to state that there were none that had less than three months of work experience or less than 25 inspections?

MR. DEL GEORGE: With the exception of a contractor Peabody, I believe that is the case. And as I have indicated previously, for Peabody, every inspector was sampled and all of the reinspectable work associated with those inspectors was reinspected.

JUDGE COLE: All right, sir. Thank you.

JUDGE SMITH: There is still a subset of inspectors that you have not discussed and that is those inspectors from those contractors who had to have 50 inspections

before their first three months was evaluated for inspector purposes. And you said the vast majority of them had 50 inspections. But you have not addressed the small minority who have not.

MR. DEL GEORGE: In that regard, I believe I indicated previously that I did not have personal recollection of how many of those individuals they were. But that Mr. Shewski's -- an attachment to Mr. Shewski's direct testimony had identified that there were three such individuals. And without reviewing the record myself, I wouldn't be able to give any more information.

JUDGE SMITH: But the methodology was then, for those individuals, that as inspectors they were not counted and you went, then to the next one when you realized that and examined their work. But that the less than 50 inspections remained in the data base. Is that correct?

MR. DEL GEORGE: I believe that's consistent with the way in which the program was implemented. But depending on whether or not any or all of those three individuals was found to pass or not pass the program acceptance criteria within the three month period, I don't know how the individual was classified.

Not knowing the individuals and what the results actually were, I don't know where in the table to which we made reference earlier they would fall.

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JUDGE SMITH: In any event, determining -- the determination was based upon numbers of inspections during the first three months and not the time of employment?

MR. DEL GEORGE: Where the quantities of inspection work were small, we thought it prudent to go beyond the three month period so that we had a viable sample of inspections from which a judgment could be made, relative to the individual inspector.

It would be possible, for example, for an individual not to have done any reinspection work in his first three months, but to have done reinspection work in the next month. We used the 50 inspection minimum to go beyond three months to capture inspection work for that individual, so that we could assess his qualification.

And in that sense, he wasn't discarded from the sample. We went beyond the three month period to the first inspection work he performed and used it as a basis for assessing his capability.

JUDGE SMITH: Mr. Cassel?

MR. CASSEL: Could I have just a moment, Judge?

(Counsel for Intervenor conferring.)

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BY MR. CASSEL:

Q Let me try the question from a somewhat different angle. In reviewing the program, you were trying to determine whether you would draw inferences from the results for the inspectors who were sampled and who met the program criteria to the total population of inspectors for the contractors involved, right?

A For the time of the reinspection program, yes.

Q For the time of the reinspection program. Now, would a factor in whether you could draw that inference be whether the sample that was counted under the program criteria was representative of the total population?

A Yes.

Q Including whether it was representative of the total population, in terms of longevity of service for the contractors involved?

A Can you repeat the question?

Q Including whether the sample was representative of the total population, in terms of the employee's longevity of service for the contractor involved?

A You have an employee there and you have a population. I'm trying to figure out what you're really after.

Q Was it not necessarily for the sample to be representative of the total population in terms of the

271b2

inspector's length of service as an inspector for the contractor involved?

A Are you recommending that we sample the entire term of his employment? Is that what you're saying?

Q No. I'm just asking you whether, in determining whether the sample is representative of the population, one should ask whether the sample is comparable to the population, in terms of the inspectors -- the length of the inspector's term of service with his employer?

A I think you are trying to --

Q Let me give you an extreme example. Suppose the program acceptance criteria had been we are not going to count any inspector unless he has been with the contractor for two years. With 356 inspectors and only a small number of them met that two year criteria, would that be a representative sample of the total population of the 356? If the sample were limited to people who had been with the contractor for two years?

MR. GALLO: Objection. I can't follow that question. May we have that question back?

JUDGE SMITH: Please read the record.

(The reporter read the record as requested)

MR. GALLO: I guess this is a hypothetical question and I'll let it stand if the witness understands it.

THE WITNESS: I think I do, but I'm not sure.

In the particular case of Edison at Byron, I don't think it would have been a representative sample.

If I may, I think what you're heading for is where we draw the line, three months, six months, a year. Is that the point that you're heading for?

BY MR. CASSEL:

Q Not exactly. I'll tell you the point and maybe this will be helpful. I'm concerned about whether the sample was representative, in terms of length of service, to the total of population which, by definition, the sample that was counted in the program would not include a short-term employee; i.e., one who was there three months and had no further inspections.

A Again, we were out to evaluate inspector certification programs. Edison, as you are well aware, selected first 90 days, person's employment after they were certified, to have that work reinspected. I think that that period of time represents a period of time when that inspector would be most prone to make mistakes of poor judgment on inspections.

Now, I don't know if I got to your question or not.

MR. GALLO: He's telling you length of service is immaterial. That's what the witness just testified to.

MR. CASSEL: I think maybe we have pursued that --

THE WITNESS: We had a targeted sampling plan. We were aimed at, conservatively, to try to find problems, if

21b4

they existed. The first three month period of time is when that would happen, in my opinion.

JUDGE SMITH: Mr. Hansel, I'm going to come back to this point again. What is your understanding as to what the methodology and implementation did when an inspector for Hatfield would have been reinspected and counted in the results but it turned out that he had less than 50 inspections during the first three months?

THE WITNESS: If he had -- my understanding is if he had less than 50 inspections in that first three months, and they found that out late and the inspections had been completed, the numbers were left in the data base and counted against the contractor. They then went to the next inspector in line and inspected his work.

JUDGE SMITH: Do you agree with that, Mr. Del George?

MR. DEL GEORGE: I believe that only operated in cases where individuals didn't pass the program acceptance criteria. And as I've indicated, there were a few of those and in that case, a substitution was made. Wherever an indeterminate individual was identified and reported -- as reported in my testimony, a substitution was made for that individual.

JUDGE SMITH: On page 16 and 17 of your testimony, you say generally an inspector had to perform a minimum of 50 reinspectable inspections during this period, subject

to reinspection, except for Pittsburgh. When required, the next inspector listed chronologically was substituted.

In those cases, for which reinspection was initiated for the original inspector, but a minimum quantity was not reinspectable, all reinspections actually performed of the original inspector were also included in the program data base, which is parallel to what Mr. Hansel has said?

MR. DEL GEORGE: Yes, sir. I guess what I'm saying is that the provision never had to operate.

JUDGE SMITH: Oh.

THE WITNESS: It was there. There was one inspector, I heard before that there were none. I heard of one inspector who had 48 inspections. 48 inspections in the first -- well, they didn't hit it in the first 90 days. They went beyond that to get the 48. It was very close.

JUDGE SMITH: I see. So you would say he was very close in the first three months, so you go until they have 50.

THE WITNESS: That was only one case that I found that in. They didn't have to go very far.

JUDGE SMITH: Into the second three months?

THE WITNESS: Yes, sir. It wasn't very far, but that's the only case that I ran across. And I think Mr. Del George referred to Peabody. I did not spot those.

21b6

BY MR. CASSEL:

Q Mr. Hansel, your direct testimony concludes that the results of the reinspection program provide reasonable assurance that QC inspectors who performed inspections at Byron from 1976 through September 1982 were qualified. Is that your testimony today?

A Could you give me --

Q I'm sorry. Page 23 of your direct testimony. The very last conclusion in your direct testimony. Why don't you, when you find it, take a moment to review it. Then I'll ask the question again.

A Go ahead and repeat the question.

Q On page 23 of your direct testimony you conclude, do you not, that the results of the reinspection program provide reasonable assurance that QC inspectors who performed at Byron from '76 through September '82 were qualified. Is that correct?

A Yes.

Q By qualified, you mean they were properly certified?

A Yes.

Q Do you also mean qualified in the sense of performing capable work throughout the tenure of their service as inspectors for the contractor? Do you mean that by this statement here? Or do you mean only that they were

271b7

properly certified at the beginning?

A Well, first off, I feel that the pre-inspection program provided sufficient information and data that allowed me to believe that the yearly certification practices were adequate. There were enough checks and balances through the procedures provided to assure that only qualified people were put to work. From that I could also draw the same conclusions, that is statement applies that they were qualified throughout that period.

Q Now do you have a copy of the reinspection program report there?

A Yes.

Q Would you turn to Table ZE-2? Actually, it's V-2 in Exhibit V-2. That's at the end of Chapter 5, just before Chapter 6.

A I have it.

Q All right. Table ZE-2 indicates the program results for inspectors doing subjective inspections. I believe you heard the testimony earlier today with Mr. Del George that of the total 110 inspectors, 18 of them failed to achieve a 90 percent passing score on their subjective attributes. Is that correct?

A Yes.

Q I believe you also heard Judge Cole's subsequent question and the answer that if the cutoff were at the first

271b8

three months, the number of inspectors who by that date had not attained a 90 percent score on subjective attributes was 20?

A Yes.

Q Now do you regard 18 out of a total of 110 inspectors, who were sampled, failing to reach the 90 percent level as a reasonable assurance that the inspectors at Byron during the time period covered by this program were qualified throughout the tenure of their service?

MR. GALLO: I'll object to the question. Throughout the whole colliquoy with Mr. Del George on this point it struck me it was never made clear that pass or failure for purposes of the program did not count at the end of the first 90 days. Counsel's question assumes that that's the fact.

In fact, the program is structured such that an inspector did not pass or fail, for purposes of the program, until after his second six months of inspections were reinspected.

JUDGE SMITH: That's the identical objection made by Mr. Miller when the same question was asked of Mr. Del George and we resolved it by you using non-perjorative words.

BY MR. CASSEL:

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Q Let me use any verb other than fail.

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Apparently that's the problem. Do you regard the fact that out of 110 inspectors sampled, 18 did not attain the 90 percent level for their subjective inspections, gives reasonable assurance that the QC inspectors at Byron during the time period in question were qualified?

A I think you have to take more into consideration than just the reinspection data itself. I think part of what led me to that conclusion, anyway, was this thing of the 90 percent. We're dealing in a highly subjective area in terms of inspector repeatability and I just feel like 95 is even high, though the data came back very favorable.

I think you take this data into consideration on the subjectivity of that type of inspection and also coupled up with the results of the engineering evaluation.

One thing that brings me to that conclusion is anybody who has been in quality for any amount of time knows that there are certain flaws in inspections, as I indicated earlier. It's not 100 percent. And the thing that you hope for is that your inspectors are going to find what is most critical to you.

I think they have done that. And the fact that we did not find -- or Edison did not find -- any defects or discrepancies that have any design significance. So these inspectors have found what is the most important. They have found what I call the vital few versus the trivial many.

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So those factors have brought me to the words that I feel like yes, those programs were adequate and that they produce qualified inspectors.

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Q And you would, I assume, give the same answer with respect to the ratio of inspectors who did not attain 90 percent versus a total number that did subjective inspections; namely 18 out of 72 inspectors involved in visual weld inspections did not attain a 90 percent score?

A That's even more subjective.

I don't think you can just take this data by itself. You have to think about and take into consideration -- at least I did -- the results of the engineering evaluation and the types of defects that they found.

Q That goes to the work-quality issue, of safety of the plant.

A But it tells me that those inspectors are oriented and trained to do a proper job. They know what they are out there to look for.

Now, they may miss a very small item on a weld that is inconsequential. But, I certainly want them worrying about the items that are most important to them. And I think that these training programs have done that.

Q But part of your series of inferences in that answer relies on your view that 90 percent is such a strict criterion in the area of subjective weld inspections. And yet I am sure you also have noticed the data that indicate that many of these inspectors on weld inspections were able to score up in the upper 90s. Is that not, in

mm2 fact the case?

A Yes, they did well.

Q Doesn't that suggest that 90 percent is not so tough a criterion to impose on an inspector of welds if many, or maybe even most of them score in the high 90s?

A Again I think that attests to the level of training that was given these folks both prior to the reinspection program and during the reinspection program.

Q And yet 18 out of 72 were unable to attain even the 90 percent level?

A But think about where the bulk of those came from.

JUDGE SMITH: Well, there is no objection, but counsel does not like to have perjorative terms. Now some of those were in there. There was no demonstration that they were unable to make it.

MR. CASSEL: Did not attain?

I don't know how much -- it seems to me, Judge, I am not out to use needlessly perjorative terms. But we are talking about whether an inspector was able to perform reinspections -- inspections that a reinspector would say were accurate.

Now if he did not, it seems to me that that is not a positive statement about the inspector. I'm not trying to be inflammatory.

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JUDGE SMITH: I'm not saying you can't litigate that issue. I am just pointing out that we have had a series of objections now in which that premise in the question put to the witness is unacceptable.

MR. CASSEL: With respect to the use of the word "fail," which I didn't use then --

JUDGE SMITH: Well, perhaps I am using the word "unable" not in the way you intended it. Some of them had no opportunity to attain the passing score.

MR. CASSEL: Judge, I am talking only about those whose, whatever number of inspections they did -- less than 90 percent of them were reproduced in the reinspection; that is, more than 10 percent of the cases a reinspector disagreed, regardless of the number.

JUDGE SMITH: Okay.

BY MR. CASSEL:

Q Now you relied on -- in reaching your judgment about the qualifications of the inspectors, Mr. Hansel, you then relied not only on the information discussed in your testimony, but also on the design significance reviews done by Sargent and Lundy?

A Yes. Plus discussions with the contractors and review of their certification procedures that they used early on, and tests, indoctrination training, training outlines -- I looked at a lot of data.

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Q And to reach the inference that you do concerning the qualifications of the inspectors, you then have to rely both on your judgment that 90 percent is a high mark to meet, and on your acceptance of the design review work done by Sargent & Lundy?

A Plus the other considerations that I mentioned.

Q Did you examine the extent to which the work at Byron was inaccessible or not recreatable, Mr Hansel?

A I did, in some degree.

Q And did you determine the extent to which it was not recreatable or inaccessible?

A What do you mean by extent?

Q Proportion.

A I did not do a summation. I looked at the categories and satisfied my own mind that proper decisions were being made there and that they were not counting something as inaccessible or not recreatable that should in fact be the other way.

But I did no quantification of it.

MR. CASSEL: I have no further questions of the witness, Judge.

JUDGE SMITH: Mr. Lewis?

CROSS-EXAMINATION

BY MR. LEWIS:

Q Let me ask the witness whether he is familiar

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with the tables in Section V of the Reinspection Report? I am referring to a series of tables. They are organized by contractor.

The first one that I was looking at was Table V-3, Johnson Controls.

Then also V-4, V-7, V-8.

Now each of these tables has a commentary in it which appears to be relevant to the discussion that we were just having --

MR. LEWIS: Your Honor, some of these questions were given to Mr.Del George, although Mr. Hansel was on the stand. And if I may, I would like to feel free to raise these and have them answered either by Mr. Hansel or Mr. Del George, if that is permissible.

JUDGE SMITH: Counsel has agreed to that, I believe.

MR. LEWIS: With respect to Table V-3, there we find - for the first time a mention of one inspector who did not have minimum quantity in the first three months or in total inspections. And from what I make out from that table, that inspector's work was covered within the reinspection program. It says all of his accessible and recreatable work was reinspection.

Now I had earlier heard Mr. Del George state that individuals who did not meet the minimum quantity

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criterion were not included within it.

I am seeking clarification.

JUDGE SMITH: It is kind of consistent with that statement.

MR. LEWIS: I am seeking clarification of the position on that.

MR. GALLO: Can you answer that, Mr. Hansel?

THE WITNESS: Not without going back to specific notes which I don't have with me.

JUDGE SMITH: What is the portion of that that you think requires explanation?

MR. LEWIS: According to what Table V-3 indicates to me -- and I might say I find the same thing in V-4 with respect to Hunter, V-7 with respect to Powers-ASCO-Pope and V-8 with respect to PTL. It appears that in every instance when it is noted that an inspector was encountered who did not have the minimum quantity of work the reinspection program then considered all of his accessible and recreatable work and inspected all.

JUDGE SMITH: That is consistent with several items in testimony.

MR. LEWIS: I thought I heard something indicated to the contrary during the examination and I was attempting to clarify in my mind that the correct statement is as stated in these tables I am referring to. I believe

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actually Mr. Del George is the one who could more directly answer that.

MR. DEL GEORGE: If a minimum quantity was not achieved, one should assume that a 100 percent of that individual's work was reinspected. And I believe that is the indication that is made in the discussion in the table to which you make reference.

And, with respect to that one individual, his work was identified as "indeterminate," and a substitution within the program approach was made for that individual.

JUDGE SMITH: But the work that was reinspected was put into the data base?

MR. DEL GEORGE: Yes, sir.

MR. LEWIS: And appears in the statistics of the program?

MR. DEL GEORGE: Yes, sir. It is in the data.

THE WITNESS: There was no data left out. Any inspections that were accomplished with that data were included in the data base.

MR. DEL GEORGE: If that has not been made clear, all reinspection data has been retained in the program data base and reported in the QC Inspector Reinspection Report for Byron.

MR. LEWIS: Mr. Cassel asked a question that was premised, to the best of my recollection, on -- the

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question was, to the extent that short-term inspectors which he defined as having less than three-months' work are excluded from the program -- and then his question was, would that have a tendency to bias the results?

Is it correct that any short-term employees were excluded from the program if they were the person whose number came up along in the reinspection program?

MR. DEL GEORGE: I know of no one who was excluded from the program.

To the extent the individual was identified before inspections began as not having minimum quantities, a substitution was made at that time. If reinspections were initiated and later determined not to meet the minimum quantities, that data was retained in the program data base.

In the case of the one individual to whom you make reference, a substitution was made for that individual, drawing in another inspector for sampling.

JUDGE SMITH: Now that we are on that, there is yet another nuance to this that we haven't focused on. Here comes an inspector who follows and would be selected, but you know in advance that he does not have -- he works for Hatfield and he doesn't have 50, so you don't even undertake to inspect those, hypothetically.

MR. DEL GEORGE: Hypothetically.

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THE WITNESS: You go to the next person.

MR. DEL GEORGE: There were certain inspectors who were certified, but never did inspection work.

JUDGE SMITH: All right. So if you know in advance that they don't meet the acceptance criteria for qualifying, you skip.

But then if you don't know until you get onto it, and they don't meet it, you put their data into the data base and then go on to the next?

MR. DEL GEORGE: Yes.

But so that I am clear, I know of no individual who would not have met the 50 minimum, for whom inspections were not undertaken and a substitution made.

JUDGE SMITH. For Hatfield?

MR. DEL GEORGE: For any inspector. My only knowledge is as to individuals who are certified but were known to have performed no inspection work, for whom the substitution was made. That is my recollection of the data base.

MR. LEWIS: Did such people initially get listed on the contractor's certification list and were then not counted as they went down the list?

MR. DEL GEORGE: As Mr. Tuetken described, all of the inspectors certified were listed, and the selection was made by him. And that selection was made before the

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information was known as to the population of inspections, capable of reinspection.

That is my understanding.

end T28

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BY MR. LEWIS:

Q In a separate question, Mr. Hansel -- I don't want you to feel slighted up there -- in Answer 20 of your testimony -- it's on page 16 -- you make reference to situations where, for subjective attributes, specifications had changed. This is in the course of a discussion about the degree to which the engineering requirements used for reinspection would be the same as those used in the initial inspection.

Could you tell us what you had in mind when you indicated specifications had changed?

A Well, when I look at it now, probably specifications may be a bad selection of a word. The criteria that the inspector was using.

These fellows had undergone extensive training. They had been there for some time. They had seen -- their skills had sharpened. They had received more instruction from supervision. And I think that over the period of time, the had a more sharper focus as to what to look for.

"Specifications" is a bad word. I would rather say "inspection criteria."

Q Were you referring to any changes in the relevant codes, or was that not what you had in mind?

A I think, yes, there was a change in the AWS Code also during that period of time prior to '82,

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in d(1) and d(3).

MR. LEWIS: That's all I have.

EXAMINATION BY THE BOARD

BY JUDGE COLE:

Q Mr. Hansel, on page 7 of your testimony, Item (e), in the last part of that, you indicated that you conducted a sample audit of the process that was used to determine what inspections had been conducted by specific inspectors.

Would you describe to me exactly what you did?

A Sure. Let's start with Hatfield, for instance. I sat with several folks and looked -- they had a Wang data base that they had developed that had input into it -- all of the various weld traveler card information, the drawing date, the inspector, the identified information, weld and these types of things.

I also wanted to know how that data base was built. As Mr. Shewski indicated this morning, in the early days of construction, back in '76 and '77, with Hatfield, a lot of that verification of the results of those inspections were recorded on drawings. They then backed up and went back and filled out the weld traveler cards and duplicated that information.

The thing that I wanted to satisfy in my mind was that we had the totality of the data base for all of

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that information. And then, how could they sort that and then get that to a specific inspector, and then from that point down to the first 90 days, and then from that point forward?

So I looked at a considerable amount of data and computer printouts to see how they went through that process.

Q They took the plans and/or the weld traveler cards and computerized these data?

A Yes, sir. That was still in process and was being built into the data base during the reinspection program. So when they had to put together the package for a specific inspector as to what work belonged to him that he was accountable for, this required them to do a manual search and a crosscheck against the Wang data base to assure that they had everything that belonged to that inspector. And I reviewed that process.

Q Okay. Now the weld traveler cards, you reviewed groups of these?

A Yes, sir.

Q How did you find them? What form were they in? Where were they physically located?

A At this point in time, they had them filed -- when I was there, early February, they had them filed at that

mgc29-4

point in time by inspector, but they also had a cross-reference of those records backed by drawing.

Q So the file by inspector made it quite convenient.

A Yes and no. They weren't all totally there. As I say, some were in drawings. They were still doing the research. So it required that we not only look in the inspectors file, drawing file, they also had some of them in process.

Q You indicated you conducted a sample audit of the process.

A Yes.

Q How did you do that? Did you actually pick an inspector and try to do it yourself?

A I took drawings and weld traveler cards and inspection numbers and got from the weld traveler card to the inspector by name and tried to work with a gentleman there to reconstruct a portion of that period for several inspectors to ensure that I was satisfied with it.

Q How many inspectors did you check?

A As I recall, with Hatfield, we went through that process with three people.

Q And what did you compare it with to make sure that you did it right?

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A Just the actual records myself. There was nothing to compare it against other than the basic documents, the original documents.

Q Somebody else did this, and it was completed, wasn't it?

A Hatfield had done it, and it had also been audited by Commonwealth Edison.

Q When you say you conducted your own sample audit, what did you then compare it with while you were doing it? You just found out how they did it?

A I was looking at their process. I wanted to make certain that they had the right methodology in place to identify those inspections for a particular inspector.

Q Are you saying that had you completed your process, you would have come up with the same results that they had?

A Yes. They had a number of checks and balances built in as well. They weren't satisfied just with their clerical people checking it and building that data base. Those lists were reviewed several different times by different members of supervision.

Q You indicated they had a crosscheck with a Wang computer list?

A Yes. That was being built. That data base was being developed at that time.

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Q So you did not use that in your sample audit?

A Where it applied, I did. Some of the data was in there; some of it was on its way in; some was ready for input.

Q So you did check some of that?

A Yes, sir.

Q In Item (f), you indicate you reviewed the qualifications of a sample of those persons conducting the reinspections. How did you do that?

A I pulled the personnel folders. I went to the list of inspectors who were identified for reinspection, and I pulled some folders at random. I looked to see what types of work that they were reinspecting. I then checked that against the personnel folder to make certain that they were certified in that particular area. I then pulled -- had them pull for me their most recent copy of their training and certification procedure for each of the contractors, and then I looked at what their requirements were and then made a review of the personnel folder, then back against their internal procedure.

Q It sounds as if you are doing what an NRC inspector would do.

A I have been in quality for a long time.

Q On page 10, just a clarification, sir.

At the bottom part of the page, you indicate

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that the sample of inspectors was selected on a random basis. I guess it's just your use of the term "random" there. It might mean something different to me than to you.

You are talking there about the first one, the fifth one, the tenth one?

A It wasn't by a random number generator or anything of that nature. It was first, fifth, tenth.

Q But that was the process you were using?

A Yes. To me, that was rather random, because it covered a good spectrum of the total population.

JUDGE COLE: Thank you.

JUDGE SMITH: Do you have redirect?

MR. GALLO: Any cross on the Board's questions? Shouldn't that come next?

JUDGE SMITH: I guess. I don't know. We've gone both ways.

MR. CASSEL: I think it's a moot issue. I don't have any cross on the Board's questions.

MR. GALLO: Could I have a few moments?

JUDGE SMITH: Do you want to have redirect this evening or would you rather go to tomorrow morning?

MR. GALLO: I prefer the morning. I will leave it up to the parties.

JUDGE SMITH: All right. I thought for your

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convenience we would finish tonight. But tomorrow would be better for everybody else.

MR. MILLER: Judge Smith --

JUDGE SMITH: Need this be on the record?

MR. MILLER: I don't think so. It relates to scheduling.

JUDGE SMITH: Is there anything else that needs to be on the record this evening?

(No response.)

JUDGE SMITH: All right. We'll adjourn for the record's purposes.

(Whereupon, at 5:10 p.m., the hearing was recessed to reconvene at 9:00 a.m., Thursday, July 26, 1984.)

End

CERTIFICATE OF PROCEEDINGS

This is to certify that the attached proceedings before the NRC COMMISSION

In the matter of: Commonwealth Edison Company, Byron Nuclear Power Station, Units 1 and 2

Date of Proceeding: Wednesday, July 25, 1984.

Place of Proceeding: Rockford, Illinois.

were held as nerein appears, and that this is the original transcript for the file of the Commission.

Mimie Meltzer
Official Reporter - Typed

Official Reporter - Signature