E-29

NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF:

NRC/TMI SPECIAL INQUIRY GROUP

DEPOSITION OF WILLIAM H. SPANGLER

Place - Lynchburg, Virginia

Date - Tuesday, 16 October 1979 Pages 1 - 129

Telephone:
(202) 347-3700

ACE - FEDERAL REPORTERS, INC.

Official Reporters

444 North Capitol Street
Washington, D.C. 20001

NATIONWIDE COVERAGE - DAILY

T

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

- - - - - - - - - - - - - - - - - - - x
:
In the Matter of: :
:
NRC/TMI SPECIAL INQUIRY GROUP :
:
- - - - - - - - - - - - - - - - - - - x

Offices of Babcock & Wilcox
3515 Old Forest Road
Lynchburg, Virginia

16 October 1979
8:45 a.m.

DEPOSITION OF WILLIAM H. SPANGLER

BEFORE:

DAVID EVANS, Esq.
R. LAWRENCE VANDENGERG, Esq.
JOHN DIENELT, Esq.
HAROLD ORNSTEIN
HANS SCHIERLING

PRESENT: GEORGE EDGAR, Esq. and MICHAEL MANEY, Esq., on Behalf of the Deponent.

ALSO PRESENT: CARLA D'ARISTA, NRC Staff.

C O N T E N T S

Exhibits:	Identified
1150	4
1151	12
1152	40
1153	48

dsp3

P R O C E E D I N G S

Whereupon,

WILLIAM H. SPANGLER

was called as a witness, and having been first duly sworn, was examined and testified as follows:

MR. EVANS: I would state for the record that this is the deposition of Mr. William Spangler being conducted by the NRC/TMI Special Inquiry Group.

It is being held in the offices of Babcock & Wilcox in Lynchburg, Virgnia.

Present with Mr. Spangler is Mr. George Edgar and also Michael Maney, again representing Mr. Spangler.

Present for the NRC/TMI Special Inquiry Group is Mr. Hans Schierling, Dr. Hal Ornstein, R. Lawrence Vandenberg, and David Evans.

Mr. Spangler, the first thing I'm going to do today is to ask you some preliminary questions in an attempt to establish your background.

MR. EDGAR: You brought a resume?

THE WITNESS: Yes.

EXAMINATION

BY MR. EVANS:

Q Do you have a resume present with you today?

A Yes.

Q Okay, I would ask the court reporter to mark

dsp4

this as Exhibit 1150.

(Witness handing document to counsel.)

(Spangler Deposition Exhibit 1150 marked for identification.)

MR. EVANS: Off the record.

(Discussion off the record.)

BY MR. EVANS:

Q Mr. Spangler, is your present position still manager of nuclear plant startup services?

A No.

Q What is your current position?

A I'm in sales in Detroit, Michigan.

Q During 1977 and 1978 were you manager of nuclear plant startup services?

A Yes.

Q In that capacity, did B & W startup personnel working on the TMI-2 unit report to you?

A Yes.

Q Was that a direct line reporting to you or did they nave intermediaries between you?

A The site manager reported to me.

Q Who was the site manager?

A Lee Rogers.

Q Could you describe what other nuclear plants you've had experience with in your capacity as startup manager or

dsp5

otherwise, other than TMI-2?

A As manager of startup services, Crystal River, Davis-Besse, and TMI-2.

Q And in other capacities?

A Oconee,as a project manager, and a brief spell as project manager in the very beginning of the Detroit Edison project.

Q Turning now to Three Mile Island 2, did General Public Utilities have a contract with B & W for startup services?

A Yes.

Q Is that a separate contract other than the supply contract?

A Yes.

Q How was that contract like or different from contracts with other utilities that B & W has entered into startup service contracts with?

A I don't know the details of the various contracts, per se, but in so far as I know, they are basically the same from utility to utility.

It's a master service contract I'm sure there are differences in verbiage because each one is negotiated with each individual customer.

Q Do you know if the master service contract with GPU called for B & W to write procedures or standard tech

dsp6

specs or any other startup criteria?

A To my knowledge, not specifically.

Q How many B & W test engineers were at Three Mile Island 2 during functional testing and power ascension testing?

A It's going to be a guess now, and an order of magnitude; there were two teams on the site. One was the contract team.

Q Contract for B & W?

A One was the NSS contract team -- okay -- which we supplied as part of the NSS -- part of our startup service. There were probably five -- five or six of those, including Lee.

Then as part of the master service contract there were about the same order of magnitude, five, six, seven people.

Q So there was only -- anywhere between 10 and a dozen test engineers?

A 10 and a dozen B & W test engineers on the site.

Q Did these site test engineers report back to you?

A Not directly. They reported to me through Lee.

Q Did you receive reports from Lee Rogers on their work?

A I don't -- relative to what?

Q Relative to the progress of the test schedule;

dsp7

relative to the acceptance of the test results?

A Yes. We got some of the test reports, of course.

Q They were sent back to you here in Lynchburg?

A They were sent back to us here in Lynchburg.

Q Do you know a gentleman named Ron Toole?

A Sure.

Q Did the B & W site test engineers also report to Ron Toole in any capacity?

A I don't -- I can't answer that specifically; again, because that job was administrated by Lee Rogers, and I don't know whether some of those people reported directly to Ron in their day to day activities or not.

Q Based upon your experience with other units, would it be odd to have the B & W site test engineers report to the utility representative?

A Not at all.

Q Based again on your experience, how does this split reporting authority -- that is, to B & W through the site representative and to the utility -- utility's representative work?

A You have to understand -- I mentioned what we called our master service contract, and under this contract we provide technical expertise, people -- in the form of people to these customers.

And oftentimes they are people that they buy for

dsp8

dollars and put in their organization reporting within the utility organization on specific assignments.

So although they are on B & W's payroll -- and I'm responsible to pay their salary -- in effect functionally during that assignment they are reporting to the utility supervisor.

It's not unusual at all.

MR. EDGAR: How do you spell "Ron Toole"?

THE WITNESS: T-o-o-l-e, I believe.

MR. EVANS: Thank you.

BY MR. EVANS:

Q Mr. Spangler, could you describe for us your personal involvement with Three Mile Island 2? Did you go to the site?

Did you observe any tests?

A You're talking about the startup, per se?

Q Startup test program, yes.

A My -- as I mentioned, Lee was my representative. Lee was our site manager and Lee reported to me.

So the responsibility for the test program -- test program results and the everyday activities and the technical responsibility for the plant lay with Lee Rogers who reports to me.

I made, while I was in that job -- I was in the habit of making routine visits to the site, and I used to set

dsp9

a goal for myself of getting up there or to each site no less than every 90 days. That was one of my objectives.

And the purpose of those visits was more personnel matters than anything else; I used to make it a point just to go up and talk to our people to let them know that I was here.

And so it was -- unless there was some special meeting on some special problem with the customer, which occurred occasionally, my visits were mostly personnel in nature.

Q Do I understand, then, that you didn't schedule visits with an eye toward the tests that would be performed or specific points in the startup program that you wanted to observe personally?

A That is correct, I did not.

Q I'd like to focus now on the information that you received from the site; how often did you receive reports from Lee Rogers on the startup test program?

A We received reports -- well, first of all, we had a policy in which we had a daily morning telephone conversation between the site and my office. It was routine. There was a time set, and it happened at the same time every morning.

That was our daily communication in which we got brought up to date on what was going on and what was going to

dsp10

happen, and what any problems were; information exchange, I guess would be the best way to describe it.

In addition, Lee provided us with a weekly report, written, on the activities at the site.

And then of course we received any number of special letters or whatever, copies of letters that Lee wrote to the customer, that sort of thing, special reports.

Q In the course of these communications, daily briefings, weekly reports or any special letters, did Lee Rogers ever express to you the opinion that the test program was going rushed?

A No.

Q Did he ever express to you the opinion that people at the site felt that?

A No.

Q Did Lee ever communicate to you that there was a conflict between the Met Ed personnel and the GPU Service Corporation personnel who were running the test program?

A Not specifically and per se, no. But in an organization on a site like that where you have two organizations, there is always some degree of difference of opinion or conflict between them.

There isn't any question about that. I don't, as far as I know -- and Lee certainly never expressed to me that the situation there was bad or unusual or anything of that

dspl1

nature or detrimental.

Q What is the usual type of conflict which exists?

A I don't -- I don't know exactly how to answer that: Differences of opinion, I guess, on day to day activities.

Q Is it your --

MR. EDGAR: The normal spectrum of human differences of opinion that you would expect on any job?

THE WITNESS: Yes.

BY MR. EVANS:

Q Is it your understanding that the GPU Service Corporation personnel were running the test program?

A Yes.

Q Is it also your understanding that the Met Ed people were required to physically manipulate the plant to run this program?

A Yes.

Q The conflict I'm trying to focus on is the conflict between directions to complete a task program from the service corporation personnel to Met Ed employees required to physically manipulate the plant.

A Yes.

Q Now, are you aware of that conflict?

A No.

Q Did Lee Rogers report to you during the hot functional test phase a transient during which the reactor coolant pump

dspl2

seals were damaged?

(Pause.)

A I recall vaguely -- very vaguely -- some problem with reactor coolant pump seals, but I can't sit here and talk any details.

No, it's very vague in my mind.

Q So you don't recall at this time the circumstances of that transient?

A No, I certainly don't.

MR. EVANS: Off the record a minute.

(Discussion off the record.)

MR. EVANS: Back on the record.

I'd like the court reporter to mark this as Exhibit 1151.

(Spangler Deposition Exhibit 1151 marked for identification.)

BY MR. EVANS:

Q Mr. Spangler, do you recognize what the court reporter has marked as Exhibit 1151?

(Counsel handing document to witness.)

(Witness reviewing document.)

A Yes, this looks like a paper I prepared for one of our operating seminars at Hershey, I guess; yes, certainly. It's a very good paper, by the way.

(Laughter.)

dspl5

were a lot of communication and resolution of that problem going on offsite, presumably at Parsippany.

So we weren't usually privy to or participating in those particular discussions.

So I guess as an interested outsider or an interested bystander, we certainly pursued whatever information we could, but we certainly weren't kept totally up to date on what was going on.

Q Are you familiar with the double ported design of the Lonergan valve?

A No.

Q Are you aware of what the term critical path planning means?

A I guess so, yes.

Q Do you think that is an appropriate way of planning and replacing a major component at a plant?

A Well, yes, I certainly -- it's an effective way of planning. I think in planning any project of that scope you almost have to have some sort of critical path, sure.

Q Can you tell me if any B & W site test engineers or any other B & W personnel were present at the Three Mile Island 2 unit acceptance test?

A I don't have specific firsthand knowledge, but I guess I would assume yes, they were there.

(Witness conferring with counsel.)

dsp47

still believe is that fuel should not be loaded until the plant is complete.

That is just my personal belief, totally complete. And I personally don't believe that that would cause an ultimate delay.

Q So in your opinion, if you delay loading the fuel, you could still meet an end date if it was realistically set?

A In my opinion; but that's an opinion as a non-construction expert: my opinion.

MR. EVANS: Off the record.

(Discussion off the record.)

MR. DIENELT: Okay. Let's go back on the record.

BY MR. DIENELT:

Q Have you been deposed by the President's Commission?

A No.

Q Have you testified before the President's Commission?

A No.

Q Have you testified before any state or federal Congressional committee?

A No.

Q Have you been scheduled for testimony before the President's Commission or any Congressional or legislative body?

A No.

Q Do you recall having been interviewed by the office

46

Q Would you call the schedule at TMI-2 unrealistic?

A I -- I don't recall the schedule, and I don't recall identifying it specifically as any more unrealistic than any previous schedules.

You know, it's always a relative thing, and startups are the same in these areas.

Q During 1977 and 1978, what other units were going through B & W startup programs? What other units were you responsible for as manager of startup services?

A Davis-Besse. I think that's it. I don't remember when Crystanl river got finished. I mentioned earlier it was three plants: Crystal River, Davis-Besse, and TMI.

I don't remember if there was a period where we had all three of them going at the same time or not; but basically Davis-Besse and TMI going at the same time.

Q Was there a period in 1978 when there was only TMI-2?

A I don't even remember that.

Q Turning to one statement you made earlier, I believe, that utilities should consider not loading the fuel as quickly as has been done in some circumstances; is it fair to say that delaying of the load of the core would thereby delay the power ascension program?

Are those two interrelated?

A No. The point I tried to make here and the point I

dsp45

A Certainly.

Q And no difference in the consequences?

A Oh, I'm talking strictly about getting a power plant into operation; there is a desire to have them run, whether they be coal or whatever.

Q Also on page 31 you have the statement: "There needs to be an industry-wide effort to establish and maintain realism in project schedules."

MR. EDGAR: Do you see the context of that?

THE WITNESS: Where is that? Okay.

BY MR. EVANS:

Q Can you elaborate on that? What do you mean by "realism"?

A Yes. What I mean is realism, if -- and what that simply means is if realistically it's going to take five weeks to repair a reactor coolant pump, for example, then don't schedule it for three weeks for purposes of making people work harder.

If I schedule it for three weeks and target it for three weeks, you guys are really going to go like hell to make the three week date.

Q So in your opinion, utilities have been unrealistic in scheduling very optimistic work?

A In my opinion, there have been times when schedules are unrealistic, yes.

dsp44

questioning by asking you again a couple of questions regarding statements in Exhibit 1151.

On page 31, under your generic conclusions section, you state: "Pressure on startup personnel to achieve unrealistic schedules often results in serious mistakes being made that ultimately cause additional delays."

Could you explain to me who puts the pressure on the startup personnel?

A Whoever is running the startup program.

Q Generally, would that be the utility?

A Generally, that would be the utility:

Q Has B & W ever run a startup program?

A No.

Q What is your basis for making that statement? Is it the units you've been involved in or just what you've learned from your field representative?

A It's units I've been involved in. If you look at my resume, I have a long history of field work, most of it in fossil.

There's no difference now than there was then. Things haven't changed; there is always drive to achieve and get the plans operating, which is natural and normal. So it's just based on years of experience, recent and past.

Q Do you really believe there's a similarity between coal and nuclear units on drive to get them into operation?

dsp43

and what have you; I have nothing official.

I have heard it said at various times that there are certain advantages, tax-wise, for a utility to get a plant commercial or started up or whatever by some date. But I have zero understanding of that, and I wouldn't want to put myself in a position to be an expert.

Q Have you ever heard from Lee Rogers or his counterparts at other sites that report to you indications that those kinds of factors were important in a utility's schedule?

A Sure.

Q Can you give me a --

A Verbal? Not specific, no. You know, in conversation type things, but nothing that would be specific, whatever.

Q Can you recall any of those remarks that Lee Rogers might have passed on to you about TMI-2?

A Not specifically, certainly not.

MR. VANDENBERG: Mr. Evans, do you have some questions?

MR. EVANS: I have a couple of follow-up questions, but it might be a good time to take a five minute break. So let's take five minutes.

(Brief recess.)

MR. EVANS: Back on the record now.

BY MR. EVANS:

Q Mr. Spangler, I'm going to finish this line of

dsp42

And as the need to change that date comes up due to changes, there is a tendency to move it ahead as little as absolutely necessary for -- I don't know whether they would be public relations reasons or whether they would be financial reasons or what. I really don't know.

But it has been my experience that there is a tendency to compress a schedule and try to demonstrate that they can do more work in a shorter period of time so that they can stay as close to their original predicted date as possible.

Q Is that predicted date,in your view,related perhaps to commitments the utility may make for providing capacity to a power interchange pool?

A I wouldn't want to -- you know -- venture that. I do know that utilities have power pools, and I do know that -- you know -- they do commit to each other to provide generation for these pools.

But I don't know enough about their business to -- to want to venture a guess as to how much of a factor that particular thing is.

Q Do you think that in your experience that the acquisition of certain tax benefits, such as the investment tax credit, is sometimes a factor in a utility setting completion or commercial operation dates?

A Again, I have to answer the same way. You know, I have heard by the grapevine -- you know -- whole conversations,

dsp41

MR. VANDENBERG: Thank you.

THE WITNESS: Do you want a copy of this standard -- standard startup plan of ours?

MR. VANDENBERG: Yes, please.

THE WITNESS: I can provide you with that.

BY MR. VANDENBERG:

Q By the way, the test schedule that utilities become committed to, in your view, what -- what are the reasons or incentives that exist for a utility to pick a particular date which they then get committed to?

A Okay. Now, this is in my view. Okay?

And I don't pretend to represent B & W in this view or the utility, for that matter.

But as I view it, these are long term projects; everybody knows that. You know, it used to be seven years. It's now 12 years or whatever. And when the projects are initiated, there is a stated startup date at that time based on whatever, presumably based on some reasonable planning.

As we also know in this particular industry, for various reasons, construction schedules have extended for a lot of reasons: money, additional technical requirements, and so forth.

And -- but the startup date -- the original startup date is still in print: hey, this is the date that we intended to start this plant up.

dsp40

MR. VANDENBERG: Also I'd like to ask the court reporter to mark as Exhibit 1152 this March 3, 1978 memo to Metropolitan Edison Company which encloses amendment number one to the operating license, DPR-73.

(Spangler Deposition Exhibit 1152 marked for identification.)

MR. VANDENBERG: This was previously discussed.

(Discussion off the record.)

MR. VANDENBERG: Back on the record.

BY MR. VANDENBERG:

Q Mr. Spangler, I wondered if you could provide a couple of items for us: one, the B & W document that contains the standard test plan schedule that we've talked about this morning.

A Yes.

Q And also while we were off the record you talked about a follow-on article to what we have been calling Exhibit 1151. Could you supply that to us as well?

A I think so.

The reason I'm saying that is it was not published. I presented it there, and the question is whether I can lay my hands on a copy of it.

I'm going to try, certainly.

MR. EDGAR: We'll undertake to search for it, and if it's available, we'll furnish it.

dsp39

granting of the OL?

A I don't remember any specific -- specific conversation on that subject, but that is a general topic of discussion. You recall I mentioned that we had daily telephone conversations with every job that was in startup.

And the punch list -- every job at this stage has a punch list, and we are,one, specifically interested in those items on that punch list that are B & W's responsibility.

We make sure we know and understand those specific items. From a general standpoint, it's not unusual during our discussions for somebody to say, hey, you know, in addition to the B & W items there is X-100 additional items on this punch list.

But I don't recall that this particular instance was discussed in any different fashion than any previous jobs. It was just an item of discussion during the course of events.

Q Was the number of punch list items in January 1978 more or less than other plants at that stage, in your view?

A I have no idea. But I don't remember or don't recall thinking, gee whiz, this plant certainly has a large number of punch list items.

Q How about a much later period around December of 1978? Do you have any recollection then of the number of outstanding items?

A Certainly not.

dsp38

A I don't know; I've never seen this before.

MR. VANDENBERG: Off the record.

(Discussion off the record.)

MR. VANDENBERG: Back on the record.

BY MR. VANDENBERG:

Q Please go ahead.

A You know, I don't know the specific details of that instance or -- you know -- just in a few brief seconds here I'm not sure I know exactly what that was all about.

But on the surface, I think it's obvious it's just that kind of thing you just referred to.

Q Did Mr. Rogers ever report to you additional evidence that would support your conclusion that utilities tend to load fuel prematurely?

A No, not specifically.

Q And one last question I have, Mr. Spangler, deals with the number of punch list items at TMI-2.

As I understand it, the operating license for TMI-2 was granted on February 8, 1978 and for the couple of months prior to that there were as many as 10,000 punch list or open items to be completed.

Do you have a recollection of that?

A No, not specifically.

Q Did Mr. Rogers ever communicate or talk to you about the number of items that remained to be completed prior to

And my point is that once they load fuel, they really have given themselves a kick in the tail because then they are limited in access -- you know -- all the various safety criteria,and so forth, apply.

And they are limited in access to the plant to continue and complete their construction on other faces, other than the NSS.

And I'm simply saying, "Hey, you're really better off, in my opinion, and you wind up ultimately saving time" -- again this is my opinion here.

You are better off and you'll save time if you finish the whole plant, everything, prior to the time you load fuel.

Q Mr. Spangler --

A Because once you put fuel in the core, you're very limited in access.

Q Mr. Spangler, I want to show you a March 3, 1978 letter to Metropolitan Edison from the Nuclear Regualtory Commission, enclosing amendment number one to the TMI-2 operating license.

Is the -- excuse me. Let me start over again.

Was the need for this amendment an example of the kinds of things you have just been talking about?

(Counsel handing document to witness.)

(Witness reviewing document.)

dsp36

that later proved to be unrealistic.

Do you see that in there?

A Yes.

Q What kinds of difficulties that lead to?

(Pause.)

A Okay. You know -- this says -- and you know I wrote this and I believe it -- that there is a tendency to get committed to construction dates and end dates and try to hold these end dates and try to compress construction and startup schedules by working overtime and by other means to meet end dates.

And one of the points I make and continue to make is that sometimes they tend to load fuel at a time when the NSS, per se, is ready for fuel.

It has gone through all its tests; it is functionally acceptable, and it's ready to load fuel. And, again, it has met all the criteria, met or exceeded all the criteria, so fuel is loaded.

But that doesn't necessarily mean that the plant is ready to run. There are other components of that plant besides the NSS.

The NSS is obviously ready, but there are many other components that make up the total plant: secondary side turbine generator; water treatment -- you know -- everything. The plant, per se, can't run until it's all ready.

dsp35

Q And also on this test program, is it fair to characterize this -- this test program as just a sequence of tests that has to be peformed regardless of dates, or is it rather -- and I'm inferring from what I think you said -- that the utility gets committed to a schedule, a date, and then matches the tests to accomplish that date?

A Well, he's got a test program that he has to do; he's got a series of tests that he must do. Eventually, he is overall -- he is going to try to schedule those tests and try to understand the schedule so he can predict when the test program is going to be -- but my understanding -- but my understanding is that the test program comes first, and then the schedule is developed around the test program because the test program is a required thing.

Does that answer your question?

Q Yes.

Do utilities often review their test programs to see if there is anything -- any test item that they can delete or substantially postpone?

A I don't know that.

Q Did Lee Rogers ever report to you any such indication at TMI-2 that certain tests were being deleted or postponed?

A Most assuredly not.

Q Mr. Spanger, in your article, you mention this idea that utilities continue to become committed to startup schedules

dsp34

A I think that's obvious, yes. You know, the utility puts together a test program, and that test program is approved within their own organization and ultimately, presumably, by the NRC in some fashion.

Now, whether that program meets -- we all know it meets the requirements of the NRC. I'm not sure whether any of us really recognize or ask the question whether it exceeds requirements of the NRC.

The test program is developed; it's approved within the customer's organization, and it's approved by the NRC. So the question you asked as to whether they go overboard, I can't answer that.

You know, the only thing I can say is: everybody knows that the ultimate test program is approved and accepted by those that are involved in that.

Q So in the plants -- four or five plants you indicated you have been involved in, are you aware that any of those had test programs in excess of NRC requirements?

A No, not specifically, no.

Q Okay.

With regard to tests also, are you aware of anything -- any requirement, rather, of the Federal Energy Regulatory Commission regarding a 120 rule for completing a test program?

This would sometimes be called construction 9-D?

A No, I'm not.

dsp33

situation where that has arisen?

A We haven't ever done -- taken any specific action about that.

Q Does NRC, to your knowledge, have any guidance about test programs being conducted too slowly?

A No.

Q Okay. Going back to some of the things we mentioned a little bit earlier, is it your impression that all the tests in the startup test program are documented in the FSAR?

A I don't -- again, are you talking now TMI-2?

Q Yes. That's talk specifically about TMI-2.

A I'm not that familiar in detail with any FSAR; the TMI-2 FSAR is -- you know -- old. I can't answer that.

Q With regard to TMI-2 or generally?

A Generally or TMI-2.

Okay. Do you know if the -- if utilities ever have tests beyond those that are required by the NRC startup tests?

A Not specifically.

Q In general, they keep pretty close to the NRC requirements?

A I -- you know -- I don't know.

Q Is it your -- is it possible, then, that in your view that the extent or number of tests that are performed on a specific unit would vary based on the desires or attitudes of the utility in terms of tests that go beyond the NRC requirements?

dsp32

Q Did you participate in answering any NRC or more specifically office of nuclear reactor regulation questions about the test program during NRC's review of the TMI 2 application?

A No, no.

Q Is -- does B & W have any concern that a utility may conduct its test program either too quickly or too slowly?

A If you're looking for an official B & W position, I can't give you one.

Speaking for myself, I'm not sure -- I'm not sure how to answer that question. I'm not sure I understand the question.

You know, if we saw -- if I saw in a plant that I was responsible for that I felt the company was moving too fast, that he was getting himself in a situation where it was reckless, yes, I would feel obligated to make that fact known.

I think the answer to the question is that obviously B & W would be interested and concerned about that sort of thing.

Q How about if the customer, for your point of view, was proceeding too slowly?

A Well, that concerns us also.

Q In what regard?

A It costs us money.

Q And what could or have you ever done about that in a

dsp31

Q Okay. How do you label the tests before core load?

A We call that pre-op testing.

Q And that would include hot functional testing?

A To my view, yes. You may find other people in the building that feel that -- call it something else.

Q Do you know if NRC provides any guidance on the schedule for conducting the full range of startup testing?

A Not that I know of.

Q Do you know if there was any formal or informal guidance that B & W received upon which they based this B & W standard test program?

A No. As far as I know, it was strictly based on our own experience and on our own thinking.

MR. EDGAR: Is this in regard to schedules?

THE WITNESS: This is the standard program test schedule.

BY MR. VANDENBERG:

Q That's my question. So you're saying that as far as you know --

A It was developed by B & W for our own use, for our own purposes.

Q And was not based on any NRC formal or informal guidance?

A Not as far as I know.

dsp30

Q You just think it's an irrational --

A It gets to be, "Hey, the plant is near completion, now."

MR. ORNSTEIN: Off the record.

(Discussion off the record.)

BY MR. VANDENBERG:

Q Mr. Spangler, where is the B & W standard test plan documented?

A The B & W standard test plan?

Q Yes, the one we've been referring to this morning.

A Our test input -- I don't know what you mean. Where it's documented? It's part of the service department.

Q Is there a particular document that can list and contains the standard plan schedule?

A I'm sure there is, but I can't identify it by title right now.

Q I want to clarify two of the terms: startup testing; in your view does startup testing include both those tests before core load and those tests after core load?

A Startup testing?

Q Yes.

A Yes, in my view it does.

Q And if -- is it appropriate to call the tests after core load power ascension tests?

A We call them power escalation tests.

dsp29

ascension program.

We used this particular curve for our planning purposes, and frankly, it's as much for planning our manpower resources as much as anything else.

But it is what we consider to be reasonable in knowing we were going to have certain problems.

But that doesn't mean it's going to be anywhere near that. It could be much shorter or much longer at any given site. It depends on the particular circumstances of that site.

Now, let me say one more thing on that, because I think it's very important. Fuel loading gets to be a great big, emotional, commerical thing in the eyes of the customer when they're building one of these plants.

That gets to be a day that everybody looks forward to, and everybody has made commitments for. So, they load fuel as soon as the plant is ready. Okay?

So, that also can affect how ling it takes from fuel loading to completion of power ascention. OKay? It varies from plant to plant.

Q Why is fuel loading such an emotional, commercial day?

A I don't know.

Q Do you know what importance the ompanies see in that?

A No.

dsp28

went from test to test with no outages and no shutdowns.

Q Would eight weeks surprise you?

A I don't even want to venture a guess. I don't know how many days are involved. But if you went from one test to the other without shutting down and without problems and without delays, it certainly would be done in a much shorter period than the five or six months we're talking about.

Q So what is the proper method of planning, in your opinion?

Do you plan for the outages or do you schedule the most optimistic schedule and then just deal with the outages as they occur?

A You plan, to my way of thinking -- my way of thinking -- you plan for reasonable outages based on past experience.

Q Did you -- excuse me.

A But when you get up to a power ascension program -- remember this -- there are various degrees of what has happened prior to that time.

Do you understand what I mean? You could well have been through a -- a hot functional test that ferreted out most of the problems and you could be in good shape to run a rather rapid power ascension program. So there are too many -- too many factors that are individual to each individual plant to say how long it's going to take to do a specific power

dsp27

accounts for routine problems.

If you have major problems, major equipment problems, it's going to go longer than that. If you're lucky and have few problems, which sometimes occurs, you're going to go shorter than that.

Q Now, turning your attention to unit 2 at Three Mile Island, based upon the discussion we had earlier regarding main steam valve failure and the need to replace those, assuming if you will, that they had done very few of the power ascension tests before they had that problem, that when they came back on-line after curing the problem, they would then have to run the entire power ascension program; would you estimate that it would take six months to complete -- six months to complete that program to the unit acceptance tests?

A That's what the curve says, everything being normal.

Q Would you consider it to be an overly optimistic schedule to complete the power ascension program in the time period of September -- mid-September to the end of February, 1979?

A Not -- no, not if -- how long it takes to do a power ascension program -- you know -- if all you do is do the testing, you go from one test to the other; it doesn't take long.

I don't know, you know, how many days per se are involved in the power ascension program, per se; if you just

dsp26

A That's correct.

Q And is it accurate that the B & W plant startup schedule calls for a total of approximately 14 months or 28 weeks?

A From hydro, yes.

Q From hydro to unit acceptance test?

A Yes, that's correct.

MR. EDGAR: 14 months or how many weeks?

THE WITNESS: 14 times 4. What --

MR. EDGAR: 56 weeks.

BY MR. EVANS:

Q And is it accurate to state that this B & W planned startup schedule calls for approximately six months between fuel load and the unit acceptance test?

A Yes.

Q Does that six month period in the B & W planned schedule take into account significant downtimes which will occur at units because of problems in the test phase?

A I'd say it takes into account what we would consider to be-- and I know you're going to ask this -- but what we would consider to be a normal problem sequence.

You have outages during the startup period for problems, and -- you know -- routine problems, I guess, more or less.

It does not account for major problems, but it

dsp25

A Well, I'm going back -- now I'm recalling our planning for a startup and our standard plan schedule. Our standard plan schedule, if I recall right, is about 22 months.

Q 22 months for what?

A From the beginning of the testing which occurs -- you know -- just around about the same time hydro takes place -- system hydro to completion of acceptance tests.

Q That's a standard --

A That doesn't jive at all with this. You know, this says four years from hydro --

Q Now, I believe if you look at that --

A -- completion of hydro.

Q If you look --

A Wait a minute now. Let me look. Okay, maybe you are --

MR. EVANS: Let's go off the record.

(Discussion off the record.)

MR. EVANS: Let's go back on the record.

THE WITNESS: So we're back to five months.

BY MR. EVANS:

Q Back on the record now, Mr. Spangler, let's attempt to clear up this problem with Figure 6 in Exhibit 1151.

A Okay.

Q Is it accurate now as listed in that exhibit that the standard is months and not weeks?

dsp24

(Discussion off the record.)

BY MR. EVANS:

Q Mr. Spangler, what is the standard B & W estimated period for the period between fuel load and unit acceptance test, to your knowledge, whether based upon this article or not?

A I really would rather go back and check my records, my paper.

Q Would five weeks be an unrealistic time?

A That's pretty short.

Q Would 10 weeks be realistic between fuel load and unit acceptance test?

A I would say it would be fairly realistic. But again I want to go back and check our planning because this has confused me -- you know -- right now.

Obviously, 10 months is a long time.

Q Would you also suggest then that the measures used on page 27 of the article which talk about months after fuel loading and show that at Crystal River 3 the unit acceptance test was conducted 4.6 months after fuel loading --

A No, I think that's right.

Q That's right?

A Yes. No, that's actual.

Q Well, then could you explain for me why you believe it's actual on page 27, but a typo on page 29?

dsp23

which are prepared as shown in Figure 6 -- I'll give you a chance to look at that.

(Counsel handing document to witness.)

(Witness reviewing document.)

A Okay.

Q Okay. Would it be fair to say, based upon the table that is presented there -- and I could point you to other points in the article, if necessary -- but would it be fair to say that approximately five months is the standard time for a B & W unit between fuel load and unit acceptance test?

(Pause.)

A Let's see. Let's see. We say -- we're looking at eight to 10 weeks for fuel loading and acceptance tests. That's what we say is achievable here: three to five; Oconee 1, three to five. It was, oh, 15 weeks.

Three Mile Island 1 was only about five weeks.

Q Maybe you can help me understand the legend at the bottom. This is months?

A This is months. Excuse me. Yes, it is.

Q So all your prior statements should be corrected to read "months."

A Right. We say, going back, "fuel loading to acceptance test" -- no, there's something wrong here somewhere.

MR. EVANS: Off the record.

dsp22

customers.

The purpose of that seminary is to relay to all of our customers at one time in one room all of the information we have relative to operating plants.

In the course of -- well, the objective is to get problems on the table, and usually at these meetings they ask whoever is manager of the startup effort of our startup programs to just discuss the activities of those plants that are in the startup program or in startup phase. And that was the purpose of that.

Q Is this an annual meeting?

A This is an annual meeting.

But it doesn't have the same agenda every year. The agenda is put together based on the times, what is going on. So it's not something the same paper would be prepared every year for.

Q Do you recall at the present time what you calculated as the average time that would pass between initial fuel loading at a unit and the unit acceptance test?

Do you have that in your memory?

A Run that by me again.

Q Do you recall today what is the average time for a B & W unit between fuel load and unit acceptance tests?

A No, I don't have it in my head.

Q Let me ask, if looking at Exhibit 1151, the tables

dsp21

A If I recall -- it goes back awhile -- if I recall, we were not very far along on the TMI startup when that thing was written.

And so it was impossible to make comparisons.

Q Subsequent to publishing this article, did you publish another article which included data on Three Mile Island 2?

A No, I don't think so.

Q Was there a 1978 version of this article?

A No.

Q So this is a one shot deal. It's not something you prepared annually?

A That's right.

It depends on the subject of the meeting.

Q For your own purposes, have you gone back and compared the startup program at Three Mile Island 2 with the programs that are identified in this article?

A I haven't, per se, because just about the time things were wrapping up, the TMI-2 incident occurred. Otherwise, I no doubt would have.

Q Has anyone else that you know of at B & W prepared such an analysis?

A Not to my knowledge.

Q Why did you prepare this 1977 article?

A We have an annual operating plant seminary with our

dsp20

A I don't -- I can't answer that question. I have no idea what the significance of those tests are to NRC.

Q Do you know if it's included in the FSAR of Three Mile Island 2?

A No, I do not.

Q Do you know if it's usually included in the standard FSAR test procedures which B & W assists the licensee in preparing?

A I do not.

Q Do you know if the unit acceptance test has an importance to any other regulatory agency, other than the NRC?

A I don't.

MR. EVANS: Off the record.

(Discussion off the record.)

MR. EVANS: Back on the record.

BY MR. EVANS:

Q Mr. Spangler, I'm now going to focus on some of the information in Exhibit 1151 and specifically I'm going to attempt to have you assist me in drawing comparisons between the startup test program at Three Mile Island 2 and those described in your 1977 article, which is Exhibit 1151.

In that exhibit you stated that you hadn't received enough information from Three Mile Island 2 to make a comparison of its program when you wrote this article; is that correct?

dsp19

to be performed.

Is that consistent with your understanding?

A Yes.

Q My question is --

A Well --

Q Excuse me.

A Are we talking about the TMI FSAR, per se?

Q Not yet.

My question is: does B & W normally assist licensees in preparing a list of tests to be performed which are then incorporated into the FSAR?

A Yes. We provide them with guidance and with information, and then they prepare the FSAR from that.

Q Are you familiar with the FSAR for Three Mile Island 2 as it relates to tests to be performed?

A No.

BY MR. VANDENBERG:

Q Is that assistance, Mr. Spangler, part of the master service contract or part of the NSSS?

A Part of the NSSS.

BY MR. EVANS:

Q Mr. Spangler, what is your understanding of the importance of the initial warranty run to the NRC?

A Again, I don't know what a warranty run is.

Q Excuse me. Unit acceptance test?

dsp18

test?

A A full load operation metting prescribed criteria.

Q Is that a test?

A It is a test, but it is not an official test; it's not a test that is recorded for some official purpose like the acceptance test.

Q Well, that is my question: what is the test before the acceptance test which is recorded for some official purpose which shows --

A To my knowledge, there is no official test prior to the acceptance test that officially records that.

Q Would you consider the full power generator trip test to be the next closest thing?

(Pause.)

A I don't recall exactly where that comes in the test sequence.

I -- you know -- I don't have the whole test program committed to memory.

Q Are you familiar with the -- strike that.

Is there a standard set of B & W tests which are incorporated in the FSARs of various units?

(Pause.)

A I'm not sure I understand the question. There is an FSAR, of course.

Q And the FSAR, I understand, contains a list of tests

dspl7

and again I'm just going by memory --

Q Yes.

A -- was put into what they called commercial operation significantly prior to the acceptance test.

Q Can you think of units where the acceptance test has been run before commercial operation?

A No, I can't.

Q Do you consider the unit acceptance test the completion of the test program?

A Yes.

Q Could it be fair to say a test program was incomplete without it?

A That's hard -- you know -- the acceptance test really has a lot of commercial impact, per se.

And in reality prior to the time that official acceptance test is run, the unit would normally have been operated at full load a number of times, and would have already proven itself capable of doing so.

It's this formal thing, then, that becomes the acceptance test.

So normally the test program will not be complete without it. But certainly the plant would be proven prior to that time, proven capable.

Q What is the test,in your mind,which proves that the plant is capable of being operated before the unit acceptance

dspl6

Q Mr. Spangler, would you like to clarify your previous answer?

A No. I would assume that some of our people were there during the so-called acceptance test.

MR. EDGAR: Off the record.

(Discussion off the record.)

MR. EVANS: Back on the record.

BY MR. EVANS:

Q Mr. Spangler, could you, based upon your experience, draw a distinction, if there is one, between a unit acceptance test and an initial warranty run test?

Is there a difference between those two?

A Not in so far as I know about; we use the term "acceptance test," so I don't recall in my history here that we use the term "warranty test," per se.

Q Could you describe for me, based on your experience, the relationship between the unit acceptance and commercial operation at a nuclear unit?

A As far as I'm concerned, the two aren't related, normally.

Q Is complete -- successful completion of the unit acceptance test a prerequisite to commercial operation?

A It certainly hasn't been in some cases?

Q Could you name instances where you --

A Davis-Besse, for example: that unit, as I recall --

A No.

Q Do you have any recollection as to the similarity between the two problems at TMI-2 and at Davis-Besse?

A No.

Q Do you recall regarding this main steam relief valve problem at TMI-2 whether B & W played any role in analyzing the problem or making recommendations as to the solution of the problem?

A We did not from here.

Q Do you know if Mr. Rogers did?

A I don't know.

Q Would you expect Mr. Rogers to report to you if he did take a role in something of that nature?

A If he did anything in an official fashion, such as written recommendations, I'm sure I would have received copies of such recommendations.

Q Through your daily briefings with Mr. Rogers or through the weekly reports, did you keep track of the progress of this problem at Three Mile Island 2?

A Sure.

Q Are you familiar with the planning of GPU with regard to the problem, whether they were going to replace the valves or modify the valves?

A To the -- to the extent that they kept us advised on a daily basis; but recognize that the communications -- there

dspl3

Q I'm going to ask you some questions based upon things in this paper throughout the course of our questioning.

At this time, I'd like to call your attention to Table 2 in Exhibit 1151, which deals with Davis-Besse 1, problems during startup.

And under that table you have listed HPI pump lube oil system as being one of the problems at Davis-Besse.

A Where are we here?

Q Do you recall that at this time?

A No, I certainly don't.

Q Did Lee Rogers report to you during the power ascension testing phase of an April 23, 1978 transient, during which the main steam relief valves malfunctioned?

A I don't recall.

Q Let me attempt to refresh your recollection: at Three Mile Island 2 there was a significant period of downtime required to replace the main steam relief valves.

A That's correct.

Q And it is my understanding that this transient first brought the problem to GPU.

So are you familiar with the problem?

A I'm familiar with the problem, yes.

Q Again referring to Exhibit 1151, at Davis-Besse you have listed as a problem main steam code safety valves.

Do you recall that at this time?