UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	S S
HOUSTON LIGHTING & POWER COMPANY	S Docket No. 50-466
(Allens Creek Nuclear Generating Station, Unit No. 1)	5 5 5

Material Facts As To Which There Is No Genuine Issue To Be Heard

(1) Following a postulated loss-of-cool accident (LOCA) Mark III drywell pressure is increased by escaping reactor steam and a steam/air mixture is directed to the Suppression Pool through the horizontal vents which connect the drywell and the containment. The drywell air forms large bubbles which expand and depressurize causing an upper displacement of water in the Suppression Pool. When the bubble breaks through the pool water surface a froth is formed. This entire phenomenon is referred to as "pool swell." (Stancavage Affidavit pp. 2-3)

(2) As part of its Mark III test program, General Electric has engaged in an intensive experimental and analytical effort, including more than fifty full-scale and

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sub-scale experiments over a period of 5 years, to determine the loads on structures and equipment above the Suppression Pool. (Stancavage Affidavit pp. 3-7).

(3) The General Electric and other tests have shown that the worst case event which initiates pool swell is the design basis LOCA event; safety relief value actuation does not cause pool swell. (Stancavage Affidavit p. 3).

(4) The pool swell phenomenon occurs in two phases; "bulk" pool swell, followed by a "froth" pool swell. Bulk pool swell imparts both an impact load and a drag load on exposed structures and equipment while the froth stage imparts only a drag load. (Stancavage Affidavit p. 7).

(5) The Control Rod Drive Hydraulic Control Units (HCUs) will be located on platforms above the maximum lift height of the worst case Suppression Pool swell. Therefore, these units will not experience a direct "impact" load from the rising water slug. The HCUs will be conservatively designed to withstand the less severe "drag" loads produced when escaping air bubbles break through the water surface. (Stancavage Affidavit pp. 8-10; Sullivan and Cheng Affidavit pp. 2-3)

(6) The transversing in-core probe (TIP) station will be located on a concrete structure cantilevering outward from the drywell wall at an elevation approximately six feet above

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the normal Suppression Pool surface. Because the TIP platform design includes a sloped bottom, this structure will not experience a direct impact load. In any event, the TIP performs no safety function and its postulated loss has no safety significance. (Stancavage Affidavit pp. 10-11; Sullivan and Cheng Affidavit p. 3) 79-1743C DSH

> Doherty Contention No. 5/ Suppression Pool Swell

COST S _ PAID BY PLF. DEF.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

IN THE MATTER OF: HOUSTON LIGHTING AND POWER COMPANY, (ALLENS Docket No. 50-466 CREEK NUCLEAR GENERATING STATION, UNIT 1)

DEPOSITION OF : JOHN F. DOHERTY

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 consequences listed in B, C and D of your contention? Is that where you are right now? A. Yes. O. Thank you. Let's move on to pool swell. A. Thank you for that. O. Would you describe for me what you understand to be suppression pool uplift? A. When the preasure is released through the safety relief valve to the suppression pool, there is a pushing up and outward of the water in that pool. Some of it is up, uplift is the word I've seen used and I used here, describing that. Q. So for purposes of this contention, you are talking about a dynamic effect on the pool caused by the lifting of safety relief valves? A. Yes, I think that's right. Q. I gather from your answer, you don't know how high it goes? A. You can only sort of estimate from the drawings here a little bit. I'd like to get an exact amount. Q. What is your estimation of the height above the top of the pool? 	1.		
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25 above the top of the pool?	23	exact amount.	
	24	Q. What is your estimation of the height	
19	25	above the top of the pool?	
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1	A. It looks like it would be something of
2	the order of 20 or 25 feet.
3	Q. What is the source of your estimate of
4	how high the uplift will go?
5	A. Just looking at these drawings.
6	Q. And would you tell me what that drawing
7	is?
8	A. PSAR Figure 1.2-8.
9	Q. Where is it indicated on there the
10	height of suppression pool uplift?
11	A. It's not. I think it should be
12	corrected, there seems to be two numbers. It's
13	also Figure 2.2-2, Sheet 1.
14	Q. Is there anything on that drawing that
15	you have there that indicates the height of
16	suppression pool uplift?
17	A. No, there's nothing there.
18	Q. Then, how did you estimate the height of
19	suppression pool uplift using that figure?
20	A. I just took a guess looking at the
	figure.
21	Q. You just looked at the figure and then
22	guessed as to how high it would go?
23	
24	 A. Yes. Q. So the whole of your contention about
25	Q. DO CHE WHOLE OF JOUR CONTRACTOR

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1	influencing certain components is based on your
2	guess of how high suppression pool uplift will go
3	by looking at that PSAR figure?
4	A. In the case of Allens Creek, yes, right
5	now.
6	Q. What loading will be exerted when the
7	pool reaches its maximum height that you have
8	guessed at?
9	A. By loading, do you mean type of force
10	would be applied?
11	Q. Yes.
12	A. That, I can't tell.
13	Q. Have you guessed at the load as well as
14	the suppression pool height?
15	A. No, I haven't even taken a guess.
16	Q. So you ventured to guess at the height,
17	but you have not guessed at the force?
18	A. Right.
19	Q. Then, what is the basis of your
20	contention here that these two mechanisms are
21	susceptible to damage by suppression pool uplift?
22	A. Well, it appears that some amount of
23	water would rise to that point.
24	Q. It appears that some water will rise to
2 5	that point?
	21

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3	1	A. Yes, estimating.	
-4	2	Q. What makes you imply that water will	
1	3	reach that height? I thought we established it	
1	4	was based on a guess.	
-1	5	A. That's right, we did.	
]	6	Q. So you have guessed as to the height.	
1	7	You have no guess as to the load and that leads	
	8	you to the third guess that there will be some	
1	9	damage to these components?	
1	10	A. A moment ago, you asked me for the	
	11	loading which implied some type of force answer.	
1	12	I have only a rough estimate, not in numbers, but	
1	13	just in terms of experience that it looks as if	
	14	the large amount of water will rise upward and	
	15	strike the parts mentioned in the contention.	
1	16	Q. Well, let's make sure we're very clear	
	17	about our terms here, Mr. Doherty. Do you have	
	18	an estimate or do you have a guess as to a load	
T	19	being exerted on these components from pool swell?	
-	2 0	A. What is an estimate to you, sir?	
1	21	Q. An estimate is some figure that has a	
1	2 2	rational basis. A guess is a hunch or a figure	
	2 3	that has no rational basis. Now, which of those	
1	24	is pertinent to your contention here?	
1	25	A. What is a figure to you?	2
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1	Q. A number.
2	A. No, then it has to be B, guess, I have
3	no number.
4	Q. So this whole contention is then a guess?
5	A. You may label it as you like.
6	Q. You have no knowledge as to the height
7	of the suppression pool uplift?
8	A. At this point, I do not, that's right.
9	Q. You have no knowledge as to the load
10	that will be exerted by the suppression pool
11	uplift?
12	A. That's right.
13	Q. You have no knowledge as to the ability
14	of these components to withstand that load?
15	A. That's right.
16	Q. You have no knowledge as to the ability
17	of the floors within the containment to withstand
18	that load?
19	A. There are documents there is a
20	document NUREG 0474 which indicates that the
21	things that I have expressed may occur.
22	Q. Would you show me those passages in 0474?
23	A. I don't have 0474 with me. However in
24	my response to your interrogatories, I believe
2 5	there is something. 23

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1	1	pool swell?
	2	A. Not for this unit, to my knowledge, not
1	3	for Gessar 238.
1	4	Q. Does it indicate what force or load
	5	might be exerted by the pool swell?
1	6	A. No, it doesn't right at the moment that
1	7	to my knowledge.
	8	Q. Then, if the only information you have
1	9	is the location of these two named components and
١	10	NUREG 0474 says nothing as to the height or load
•	11	of suppression pool uplift, what is the basis for
1	12	your contention that suppression pool uplift may
1	13	in fact affect these components?
	14	A. The previous GE units have had this
1	15	cited as one of their problems.
I	16	Q. Which units?
	17	A. Mark I and Mark II units have.
1	18	Q. Is it your understanding that Mark I and
1	19	Mark II units are identical for these purposes
	20	for the Mark III design for Allens Creek?
1	21	A. No.
1	2 2	Q. Are they in any way similar?
	23	A. That I'm not certain.
	2 4	Q. You do not understand the differences
1	25	between a Mark I, a Mark II and a Mark III . 25
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1	suppression pool?	
2	A. As related to this very detailed point,	
3	no.	
4	Q. Then, how can you base a contention on a	
5	Mark III suppression pool uplift to other	
6	different systems that you have no knowledge of?	
7	A. Part of it's in the contention answer	
8	that no full scale tests have been done to guard	
9	against the possibility.	
10	Q. What part of the answer is in that	
11	statement?	
12	A. What part of the answer? It's in the	
13	contention	
14	Q. Now, you said that the answer to my	
15	question about how you could base this contention	
16	on two completely different systems that you have	
17	no knowledge of and you said, part of the answer	
18	was the statement in the contention that no full	
19	scale tests have been performed and I asked you	
20	what part of that answer was in that statement?	
21	A. Well, evidently, I was moving ahead	
22	instead of replying to your question. What I am	
23	saying is that Mark I and Mark II plans have had	
24	these problems and as an intervenor, I see no	
25	proof that Mark III will escape these problems.	
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1	Q. As an intervenor, do you see any
2	information at all which will indicate that the
3	problems, whatever they were at Mark I and Mark
4	II, will also occur in a Mark III plant?
5	A. Apparently they were, I'm not certain
6	they have been corrected.
7	Q. Apparently what was?
8	A. That the danger of pool swell uplift was
э	a problem.
10	Q. For the Mark III?
11	A. Yes.
12	Q. What gave you that indication?
13	A. I'm trying to locate the exact site now.
14	Q. What are you looking at to locate that
15	exact site?
16	A. A book called "The Silent Bomb".
17	Q. "The Silent Bomb"?
18	A. Yes.
19	Q. B-O-M-B?
20	A. Yes.
21	Q. Did you find what you were looking for?
22	A. Not exactly, I was looking for a
23	quotation by a man named Dragoonm as who was
24	employed by Potomac Electric Power.
25	Q. Well, maybe I can expedite things, Mr.
	- 27
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1	Dohe	rty.					
2		Α.	Yes,	I'm sor	ry to	take so lo	ng.
3		Q.	Am I	correct	in as	suming tha	t the only
4	basi	s for	your	conter	ntion i	s NUREG 04	74, whatever
5	fact	s are	cont	ained i	in ther	e pertinen	t to this
6	cont	entio	on and	this b	book, "	The Silent	Bomb"?
7		Α.	No, I	think	there'	s testimon	y by the
8	Gene	eral E	Electr	ic engi	ineers	named Mino	r ,
9	Brid	lenbau	igh an	d Hubba	ard in	1976 as we	11.
10		Q.	What	did the	ey say	in their t	estimony?
11		А.	That	suppre	ssion p	ool swell	was a
12	prot	olem	for th	ne Mark	III sy	stem.	
13		Q.	What	did th	ey base	that conc	lusion on?
14		А.	At th	ne mome	nt, I d	lon't know.	
15				MR. NE	WMAN:	You said t	hey
16	ide	ntifi	ed the	e probl	em. Wh	at was the	e nature of
17	the	prob	lem th	ney ide	ntified	۱.	
18		Α.	That	in the	event	of blow-do	own, the
19	wat	er in	a Mai	rk III	contair	iment syste	em would rise
20	and	load	on s	afety c	omponer	nts in the	reactor
21	bui	lding					
22				MR. NE	WMAN:	Did they	specify tip
23	sys	tem,	T - I - P	?			
24		Α.	No,	I don't	belie	ve they di	d, but I'm
25	not	cert	ain.	I just	don't	believe s	0.
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	그는 것이 다 같은 것 같은
1	Q. (BY MR. BIDDLE): Then, am I correct, Mr.
2	Doherty in assuming that the only basis for your
3	contention is whatever facts that are relevant
4	are contained in NUREG 0474, the book "The Silent
5	Bomb" and the testimony by the GE engineers?
6	A. Yes, for the time being, yes.
7	Q. That is the basis of your contention now?
8	A. Seems to me that's where I located
9	almost all the material that went into this.
10	Q. You have no other facts to support this
11	contention; is that true?
12	A. I need to refresh my memory a minute.
13	Also, do you want to go back on or in addition,
14	there is a memorandum which I have received from
15	the Union of Concern Scientist that is
16	essentially a part of at least the document from
17	Dr. Stephen Hanour, then of the AEC, dated
18	September 20th, 1972 which does mention a
19	tendency of overcrowding and limitation of access
20	to reactor and primary system components for
21	surveillance and in-service testing.
22	Q. What has that got to do with suppression
23	pool uplift?
24	A. The fact that the reactor containment
25	building has been reduced in size because of the
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1	use of the pressure suppression system.
2	C. What has that got to do with the
3	loadings exerted by suppression pool uplift?
4	A. This says that at the moment, the type
5	of system has the problem of overcrowding and
6	limitation of access and
7	Q. That reference there is to the Mark III
8	system?
9	A. I believe it is, yes.
10	Q. Does this have anything to do with
11	loadings exerted by suppression pool uplift?
12	A. Yes, it does.
13	Q. What?
14	A. Because it says that since these devices
15	have to be placed somewhere, they have been
16	crowded near the top of the pressure suppression
17	pool
18	Q. Where does it say they have been crowded
19	near the top of the suppression pool?
20	A. All right, it doesn't say that, but it
21	does say
22	Q. You just told me that it did say that.
23	A. That's right. All right. I say that.
24	Q. Is there anything in that document that
25	you're reading from there now make any reference
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1	to suppression pool uplift loadings? Did you
2	understand my last question?
3	A. Yes, sir.
4	Q. Could you answer then this question, Mr.
5	Doherty. Are the words suppression pool uplift
6	ever used in that document you were just reading?
7	A. I didn't see them in looking through it
8	just now, Mr. Biddle.
9	Q. Would you tell me what the tranversing
10	end core probe system is?
11	A. Oh, I think it's an information system,
12	sort of like a mobile, sort of like a mobile LOCA
13	power range monitor. It can be moved around.
14	Q. So this system is used to measure
15	neutron flux when the reactor is operating and is
16	capable of moving about the core; is that your
17	understanding.
18	Q. That's my understanding of it, yeah.
19	Q. Could you describe it physically?
2.0	A. No.
21	Q. Do you know where it's located?
22	A. Part of it. Part of it is located in
23	the containment building near the concrete,
24	apparently that's concrete support for the
2 5	reactor vessel.

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	주말 물감 이 같은 것 같은 것이 같은 것이 같은 것 같은 것 같은 것 같은 것
1	Q. Can you tell me what elevation that is?
2	A. 145 feet, 145 feet and three inches I
3	guess is the way that could be read.
4	Q. Is this the component you're concerned
5	about in your contention as experiencing a load
б	from suppression pool uplift?
7	A. Yes, that's one of them.
8	Q. That is the tranversing end core probe
9	that you reference in your contention located at
10	elevation 145 feet, roughly?
11	A. Yeah, that's the one. The drive units
12	are located somewhere between 142 and a half feet
13	and 145 feet three inches. At the appear to be
14	142, well, let's say 143 feet.
15	Q. So I understand you to say that you're
16	concerned about the impact on these two
17	components, both of which are above elevation
18	approximately 143 feet.
19	A. The bottom of one appears to be 143 feet
20	from sea level.
21	Q. So the answer to my question is yes?
22	A. Yes.
23	Q. Can you tell me the role of the
24	tranversing end core probe system in preventing
2 5	accidents?
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A. I think when people decide safety . 1 equipment like this is needed, that I'm concerned. 2 Q. So you have no direct knowledge of its 3 importance; you're relying only on the fact that 4 it is, in fact, installed? 5 A. I think I indicated earlier that it was 6 used to give information about LOCA conditions in 7 the core and that is some information I have. 8 Q. And that is the basis of your concern 9 that it might be damaged is that you will lose 10 this information in the core? 11 A. Yes. 12 Q. Can you describe for me the function of 13 the control rod drive mechanism, hydraulic units? 14 A. Only that it appears to be an important 15 part of the entire control rod mechanism. 16 Q. Why does it appear to you to be an 17 important part? 13 A. It appears to be -- control rod drive 19 unit, the control rods are essential for 20 controlling the reactor. 21 Q. Well, that might be an answer to another 22 question, but mine was: What is the importance 23 or the function of the control rod drive 24 mechanism, hydraulic unit? 25 34 INTERNATIONAL COURT REPORTERS, INC.

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1	A. I don't know the exact funct:	ion of it,
2	but it appears to be significant to t	he movement
3	of control rods.	
4	Q. What gives that appearance?	
5	A. Drive.	
6	Q. What gives that appearance?	
7	A. Drive, the word drive.	
8	Q. Oh, the word drive in the na	me drive?
9	A. Yes.	
10	Q. So the important to you of t	his
11	contention as to these components is	the fact
12	that the word drive is included in th	ie name,
13	control rod drive mechanism, hydrauli	c unit?
14	A. That's part of it. Control	rod is
15	이번 김 씨는 집에서 가장에서 가장에서 가지 않아야 한 것이 없는 것이 가지 않는 것이 없는 것이 없는 것이 없는 것이 없다.	
16	Q. So you derive all of the imp	portance of
17	these components in this contention	from the
18		
19		
20		
21	know a little bit more about what th	e control rod
22	drive mechanism does in order to dis	cuss the
23	같은 것 같은 것 같아요. 아이들 것 같이 많이	
24	Q. My question to you was exac	tly that.
2 5	5 Would you tell me what you understan	id to be the - 35

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	1917년 - 1919년 - 1917년 - 1917년 - 1917년 -	
1	fu ation of the control rod drive mechanism	
2	hydraulic unit?	
3	A. At the moment, I don't understand its	
4	function.	
5	Q. And therefore, the only importance yo	u
6	attach to it is that derived from the words us	ed
7	in the label, control rod drive mechanism,	
8	hydraulic unit; is that correct?	
9	A. All right, that's correct.	
10	Q. I'd like to recap briefly, is it my	
11	understanding that you do not know what load w	i 1 1
12	be exerted by suppression pool uplift on the	
13	floor which supports either the tranversing en	đ
14	core probe or the control rod drive mechanism,	
15	hydraulic units?	
16	A. Yes, I think that was my answer to	
17	question B-2 in your interrogatories.	
18	Q. Do you know what the design loading f	or
19	those floors are?	
20	A. Not at the moment.	
21	Q. Do you contend that these floors can	ot
22	absorb the impact of suppression pool swell up	
23	lift, whatever that might be?	
24	A. Yes, at the moment.	
25	Q. What is the basis for that contention	1?

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3	A. That under previous books that I've	
2	indicated to you, that there was a problem along	
3	this line and if the floor was sufficient, there	
3 4	wouldn't have been a problem.	
5	Q. Did you identify any problems other than	
6	those experienced, supposedly experienced in the	
7	Mark I and the Mark II?	
а	A. Say again?	
3 9	Q. Did you identify any problems other than	
10	those supposedly experienced by the Mark I and	
11	Mark II systems?	
12	A. I haven't been able to reference some of	
13	the problems about Mark III which were mentioned	
14	in this book.	
15	Q. Which book is that?	
16	A. Yes, let me look at the title. "Silent	
17	Bomb".	
1 18	Q. Would you give me the author and the	
19	date of that book?	
20	A. I'll do my best. All right. The date	
21	is 1977. I am trying to remember the author's	
22	name.	
23	Q. It's not indicated on that flap edge?	
24	A. This is just xeroxing some of the	
25	chapters, so it doesn't seem to be right handy.	
3	3	7