

OFFICIAL TRANSCRIPT PROCEEDINGS BEFORE

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:

LONG ISLAND LIGHTING COMPANY

(Shoreham Nuclear Power Station

Unit 1)

)
)
) Docket No. 50-322-OL-3
)
)
)

DEPOSITION OF STANLEY G. CHRISTENSEN

Hauppauge, New York

Wednesday, May 23, 1984

8407130231 840710
PDR ADOCK 05000322
Q PDR

AR
ALDERSON REPORTING

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
Before the Atomic Safety and Licensing Board

-----X
:
In the Matter of: :
:
LONG ISLAND LIGHTING COMPANY : Docket No.
(Shcreham Nuclear Power Station, : 50-332-01-3
Unit 1) : (Emergency
: Planning)
-----X

Hauppauge, New York
Wed., May 23, 1984

DEPOSITION OF STANLEY G. CHRISTENSEN,
called for examination by counsel for ILLCC in the
above-entitled action, pursuant to notice, the witness
having been duly sworn by NICHOLAS TORRE, a Notary
Public in and for the State of New York, at the offices
of the Suffolk County Executive, H. Lee Dennison
Building, Veterans Highway, Hauppauge, New York, at
10:00 a.m., the proceedings being taken down by
Stenotype by NICHOLAS TCERE, and transcribed under her
direction.

1 APPEARANCES:

2 On behalf of Suffolk County and the Witness:

3 MICHAEL S. MILLER, ESQ.
4 Kirkpatrick, Lockhart, Hill, Christopher,
5 & Phillips
6 1900 M Street, N.W.
7 Washington, D.C. 20036

8 On behalf of Long Island Lighting Company:

9 ODES L. STROUPE, ESQ.
10 Hunton & Williams
11 333 Fayetteville St.
12 P.O. Box 109
13 Raleigh, N.C. 23212

14 On behalf of Transamerica Delaval, Inc.:

15 DAVID E. ROSS, ESQ.
16 PETER A. RAGCNE, ESQ.
17 Guggenheimer & Untermeyer, Esqs.
18 80 Pine Street
19 New York, N.Y. 10005

20 ALSO PRESENT:

21 SIMON K. CHEN, President
22 PEI Consultants

C O N T E N T S

1			
2	<u>Deposition of:</u>	<u>Examination by Counsel for</u>	
3		<u>LILCO</u>	<u>NRC STAFF SUFFOLK COUNTY</u>
4	Stanley G. Christensen		
5	By Mr. Stroupe	4	
6	By Mr. Patterson		201
7	By Mr. Miller		220
8	By Mr. Stroupe	223	
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			

1 S T A N L E Y G. C H R I S T E N S E N, having
2 been previously sworn, was examined and
3 testified further as follows:

4 MR. STROUPE: We are continuing this
5 deposition, so the witness need not be sworn.

6 EXAMINATION (cont'd) BY MR. STROUPE:

7 Q Prof. Christensen, you recall, I take it,
8 on May 8th and 9th, I took your deposition out in
9 California.

10 A Yes.

11 Q You and I discussed certain components in
12 the Transamerica Delaval engines at Shoreham. You
13 recall those discussions, generally?

14 A Yes. Generally.

15 Q I will ask you, had we, in fact,
16 discussed pistons, crankshafts, and cylinder heads?

17 A I can't recall now, sir, exactly what we
18 had discussed then.

19 Q That is my best recollection, so that I
20 will try not to go over anything that we have already
21 discussed, except for a couple of areas that I have
22 specific questions on.

1 I will ask you this question. You had
2 indicated to me at the outset of the deposition, that
3 deposition, at the start, that you were looking at a
4 number of components. I believe you read over a list of
5 the so-called 16 components, and you had indicated to me
6 that you were going to be looking at most, if not all,
7 of those components.

8 I will go through some of the components
9 and see if I can get any conclusions or opinions that
10 you have come to with regard to some of the.

11 Sir, do you have an intention to examine
12 connecting rods and/or connecting rod bearings?

13 A Yes.

14 Q We will take connecting rods themselves,
15 first, please, sir.

16 Have you had an opportunity to form any
17 preliminary opinion as to the reliability of the
18 connecting rods in the Shoreham EDG's?

19 A Yes, my preliminary opinion was that the
20 area around the bottom end bearing was weak in certain
21 areas.

22 Particularly, this is so in the area of

1 earlier, which were taken from a list of 16, I believe.
2 The five things that I was most interested in were what
3 I would call critical high priority areas: Crankshaft,
4 connecting rod and connecting rod bearings, the pistons,
5 cylinder heads, cylinder block.

6 I think that makes up the five.

7 Q Do you have, sir, an order of priority
8 among these five components? Do you treat them as of
9 equal significance?

10 A Well, no, obviously to me, if there is
11 any failure of the crankshaft, the whole engine is
12 gone. If there is a failure of a cylinder cover, only
13 part of it is gone.

14 I would fix my priorities in that area.
15 If a cylinder cover cracks, you may lose the entire
16 engine from a hydraulic lock situation in starting.

17 You have buckled the shaft, bent main
18 bearings and you have a disaster on your hands.

19 Q If we can talk about the cylinder heads
20 for a second, you are aware, are you not, that LIICC Has
21 instituted a barring over procedure, with regard to
22 attempting to detect water in the cylinders of the TDI?

1 A Yes, I am aware of that.

2 Q You have an opinion as to whether that
3 procedure will enable IILCC to detect water in the
4 cylinder?

5 MR. MILLER: Do you have a copy of the
6 barring procedure that you are referring to?

7 MR. STRCUPE: No.

8 MR. MILLER: You are asking the witness
9 from memory to discuss the procedure with you?

10 MR. STRCUPE: Yes. The record should
11 reflect in the witness' deposition taken in July of
12 1983, he discussed it in fairly much detail, with the
13 person deposing him at that time.

14 I believe he has a copy of that
15 procedure, or he had a copy of that procedure at a time.

16 MR. MILLER: No reason to dispute that.
17 I would point out that was July of 1983. This is almost
18 June of 1984.

19 I am not sure if the witness has even
20 seen the procedure since last summer.

21 If you wish to question about the
22 procedure, why not show him a copy of it.

1 MR. STRCUPE: I don't have a copy. Mr.
2 Dynner spent many portions of days this week and last
3 asking the witness, witnesses, about various things of
4 which he didn't furnish copies.

5 I would like an answer to the question.

6 I will try hard to ask the kinds of
7 questions that don't require the witness to give a
8 specific detail, any specific details of these things.

9 I am asking for a general recollection.
10 If he doesn't know, he can tell me.

11 Q Are you aware of the LILCO barring over
12 procedure?

13 A I am aware of the procedure, yes.

14 Q Do you know whether it calls for barring
15 over within a certain period of time, after the engine
16 has been in operation?

17 A Yes. If I remember correctly, I think
18 that there were periods of four hours, or maybe a lesser
19 period, but a time period, time periods after running of
20 the engine, in which they would bar over, and after the
21 completion of that period, they would not proceed over
22 with the barring over procedure.

1 I did, at the time that I looked at that,
2 consider that rather dangerous from the point of view of
3 the history of the failures of the cylinder covers.

4 If a leak developed at some period
5 subsequent to the final barring over, then the engine
6 could start, and we would have a possibility of the
7 hydraulic lock situation.

8 The next thing on that was, if you have a
9 hydraulic lock situation, you have a disaster on your
10 hands.

11 Q Not to interrupt you, but I would like to
12 ask you about the disastrous results that could happen,
13 that you referred to.

14 Is it likely, Prof. Christensen, that if
15 the last barring over of the TDI diesel generators
16 occurs 12 hours after the engine has been run, that a
17 crack or indication, whatever, can thereafter leak water
18 into the cylinder, if no water is detected at the
19 12-hour mark?

20 MR. MILLER: Is it likely that would
21 happen?

22 MR. STRCUPE: Yes.

1 MR. MILLER: Would you define that,
2 likely.

3 MR. STRCUPE: That is a
4 generally-accepted term.

5 Q Do you understand "likely"?

6 A Not here, and I don't want to split
7 hairs, but when you say "not likely," I don't know
8 whether you gave me a negation of likely or not, first.

9 Q Is it probable that that can occur?

10 A There is always probability; yes, I think
11 so.

12 Q You are saying it is probable rather than
13 possible?

14 A Well, we are in a very, very awkward area
15 of definition here.

16 Are we speaking of probability in the
17 full statistical term, where I would have to go back and
18 reference the definition for the term?

19 Q I am generally using that in the sense
20 that it is more likely to happen than not, sir.

21 A I am going to say with the history we
22 have of the cylinder covers, one could consider there

1 was every possibility it might happen. I don't know if
2 that satisfies you.

3 Q Can you tell me how you would have or
4 could have a leak that would not be detected within the
5 12-hour period, that could thereafter result in water
6 entering into the cylinder?

7 A From the fact that I do believe, from
8 looking at the design of the cylinder cover, that a
9 crack, if it commences, would most likely commence from
10 the inside and move outwards. That is from the cool
11 side of the fire deck to the lower side of the fire deck.

12 I think that would be the direction of
13 propagation of a crack.

14 Now, if you had corrosion within that
15 cracked area, then there would be--it would be possible
16 for a crack to continue growing after the 12-hour period
17 of shutdown, and then for a leak to occur. Yes, it is
18 possible.

19 When I say that, possible, within the
20 realms of probability, with the case history they had,
21 they have had on these heads.

22 Q Would it not be more likely if that is

1 going to happen, it would happen within the 12-hour
2 period, immediately after the running of the engine?

3 A Not necessarily so, no.

4 Q Why is that?

5 A Well, I can give you cases of one ship,
6 one class of ship, where we were running around with
7 cracked pistons for quite a few years, and we didn't
8 know it, mainly because the crack had been sealed by the
9 chemical additives we have been using in the cooling
10 water.

11 As the crack developed, the leakage was
12 sealed off from the build-up of the chemical within the
13 crack.

14 That exacerbated the crack growth to an
15 extent.

16 Then, due to some problems that were
17 arising in another area with this cooling treatment, we
18 changed the additive we were using from a chemical
19 additive to a soluble oil.

20 Then we discovered, right through this
21 class of ship, with this class of engines, that we had
22 cracked pistons in every engine.

1 So, there are so many things which can
2 occur which will bring the crack to light and allow
3 water to leak into the cylinder head long after you
4 decided that that was a safe period to end barring.

5 I don't think there is a safe period to
6 end barring if there is a doubt, any doubt, about covers.

7 Q How long would it be your recommendation
8 that this barring over period or procedure go on with
9 the TDI engine?

10 A It is difficult to put a time on things
11 like this. Here, in a case, in these surroundings, one
12 can only generalize.

13 I think, if there is any doubt about a
14 cylinder cover, that the barring over procedure should
15 not stop at all. Of course, the answer to the problem
16 is to get a cover that is reliable, that we know is
17 reliable and has stood the test of time.

18 Then we may dispense with the barring
19 over procedure entirely.

20 Q Do you know whether the NRC has recently
21 issued guidelines which indicate that barring over
22 procedure for nuclear service EDG's should take place at

1 the same levels that LILCO barring over procedure is
2 designed to do?

3 A I wouldn't know what they had issued
4 recently, no.

5 Q This corrosion that you described as
6 affecting crack propagation, that could only occur if
7 the crack or indication occurs on the waterside of the
8 head?

9 Isn't that true?

10 A I am mainly thinking of it in this area,
11 yes. I am not going to say that a crack couldn't
12 propagate from the other side.

13 I think I can see mechanisms whereby this
14 could occur, but I would have to think that out. As to
15 that possibility.

16 Q Since we are on the subject of cylinder
17 heads, let me ask you a few more questions about that:

18 You have stated, I believe, and correct
19 me if I am wrong, in your previous deposition with me,
20 that you very much wanted to obtain an isothermal of the
21 TDI cylinder head on the Shoreham EDG's?

22 A I said that would be extremely desirable,

1 that we have those.

2 Q I believe, did you not, that you
3 indicated to me that you didn't understand why TDI
4 didn't have that available?

5 A That was the belief that I had expressed,
6 yes.

7 Q Now, you had an opportunity, did you not,
8 to attend Dr. Chen's deposition in Washington, D.C.,
9 last week?

10 A I did hear that, yes.

11 Q Did you have occasion to hear Dr. Chen's
12 discussion regarding doing an isothermal study of a
13 cylinder head such as the TDI heads on the Shoreham
14 engines?

15 A I was very much surprised that he decried
16 any experimentation along these lines.

17 I was most surprised, and if memory
18 serves me correctly, I believe he said it was more or
19 less a waste of time and a very, very costly process and
20 was not cost effective in answering problems. I
21 completely disagree with his views.

22 Q Didn't he say that it might cost a

1 million dollars and would take several years for a large
2 group of PhD's to attempt to do?

3 A I don't think it takes a large group of --

4 Q Isn't that what you recall his testimony
5 to be, though, sir?

6 A That was his testimony, but I recall that
7 testimony was, if you were going to try to do this
8 mathematically. What I am going to say, this is usually
9 done experimentally in the areas that I know that it has
10 been done.

11 Also where I know it has been done, it
12 has been done out of sometimes problems arising in
13 areas, and in doing research so they can draw up a set
14 of isothermals, where they have found the answer to the
15 problem and have modified it.

16 Now, usually, the savings are so great
17 over the costs, that it is most cost effective. I know
18 many engine builders do these studies, both by
19 calculation and experimental method.

20 Q Have you, Professor Christensen, ever
21 seen an isothermal of a cylinder head that was not
22 related to a two-cycle engine?

1 A Yes. I have seen isothermals for
2 two-cycle and four-cycle engines.

3 Q What four-cycle engines can you recall
4 having seen an isothermal of the cylinder head for?

5 A Recently, I have seen some for an engine
6 -- I can't recall which engine, but they are shown in
7 many, many textbooks. Examples of isothermals for
8 engines.

9 I think there are isothermals of
10 four-stroke engines shown in a book that I mentioned
11 earlier, "Diesel Engines," authorized by Carl Stinson.

12 I think there are some American-built
13 engines there where isothermals are shown, if I remember
14 correctly.

15 Q Would you tell me how you would attempt
16 to do an isothermal of a TDI cylinder head?

17 A Well, no, I have not investigated that.
18 I am sure that there must be ways and means.

19 Q You say you are sure there are ways and
20 means. Why are you sure there must be ways and means?

21 A Well, one of the things which happens
22 with the TDI engine cylinder head, there are weaknesses

1 in that head which make them go to the extent of welding
2 on the covers which cover the core holds or the core
3 fastenings, whereas in many, many other engines that is
4 a bolted coverplate which can be removed.

5 If you are going to weld on coverplates,
6 you would introduce difficulties. This comes back to
7 what I call excellence in design in the first place.

8 Q What does that have to do with ways and
9 means of doing isothermals on TDI cylinder heads?

10 A There have been lots of problems with the
11 cylinder heads. No one can deny that.

12 Q That is not the question.

13 A If there is a problem existing, then I
14 think it is incumbent upon the manufacturer to overcome
15 that problem so that he can sell a reliable engine.

16 Q I understand that. What I am asking,
17 what ways and means that you have indicated would you
18 utilize to do an isothermal of the TDI cylinder head?

19 MR. MILLER: The witness told you he
20 didn't investigate how he would do an isothermal of the
21 TDI head. He told you he has seen in textbooks,
22 isothermals of four-stroke engines, including

1 American-built engines.

2 MR. STRCUPE: He mentioned ways and
3 means. I want to know what those are.

4 THE WITNESS: Whether we start an
5 investigation of this nature, I don't have a drawing of
6 a TDI cylinder head in front of me.

7 I can't give an answer to that question
8 in a few words in a deposition. That might be a study
9 of two or three days, before I come up with an answer of
10 how I would tackle that problem.

11 Q Would you agree that the TDI head is
12 geometrically a complex component?

13 A It is a complex component, just the same
14 as the other cylinder heads have been analyzed for their
15 isothermals. No different from any of the others.

16 I don't see how a problem should exist
17 with checking out the isothermals on a TDI head any
18 different from any other engine manufacturer, who makes
19 a head of a similar design to TDI.

20 What is commonly called a four-valve
21 in-head cover or head.

22 Q Do you know whether any of these

1 isothermals that you have described having seen in texts
2 or publications attempted to determine the isothermals
3 of various areas within the cylinder head?

4 A Yes. Obviously, the main areas of
5 concern in the cylinder head are where you get changes
6 in section; where you get a high to a low heat transfer
7 rate; these are areas which would be considered.

8 To bring things out of my head, it is
9 difficult at this point in time. In this very, very
10 complex area, we are talking about, to bring things out
11 -- well, as I am going to say and/or repeat, where this
12 has usually been done, it has been done in some cases,
13 in the realm of pure research where an engine builder
14 wants to know more about his engine, and in other cases,
15 in problem areas.

16 I believe I have seen in technical papers
17 on troubleshooting that they have investigated localized
18 areas of isothermals to get answers to problems.

19 I don't know whether I have drifted off
20 the question in giving the answer, or whether I have
21 headed on course and given you the answer that you
22 wanted.

1 Q Have you ever done an isothermal of any
2 cylinder head?

3 A No.

4 Q Have you ever attempted to do an
5 isothermal of a head?

6 A No, I have never had occasion to.

7 Q And that would be both experimentally and
8 mathematically?

9 A Neither way, no.

10 Q Have you ever been involved in a team
11 effort, sir, which attempted to do an isothermal of a
12 cylinder head?

13 A No, but I have spoken to engine
14 manufacturers in this area if isothermals.

15 So that, I think I can say that I am
16 acquainted with quite a few of the problems which arise.

17 Q Would you agree with me, sir, that doing
18 an isothermal on a two-cycle engine would be easier than
19 doing an isothermal on a four-cycle engine?

20 A You would have to define the method of
21 scavenging the cylinder before I give you an answer to
22 that question.

1 Q What do you mean, "scavenging"?

2 A The way the exhaust gasses are removed
3 and the way the air is brought into the cylinder.

4 Q Take a Sulzer engine. Would it be much,
5 much less difficult to do an isothermal on the Sulzer
6 head than to do an isothermal on the TDI head?

7 A I would say that Sulzer manufacturers
8 engines today in which both types of head are there.
9 One with one form of scavenging, and another with
10 another. You will have to tell me which engine.

11 I would have to know whether it was an
12 RTA engine type or one of the other types. Whether a
13 M-type, or an earlier type than M.

14 There are so many different types of
15 design for cylinder covers for the Sulzer, you can go
16 back to Sulzer engines with an identical cylinder cover
17 to the TDI.

18 You would have to define that for me.

19 Q Regardless of scavenging, would you not
20 agree with me it is easier to do an isothermal of a
21 two-cycle engine cylinder head, as opposed to an
22 isothermal of the four-cycle cylinder head existent upon

1 the TDI diesels at Shoreham?

2 A Do you want a journalization or to be
3 specific?

4 Q I would like a yes or no, and then you
5 can specify or journalize.

6 A I can't give you a yes or no answer. It
7 has to be an answer where I have to define things, and
8 where you would have to define things to me.

9 I can go and show you a two-stroke engine
10 which has almost an identical cylinder cover to the TDI
11 engine. There are so many different designs of cylinder
12 covers, that I would have to know which type of cylinder
13 cover you talk about, to give you a complete answer.

14 Definitely, if you want a yes or no
15 answer, I would have to know the type of cover.

16 Q How about a looped scavenging Sulzer
17 engine?

18 A Where are we going back to now, ten or
19 fifteen years ago?

20 Q Take at the present time.

21 A Present looped scavenging engine. Going
22 to a bore-cooled head or a normal hollow head?

1 Q Take the bore-ccled head.

2 A Comparatively as -- relatively as
3 compared with the TDI engine.

4 But, Sulzer's have produced isothermals
5 for their heads with four valves in the head, where the
6 head is almost identical to the TDI engine. I don't --
7 there is obviously -- obviously, some engines have a
8 head easier to design than others.

9 Q You don't know how long it took Sulzer to
10 produce the isothermal of the head that is comparable to
11 TDI's or a four-cylinder head, do you?

12 A I don't know, no.

13 I do know this, they considered it
14 prudent to make an investigation along these lines.

15 That is irrespective of what it cost or
16 how long it took.

17 Q Would I be correct in assuming that your
18 bottom line would be that you disagree with what Dr.
19 Chen indicated about the difficulty in doing an
20 isothermal of the R-4 cylinder head?

21 A I don't disagree with the difficulties.
22 Many things in life are difficult. I do disagree with

1 his statements in regard to cost effectiveness and other
2 things there, particularly in the area of cost.

3 So much depends on how many engines we
4 are making in a year. I know this that if I were an
5 engine builder, I would want to protect my good name.

6 I would certainly make it my business to
7 find out as much as I could about my engines, so that I
8 have the best reliability possible.

9 Q You don't feel you would know that unless
10 you had an isothermal of the cylinder head?

11 A I feel that the isothermal of the
12 cylinder head would give you an answer to many of the
13 problems that have been experienced with these heads.

14 Q If we can jump to pistons for a few
15 minutes.

16 A Fine.

17 Q I am somewhat of a novice in this area.
18 You indicated, I believe, in your prior
19 testimony, that you were concerned about piston size
20 loading in the TDI Shoreham diesel?

21 A Yes.

22 Q I believe you indicated that you had

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of)
)
)

LONG ISLAND LIGHTING COMPANY)

Docket No. 50-322-OL

(Shoreham Nuclear Power Station,)
Unit 1))
_____)

CERTIFICATE OF SERVICE

I hereby certify that copies of SUFFOLK COUNTY'S MOTION FOR RECONSIDERATION OF PORTIONS OF BOARD'S JULY 5 EDG ORDER, dated July 10, 1984, have been served on the following this 10th day of July 1984 by U.S. mail, first class, except as otherwise indicated.

Lawrence J. Brenner, Esq.*
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. George A. Ferguson*
Administrative Judge
Atomic Safety and Licensing Board
School of Engineering
Howard University
2300 6th Street, N.W.
Washington, D.C. 20059

Dr. Peter A. Morris*
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Edward M. Barrett, Esq.
General Counsel
Long Island Lighting Company
250 Old Country Road
Mineola, New York 11501

Mr. Marc W. Goldsmith
Energy Research Group, Inc.
400-1 Totten Pond Road
Waltham, Massachusetts 02154

Mr. Stuart Diamond
Business/Financial
NEW YORK TIMES
New York, New York 10036

W. Taylor Reveley, III, Esq.
Hunton & Williams
P.O. Box 1535
707 East Main Street
Richmond, Virginia 23212

Mr. Jay Dunkleberger
New York State Energy Office
Agency Building 2
Empire State Plaza
Albany, New York 12223

James B. Dougherty, Esq.
3045 Porter Street, N.W.
Washington, D.C. 20008

Robert E. Smith, Esq.
Guggenheimer & Untermeyer
80 Pine Street
New York, New York 10005

Mr. Brian R. McCaffrey
Long Island Lighting Company
Shoreham Nuclear Power Station
P.O. Box 618
North Country Road
Wading River, New York 11792

Joel Blau, Esq.
New York Public Service Commission
The Governor Nelson A. Rockefeller
Building
Empire State Plaza
Albany, New York 12223

Martin Bradley Ashare, Esq.
Suffolk County Attorney
H. Lee Dennison Building
Veterans Memorial Highway
Hauppauge, New York 11788

Atomic Safety and Licensing Board
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docketing and Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
1717 H Street, N.W.
Washington, D.C. 20555

Bernard M. Bordenick, Esq.*
Edwin J. Reis, Esq.
Richard J. Goddard, Esq.
Office of Exec. Legal Director
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Stephen B. Latham, Esq.
Twomey, Latham & Shea
P.O. Box 398
33 West Second Street
Riverhead, New York 11901

Mr. Frank R. Jones
Deputy County Executive
H. Lee Dennison Building
Veterans Memorial Highway
Hauppauge, New York 11788

MHB Technical Associates
1723 Hamilton Avenue
Suite K
San Jose, California 95125

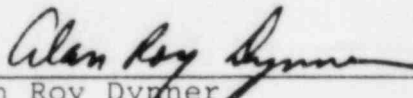
Hon. Peter F. Cohalan
Suffolk County Executive
H. Lee Dennison Building
Veterans Memorial Highway
Hauppauge, New York 11788

Fabian Palomino, Esq.#
Special Counsel to the
Governor
Executive Chamber
Room 229
State Capitol
Albany, New York 12224

Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Jonathan D. Feinberg, Esq.
Staff Counsel
New York State Public
Service Commission
3 Rockefeller Plaza
Albany, New York 12223

Stewart M. Glass, Esq.
Regional Counsel
Federal Emergency Management
Agency
26 Federal Plaza
New York, New York 10278



Alan Roy Dynner
KIRKPATRICK, LOCKHART, HILL,
CHRISTOPHER & PHILLIPS
1900 M Street, N.W., Suite 800
Washington, D.C. 20036

DATE: July 10, 1984

By Federal Express
* By Hand Delivery