

NUCLEAR REGULATORY COMMISSION

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In the Matter of:

MEETING WITH <sup>AIF</sup> ~~NER~~ ON THE FUTURE OF  
NUCLEAR POWER PLANTS

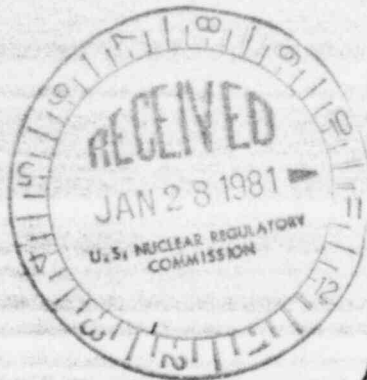
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DATE: January 21, 1981

PAGES: 1 thru 82

AT: Washington, D.C.



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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

MEETING WITH <sup>AIF</sup> ~~AIR~~ ON THE FUTURE OF NUCLEAR POWER PLANTS

PUBLIC MEETING

Nuclear Regulatory Commission  
Room 1130  
1717 H Street, N. W.  
Washington, D. C.  
Wednesday, January 21, 1980

The Commission met, pursuant to notice, at  
10:00 a.m.

BEFORE:

JOHN F. AHEARNE, Chairman of the Commission  
VICTOR GILINSKY, Commissioner  
JOSEPH M. HENDRIE, Commissioner  
PETER A. BRADFORD, Commissioner

STAFF PRESENT:

LEONARD BICKWIT, General Counsel  
JOSEPH FOUCHARD, Director, Office of Public Affairs

AIF PARTICIPANTS:

FRANCIS M. STRASZESKY  
President, Boston Edison Company and  
Chairman of the Atomic Industrial Forum  
  
FLOYD L. CULLER  
President, Electric Power Research Institute

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GORDON C. HURLBERT  
President, Power Systems Company,  
Westinghouse Electric Corporation

HERMAN R. HILL  
Executive Vice President, Power Systems Sector,  
General Electric Company

CARL WALSKE  
President, Atomic Industrial Forum

\* \* \*

DISCLAIMER

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CHAIRMAN AHEARNE: The Commission meets this morning, and there are lots of comments I could make about new starts, et cetera, et cetera, et cetera, but I will put all of those aside and instead Mr. Fouchard will open the meeting.

MR. FOUCHARD: As the Commission knows and others at the table know in the Office of Public Affairs we have mounted a modest effort to broaden the outreach of the Commission and its staff with various segments of the people and organizations that are interested in the activities of the NRC.

So when Carl Walski's letter dated November 3rd came in requesting a meeting with the Commission to discuss a number of matters bearing upon the future of nuclear regulation we welcomed the letter and also decided that in addition to hearing from this group of distinguished persons in a couple of weeks we are requesting some other organizations with possibly some different perspectives to come in and give us their views on the general subject of the future of nuclear regulation.

With that opening, Carl, I will ask you to introduce the people at the table.

MR. WALSKI: Our Chairman, Mr. Staszkesy will do that.

1           CHAIRMAN AHEARNE: Before Carl starts I have to  
2 comment on Carl's great success in having this be the  
3 opening meeting following the inauguration of the new  
4 President.

5           (Laughter.)

6           MR. WALSKE: We also arranged the hostage release  
7 at the same time.

8           (Laughter.)

9           CHAIRMAN AHEARNE: Frank.

10                           INTRODUCTORY REMARKS BY  
11                           FRANCIS M. STASZESKY  
12                           PRESIDENT, BOSTON EDISON COMPANY  
13                           AND CHAIRMAN OF THE ATOMIC INDUSTRIAL FORUM

14           MR. STASZESKY: Well, Mr. Chairman, although you  
15 may not wish to give any remarks about a new start,  
16 certainly we are hoping that we will have a new start and we  
17 want to talk about the importance about why we believe a new  
18 look is desirable from the point of view of the future  
19 electric supply of our country.

20                           We do appreciate the opportunity to meet with you  
21 and your colleagues for a discussion of the long-term  
22 outlook for additional nuclear power plants.

23                           I am Frank Staszsky. I am here today in the  
24 capacity as Chairman of the Board of Directors of the Atomic  
25 Industrial Forum. I am also President of the Boston Edison

1 Company.

2           With me today are Floyd L. Culler, second on the  
3 left here, and I am sure you know him, President of the  
4 Electric Power Research Institute, who will make a  
5 presentation on EPRI's studies of long-term requirements for  
6 energy and electricity.

7           Gordon Hurlbert on my right is President of the  
8 Power Systems Company of the Westinghouse Electric  
9 Corporation and will discuss his company's views on future  
10 nuclear power growth.

11           Herman Hill on my left is Executive Vice President  
12 for the Power Systems Sector of the General Electric Company  
13 and will discuss his company's views on future nuclear power  
14 growth.

15           As you have recognized, Carl Walske is also with  
16 us. He is President of the Atomic Industrial Forum.

17           While we did not request this meeting today to  
18 discuss the impact of regulation on the nation's operating  
19 reactors or on those in the pipeline, I would be remiss if I  
20 did not emphasize the high priority that we do attach to the  
21 continued safe operation of the operating plants and to the  
22 timely completion of those in the pipeline.

23           However, today we want to look further into the  
24 future and certainly beyond the approximate 55 gigawatts of  
25 operating reactors and some 90 gigawatts of additional

1 reactors scheduled for initial operation in the Eighties.

2           While there are approximately another 20 gigawatts  
3 of nuclear capacity committed already for initial operation  
4 in the Nineties, we shall argue that the nation's energy  
5 needs require that considerably more nuclear capacity than  
6 that come into service in the Nineties, nuclear reactors  
7 that must be ordered by utilities and licensed by the  
8 Nuclear Regulatory Commission in the Eighties.

9           The general thrust of our discussion, which Floyd  
10 Culler will initiate, will be first to examine total U. S.  
11 energy demands for the Year 2000 under scenarios that take  
12 full account of conservation possibilities.

13           Then we shall consider the possible contributions  
14 of other energy sources to our energy requirements and  
15 derive from that the range of our needs to be supplied  
16 basically by coal and nuclear.

17           Consideration of coal's potential contribution  
18 will in fact leave us with an additional demand which must  
19 be met by nuclear electricity under several assumptions.

20           The amount of additional electricity generation  
21 from coal and nuclear for which we shall argue will leave  
22 two important questions:

23           First, are we presently headed in the direction of  
24 using such increased supplies, and;

25           Second, are the nation's utilities currently able

1 to undertake such a large expansion.

2           The answer to both is unfortunately "No". This is  
3 a contradiction, and we believe it is perhaps the nation's  
4 most important unaddressed energy problem.

5           We are hopeful that the new Administration and the  
6 Congress will give it the attention it needs. Certainly we  
7 intend to work to assist in bringing that about.

8           As to the first question, our nation actually  
9 needs additional electricity for use in many promising and  
10 badly neglected applications which are both attractive and  
11 economic: electrically driven heat pumps for space heating  
12 and cooling, electrified mass transit and soon the electric  
13 automobile and in numerous industrial uses.

14           Such programs require the general education of our  
15 people as to their desirability and in fact their necessity  
16 since all of these applications can displace oil and natural  
17 gas which are dwindling resources that can be better used  
18 for other important national needs.

19           As to the second question, the electric utilities  
20 can carry out the necessary construction program provided  
21 financial problems are considerably eased.

22           First, construction times must be shortened and  
23 made predictable by increasing the efficiency of the  
24 regulatory process. That can cut costs.

25           We must also bring to an end the necessity to

1 review issues that have already been reviewed and presumably  
2 settled.

3 NRC's regulatory processes should be able to stand  
4 the test of yielding a clear-cut benefit in the form of  
5 increased safety or improved reliability of safety systems  
6 commensurate with the dollars and other resources expended.  
7 Expenditures that cannot meet this test do little more than  
8 contribute to an already spiraling inflation.

9 We believe all of these problems are solvable and  
10 if we solve them the nation can meet its energy needs.

11 After Mr. Culler's remarks Messrs. Hurlbert and  
12 Hill will deal with our subject from the viewpoint of the  
13 two leading reactor suppliers of our nation.

14 So first, with your permission, Mr. Chairman, Mr.  
15 Culler will lead off.

16 CHAIRMAN AHEARNE: Certainly.

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1 there a market for nuclear power? We have based our  
2 extrapolations and our views of what will be needed on the  
3 premises that you will find on page 14 and with the firm  
4 understanding, inspite of much debate, that both energy and  
5 GNP and jobs are coupled more loosely now than in the past.  
6 In the summary you will see that we have followed the  
7 decoupling of total energy and the GNP.

8           There is one thing that we have noted which I  
9 would like to call to your attention. During this period of  
10 total energy decoupling the increased use of electricity  
11 with respect to GNP has been constant. It is particularly  
12 true in the industrial sector. It is true in the  
13 residential sector.

14           This is a result of pressures coming from several  
15 sources. No. 1, there is substitution going and  
16 electricity, because it is sort of a common denominator  
17 energy form, is one of the substitutes being introduced even  
18 in the residential and commercial sectors.

19           Secondly, electricity is the muscle of industry.  
20 The modernization of steel of most industries and  
21 conservation has occurred in many cases and substitution by  
22 using electricity for broader uses than previously possible  
23 when oil and gas were used.

24           CHAIRMAN AHEARNE: You say that link has been  
25 maintained even in abstention?

1           MR. CULLER: Yes. There is a difference between  
2 the plots for total energy and for electricity. These are  
3 illustrated in the overview and strategy main document which  
4 I will be delighted to show you after the meeting.

5           Basically our studies have been done in a  
6 systematic way that corresponds to most accepted practice.  
7 There are certain premises that I should call to your  
8 attention.

9           First, we believe that electricity is necessary  
10 and energy is necessary to maintain the economy and that it  
11 is our job as generators of electricity and providers of  
12 energy to provide enough energy to avoid adverse social and  
13 economic effects. Prudent planning would proceed basically  
14 with the assumption that energy, a seven or eight percent  
15 factor in total GNP, should not constrain the rest of the  
16 economy and that energy itself should be sufficient at any  
17 time to allow the economy to move as it should. It should  
18 not be the constraint.

19           I will be discussing two scenarios, our  
20 intermediate and low case, where we are reasonably certain  
21 that energy is the constraining effect on the economy at  
22 least from the econometrics that we and others have done.

23           The second presumption is that over the period of  
24 the next 20 to 30 years that it is in the national interest  
25 to reduce dependence on foreign oil and to conserve oil and

1 gas for the special purposes for which it is best suited.  
2 That is religion in the world today.

3 That conservation is essential is illustrated by  
4 the assumptions. I will refer to our treatments of  
5 conservation, but growth is necessary to accommodate a  
6 larger work force and to accommodate the social expectations  
7 of the larger force and that growth itself is forced by  
8 these two variables primarily.

9 We think, too, that it is necessary for us to  
10 compete in international markets broadly and that the basic  
11 energy input into our industrial sector, even in  
12 agriculture, is an important element in determining costs  
13 and our competitiveness in foreign markets.

14 We assume that it is good national policy to use  
15 and to substitute of the next 30 years our more plentiful  
16 resources in the United States for those that are depleted.

17 One of the most important assumptions I think that  
18 is debated all time is that we are convinced that nuclear  
19 power is cheaper than any other source for the generation of  
20 electricity. If you will look at the blue sheets in a  
21 little section with a lot of dots on it called "Annual  
22 Electricity For A City of One Million" you will see there  
23 our comparisons of nuclear power. We think that it is 15 to  
24 25 percent less costly now in the United States and probably  
25 15 to 40 percent in other nations.

1           The blue sheet with costs is relatively  
2 self-evident. The three systems that are available to us  
3 now are at the top and those that are developing further and  
4 further out in time below. Those black dots are what the  
5 officianadoes think the targets might be for ultimate costs  
6 and the gray ones are what we think the current costs are  
7 levelized.

8           Nuclear has cost advantage. Therefore, if the  
9 utilities follow good policy baseload nuclear plants will  
10 protect the customer from larger increases in rates.

11           COMMISSIONER GILINSKI: Let me ask you do you  
12 think you have factored in realistic assumptions about  
13 regulation in both of those columns?

14           MR. CULLER: Yes, as best we can. As you know, we  
15 are reasonably current on most of the regulations that are  
16 coming and we have tried to estimate on a yearly basis.  
17 Bechtel and Fluor are going through again now this year for  
18 next year's study estimating the effects of regulations that  
19 we see coming not only from you but in coal, in solar and  
20 everything else. We try to take a ten-year-ahead view of  
21 what regulations are like to be in effect in 1988 and 1990  
22 in these estimates.

23           Now, you know what estimates are, and that is why  
24 I said initially I think these may be correct in a  
25 comparative sense but you have to be a little careful in an

1 absolute. We have tried to keep current all the time.

2 CHAIRMAN AHEARNE: In some sense are these  
3 national averages?

4 MR. CULLER: These are national averages and there  
5 are distinct differences by region. In almost every region  
6 of the United States, however, for baseload it is probable  
7 that nuclear is cheaper.

8 CHAIRMAN AHEARNE: Right, but the percentage  
9 varies.

10 MR. CULLER: The percentage varies greatly because  
11 of coal transportation or other environmental factors.

12 Incidentally, our planning is now starting on a  
13 regional basis. Ten years from now our plans will be done  
14 and accumulated from regionals rather than a national  
15 average. These are national averages in lumps.

16 COMMISSIONER BRADFORD: These are plants coming on  
17 line in '78 for coal, nuclear and gas?

18 MR. CULLER: These are essentially levelized costs  
19 over the period of the lifetime of these plants for 1978 to  
20 2007. We levelized capital and operating costs for that  
21 period. So these are plants that would be committed now and  
22 come on the line at varying times.

23 In the main overview and strategy we give you the  
24 time that we think will be required to bring them on  
25 including the development time. In the backend of this

1 summary you will find a time line for research results for  
2 the developing technology shown on the blue sheet, the very  
3 last page.

4 Now, the demand for energy and electricity is of  
5 course always open to debate. I call your attention now to  
6 page 6, figure 2, and will discuss this basically.

7 I have stated unequivocally that great uncertainty  
8 exists concerning future economic growth and its coupling to  
9 energy. We watch with two large groups of economists this  
10 coupling all the time and we maintain two energy modeling  
11 forums on the West Coast at Stanford and another back East  
12 where we review all of the models and run them against each  
13 other on problems similar to this.

14 You will note that our projections at the top of  
15 figure 2 correspond with most other energy projections being  
16 made now. The little box with total energy and electricity  
17 consumption estimates gives you a key to what others have  
18 said currently on the projected needs for total energy; the  
19 intermediate case at about 118 or 120 quad, just barely  
20 enough to keep the economy going and a low case at about 103  
21 quad which we are certain will constrain the economy  
22 significantly.

23 We think that if we are to avoid adverse social  
24 and economic effects and that if recent trends continue in  
25 the United States the United States will consume about 120



1 quads or 50 percent more energy than we are consuming now.  
2 This estimate is made up with a broad set of considerations  
3 based on demographic information, productivity and economic  
4 projections through the Year 2000 and beyond.

5           First off, our basic assumptions in demography  
6 assume the following: that the population in the Year 2000  
7 will be 260 million people and that is the choice from the  
8 United States Bureau of the Census that this is the best way  
9 to number, that the civilian work force will be  
10 approximately 120 million people.

11           We are assuming a productivity increase averaged  
12 over the next 20 years. That is basically the GNP per  
13 worker worker-hour of about 1.8 percent per year.  
14 Historically up until very recently productivity increases  
15 from 1960 through 1973 have been about two and half percent  
16 per year. Our last year's productivity index indicated a  
17 minus one-tenth of a percent and we are low compared to most  
18 other nations in the world now.

19           However, in order to make rational sense out of  
20 the economy we assumed a 1.8 percent growth. The GNP  
21 projections you will find basically in the main overview and  
22 strategy. We selected as an intermediate level \$4.25  
23 trillion for the Year 2000 and about \$3.9 trillion for the  
24 lower case. These are done econometrically and are the  
25 projections of the Economic Council in the United States.

1           We made the assumption that the GNP growth rate  
2 should sustain only the minimum national income  
3 expectation. This is a new wrinkle in our planning.  
4 Basically what we mean by minimum expectation is that the  
5 130 million work force or the 260 million people who would  
6 be living in the Year 2000 would anticipate the same income  
7 as the people in similar social status in the previous  
8 generation; no increase, no increase at all. A college  
9 educated engineer in the Year 2000 would make the same as a  
10 college educated engineer now.

11           CHAIRMAN AHEARNE: Make the same on a deflated  
12 basis?

13           MR. CULLER: No. Let me tell you what we assumed  
14 there. First we assumed that his status in the society  
15 would be relatively the same. He would be older on the  
16 average because the demographic data says that we will age  
17 as a work force. We multiplied that factor times the  
18 increase in population.

19           Secondly, there is an anticipated probably 15  
20 percent increase in the number of people who are college  
21 educated. That adds another 15 percent to the national  
22 expected income.

23           Now, we said that everybody would remain in the  
24 same slot relatively and no increase in overall levels. So  
25 this is a minimum expectation extrapolation. Secondly, if



1 the GNP is equal to the minimum expectation there is no  
2 growth in personal income and our low case, not the  
3 intermediate case, provides a zero expectation income.

4 In the past the GNP has increased from 1960 to '73  
5 at about three and a half percent per year during the same  
6 time. Retrospectively looking at the expectation it was  
7 about 1.7 percent. So that there was a 1.8 or 1.9 percent  
8 increase per year over 18 years in gross income to  
9 individuals.

10 We are making the projections which I will give  
11 you very quickly now on the basis of zero or a one and a  
12 half or one percent increase in expectation. The  
13 intermediate case is one percent and the low case is  
14 basically zero expectation. There is no increase in  
15 personal benefits. The society remains static and any  
16 adjustments between levels is done at the loss of those at  
17 the top. There is no upward movement of the whole  
18 structure.

19 Now, that gives you a base line and I don't  
20 recommend this as providing good social stability, but it  
21 does give you a minimum upon which to base projections of  
22 need for energy and that is what we did. We quantified then  
23 the gains that would be made by this national expected  
24 income. In time we will work this out but it is a  
25 reasonable and understandable tool.

1           It is necessary that I give you some assumptions  
2 concerning conservation. If you will look at page 7, figure  
3 4, you will see a little bit of our considerations there.

4           Basically the historic projection of energy growth  
5 as you know would have taken us to the Year 2000 to maybe  
6 150 or 160 quads. We are assigning to conservation the  
7 reduction below the trend line to the intermediate case or  
8 our low case and are saying that with some careful  
9 consideration we think that within the industrial sector and  
10 end-use sector that a 25 percent reduction below the  
11 historic level is necessary and probably achievable.

12           To give you some index, however, of what this  
13 reduction below trend will require, in figure 4 you will  
14 note that if we conserve 25 percent of the earlier trend the  
15 industrial sector will have to save 17 quads, and that is a  
16 38 percent increase in output productivity for each unit of  
17 production in industrial processes.

18           So far as nearly as retrospective data will yield  
19 the information it looks as though the industrial sector may  
20 have picked up 17 percent since 1973 and the easy things  
21 have been done. From now on it may be substitution of  
22 processes. In steel it will be electric furnaces because  
23 electric furnaces save 60 percent of the energy, total  
24 energy, electric furnaces and oxygen.

25           In the residential and commercial sectors, 11

1 quads. This means full insulation for 90 percent of all  
2 buildings and passive solar for 50 percent of all houses  
3 built after 1980. Forty-two percent of new homes with solar  
4 space heating and 25 percent of homes with active solar  
5 water heaters. Now, these are examples and not what we are  
6 recommending necessarily. They are there to give you some  
7 feeling for what saving that much energy means.

8           Transportation, 10 quads. That means that gas  
9 mileage of all automobiles have to be 10 to 28 miles per  
10 gallon or more.

11           So we have taken off a pretty good slice of what  
12 we think the inherent intrinsic demand in this GNP growth of  
13 meeting expected incomes might be.

14           The next important factor is to give you some  
15 feeling for what we used as the basis for the coupling  
16 between price and demand. Historically energy prices and  
17 demand have responded with an elasticity, and I think you  
18 are familiar with the term, of about .25. We have assumed  
19 .4 in the projections that you are looking at. The most  
20 avid conservationists in CONAES recommended .6. Our  
21 coupling on price forcing conservation is .4 in these  
22 projections. We haven't achieved that yet in  
23 retrospectively looking at what is happening.

24           Last of all, the electricity fraction of energy.  
25 I think that it is reasonably obvious that it is desirable

1 to return to a ethic that was popular in the energy wars  
2 before 1970 and even through 1973; substitute electricity  
3 for oil and gas. Most of the world is going to this rapidly  
4 and we are being left behind and I will make comments on  
5 this at the close.

6 The only basic major substitutes available for us  
7 are solar passive heating, the rational use of natural gas  
8 that will go up to \$10 per billion Btu's by 1988 or '92 or  
9 something like that.

10 COMMISSIONER GILINSKI: What do you see the  
11 electrical fraction going up to?

12 MR. CULLER: Forty-five percent. It is 30 percent  
13 now. It would be better if it were 55 percent, but we used  
14 in these projections 45 percent electricity mostly from coal  
15 and nuclear.

16 COMMISSIONER GILINSKI: This is when, in the Year  
17 2000?

18 MR. CULLER: 2000.

19 COMMISSIONER GILINSKI: This is your intermediate  
20 case or what?

21 MR. CULLER: We assumed for the intermediate case  
22 45 percent and for the low case about 42.

23 CHAIRMAN AHEARNE: What is your high case?

24 MR. CULLER: The high case is around 50.

25 This is not an unusual projection. It is concert

1 with most economic projections that are made.

2           Now, it is important that you understand that  
3 electricity is the muscle of industry. I did a regressive  
4 analysis that is wrong on the value of heat in products  
5 manufactured and the value of electricity in products  
6 through the Leontiev Tables.. Heat is worth about \$25 per  
7 million Btu's and electricity is valued in the products that  
8 it produces at around \$37.50 and both numbers are wrong  
9 because it is hard to get these data, but they are  
10 relatively in proportion.

11           Electricity for production is worth 50 percent  
12 more than heat. As a consequence electricity is the muscle  
13 of industry and it is necessary to sustain the economy. If  
14 we curb electricity growth we will suffer and that is the  
15 projection that comes through all of these economic analyses  
16 no matter how you look at it.

17           Now, we looked at all of the sources, all of the  
18 fuels for electricity. You will find in the big document a  
19 section on every one and I think we have been generous in  
20 our allowances to hydro, geothermal, cogeneration, solar  
21 wind and biomass and to the extent possible a major  
22 expansion in coal.

23           I must discuss the restraints on coal. We think  
24 that the coal industry, and most projections now sustain  
25 this, that the coal industry will have difficulty expanding

1 at a rate of more than about four and half percent per  
2 year. The necessary production of coal in the Year 2000 to  
3 keep minimum expectations is around 2.1 billion tons of  
4 which the utility industry will burn maybe 1.4 or 1.5.

5           You heard the President's announcement on energy  
6 policy two days ago saying that we would expect 38 percent  
7 of the world's coal supply by the Year 2000 and this adds  
8 significantly, like to 3 billion tons or 2.8 billion tons by  
9 the Year 2000.

10           We think that the mining of coal, just getting  
11 enough miners, in the West 16 men out of 100 would have to  
12 be a miners by the Year 2000 just to supply that coal. We  
13 have looked at the rail lines, the slurry lines and all and  
14 find the transportation networks insufficient to move that  
15 much coal without major changes even in the big truck lines.

16           COMMISSIONER GILINSKI: What does the National  
17 Coal Association say about this?

18           MR. CULLER: They say give us the money and we  
19 will get you the coal.

20           (Laughter.)

21           MR. CULLER: The National Rail Association says  
22 give us long-term contracts at \$20 a ton and we will rebuild  
23 the railroads.

24           Now, the unfortunate part in the regulatory  
25 business with the railroads is that recently it is now



1 possible for the railroads to charge differential prices for  
2 any commodity. It now costs \$22 a ton to ship coal from  
3 Montana to Texas and \$6 to get it on grade and that occurred  
4 over a period of two years. So that the transportation  
5 problems both in cost and feasibility are a restraint on coal.

6           We say that somewhere around 2 billion tons will  
7 bust our guts getting up in capacity. If you talk through  
8 the coal industry you will find a feeling that that is true,  
9 but there are still boots and saddle diggers; give us the  
10 money and we will get you the coal.

11           All right, with those constraints, if you will  
12 look at figure 5 on page 9 you will see our runouts of  
13 several cases. The intermediate case for what we consider  
14 to be the high nuclear requirement of 300 gigawatts by the  
15 Year 2000 and the low case which we economically consider to  
16 be basically a constraint on the economy. The low case is  
17 given, too, on the bottom of the high and low nuclear, or  
18 150 and 300 gigawatts each.

19           Let me give you then the summary of what we  
20 project for the intermediate case, the generation mix,  
21 assuming first nuclear of 150 gigawatts. We assume by the  
22 Year 2000, and all of our calculations indicate, that the  
23 maximum that we can generate on the supply side is of the  
24 order of 1,040 gigawatts, or put in place 1,040 gigawatts  
25 capacity, with a requirement for 1,280 gigawatts. We

1 anticipate a shortfall with 150 gigawatts of nuclear  
2 straining at every other source, including 25 percent  
3 conservation.

4 COMMISSIONER GILINSKI: What do you mean by  
5 requirement?

6 MR. CULLER: To meet the scenarios, to maintain  
7 the economic conditions which I specified.

8 COMMISSIONER GILINSKI: What are you assuming is  
9 the percentage growth in primary energy use over those years?

10 MR. CULLER: The intermediate case in primary  
11 energy use is two percent per year with electricity at the  
12 intermediate of 4.4 percent. This is shown in figure 2 on  
13 page 6 in the little table. The low case is 1.3 percent for  
14 total energy and 3.6 percent.

15 COMMISSIONER GILINSKI: Now, that is lower than  
16 you might say the long-term historic.

17 MR. CULLER: Much lower.

18 COMMISSIONER GILINSKI: But it is higher than the  
19 rate for the past ten years.

20 MR. CULLER: No, not in electricity.

21 COMMISSIONER GILINSKI: For primary energy.

22 MR. CULLER: For primary energy it is higher. The  
23 1.3 percent is about the growth for the primary.

24 COMMISSIONER GILINSKI: For it would be less than  
25 that.



1 MR. CULLER: A little bit, 1.1 or 1.2 over seven  
2 years.

3 COMMISSIONER GILINSKI: Well, over ten I thought  
4 it was less than one percent.

5 MR. CULLER: If you get back before 1973 we were  
6 still booming along. Before 1973 we were on an historic  
7 growth rate of 2.8 to 3.2 percent. It was 1974 when we had  
8 the depression and the economy started to slide.  
9 Seventy-three quads in 73 and it had been 72 in '72 and 68  
10 in '70 or something like that and there had been a big spurt.

11 COMMISSIONER GILINSKI: Okay, 73 to 79 a little  
12 less than one percent.

13 MR. CULLER: That is right. Now, that cannot be  
14 sustained if the economy is going to recover.

15 COMMISSIONER GILINSKI: I want to advertise a  
16 little NRC card we have.

17 (Laughter.)

18 MR. CULLER: I am advertising our card here.

19 (Laughter.)

20 COMMISSIONER GILINSKI: But we have it all on a  
21 little three by five card.

22

23 CHAIRMAN AHEARNE: It is on sale at the back.

24 (Laughter.)

25 MR. CULLER: We think at the intermediate economic

1 case there will be a shortfall in electricity capacity  
2 assuming 45 percent of about 250 or so gigawatts and at the  
3 high nuclear case 300 gigawatts of around 90. Even at the  
4 low economic case there is a shortfall with the low nuclear  
5 or 150 gigawatts of around 100.

6 CHAIRMAN AHEARNE: How much coal gigawatts do you  
7 have there?

8 MR. CULLER: Coal generation?

9 CHAIRMAN AHEARNE: Yes.

10 MR. CULLER: In the high case we assumed 117  
11 gigawatts of industrial electricity and this is in an  
12 extrapolation of data, poor data that we managed to collect  
13 and 100 for the low case. We assumed that there would be  
14 470 gigawatts of coal, that oil and gas would be reduced to  
15 224 gigawatts, that hydro is 100 gigawatts, and that is  
16 pretty high, that geothermal is 16 gigawatts, and that is  
17 high, that solar, wind and biomass are 10 gigawatts and that  
18 is high. That is electricity now and not heat. And that we  
19 provide storage for about 70 gigawatts.

20 We think we have been generous in allowing time  
21 for the new technologies to come in and in allowing  
22 transition from oil and gas. What we foresee with these  
23 minimum expectation manipulations of growth forced by  
24 population increase, that sometime soon, probably by the  
25 middle 1980's, we begin to see a shortage of

1 electricity without major commitment to nuclear.

2           Basically it says this, that nuclear is the swing  
3 because we have no great option of going to oil and gas  
4 without significantly hurting ourselves economically and  
5 strategically.

6           Coal may be restrained by a number of factors,  
7 digging, supply, trains and all, and its maximum growth rate  
8 historically during World War II was only three and a half  
9 percent per year. We are assuming four and a half percent  
10 growth rate average on coal. There are scenarios where  
11 large quantities of coal liquids are made that would require  
12 eight or nine percent growth rates on coal production which  
13 we think are impossible.

14           Nuclear therefore is important. 150 gigawatts  
15 will get us into severe shortages and with reasonable  
16 economic conditions 300 gigawatts still provides us with a  
17 shortfall in basic electricity generation.

18           COMMISSIONER BRADFORD: You talked about a  
19 shortfall in the mid-'80s.

20           MR. CULLER: In certain parts of the country you  
21 will begin to see electricity shortages. What is happening  
22 in the utilities, and Frank can speak to this better than I,  
23 is that companies are not able to take on new demand for new  
24 industry. They cannot commit to a big block of capacity in  
25 certain parts of the United States ten years from now when a

1 new industrial plant would come in.

2           Now, I have been told that quite a few of the  
3 utilities, because of the uncertainty of what will happen  
4 with nuclear licensing, uncertainty of shutdowns, the  
5 uncertainty on coal and financial problems, are not in a  
6 position now to commit future loads, big block loads in  
7 several parts of the United States. This will increase with  
8 time.

9           PG&E, the biggest private utility, last summer ran  
10 within three percent of its margin, and that is everything  
11 out, all of their old plants, including the old Gold Field  
12 hydro where they started, and all of the power that they  
13 could bring in from the regions. They had everything on,  
14 every old plant.

15           Now, this is occurring in Florida. There were  
16 rolling blackouts in Florida last week, three-hour shutdowns  
17 in Florida Power and Light.

18           It will occur regionally. There is an excess, a  
19 little bit in various parts of the United States.  
20 Nonetheless, these are the preliminary signs of electricity  
21 shortages.

22           Nuclear is essentially the only available swing,  
23 or one of the two available swings that we have domestically.

24           COMMISSIONER BRADFORD: I had starting to ask  
25 about shortages in the mid-'80's and you had said unless we

1 have nuclear power. What do you have in mind there.  
2 Obviously no one is going to build a nuclear plant between  
3 now and the mid-'80's starting from scratch. Are you  
4 talking about the plants already under construction being  
5 completed?

6 MR. CULLER: That is essential. The six or eight  
7 plants that are sitting around now should come on as soon as  
8 possible. PG&E is in Southern California and we can't burn  
9 coal. We can't license a coal plant in California.

10 So the nuclear stations that are in the pipeline  
11 now are becoming necessary and integral. In addition to  
12 that they will come on providing cheaper power at the margin  
13 than anything else that can be put on now.

14 COMMISSIONER BRADFORD: I understand your point  
15 with regard to particular regions and the plants awaiting  
16 licensing and the ones that are under construction. But  
17 taken as a whole we are still seeing a lot more  
18 cancellations obviously than there are new orders.

19 MR. CULLER: That is not due entirely to demand.  
20 It is due, as Gordon and others will tell you, to other  
21 reasons. The utilities cannot sustain the commitments now  
22 required for a nuclear or a coal station of a million and a  
23 half to two million dollars. One station at times is more  
24 than the net worth of the company. there is uncertainty  
25 about how long it is going to take to build. The build time

1 should be six or seven years. The interest rates can't go  
2 into the rate base, nothing can go in. As a consequence the  
3 utilities are strapped financially for making commitments.  
4 The company is put at risk for these baseload expansions.

5 Let me tell you a little bit about what is going  
6 on overseas. I just returned from a Scientific Advisory  
7 Committee meeting of the IAEA which I am still a member of  
8 for the United States.

9 The realization that nuclear is important is going  
10 on overseas at a pell-mell pace and things have solidified  
11 within the last year or the last six months. They have  
12 gotten over Three Mile Island. They are reasonably sure of  
13 the safety of the nuclear reactors. You will hear voices to  
14 the contrary but the planners are making this.

15 I cite only one case. The Japanese are going to  
16 increase their commitments from 28 gigawatts to about 51  
17 gigawatts by 1990. This decision was made in November. The  
18 French will be 60 percent nuclear in electricity by the year  
19 2,000. The Germans will build two reactors a year for ten  
20 years plus one or two breeders.

21 COMMISSIONER GILINSKI: Of course Japan and France  
22 are in different circumstances.

23 MR. CULLER: Argentina with its great water  
24 resources will have six reactors by the Year 2000 and be

25

1 totally independent. They are building Canadian heavy-water  
2 reactors. They are building their on D O plants and have  
3 all of the fuel manufacturing plants. 2

4 All nations are moving heavily into nuclear  
5 because of the decided cost advantage.

6 CHAIRMAN AHEARNE: Some nations are moving into  
7 nuclear with additional factors involved.

8 MR. CULLER: Of course.

9 COMMISSIONER GILINSKI: But the cost advantage is  
10 here, too, at least as you lay it out in your attachment.  
11 What is it about their financial circumstances that allows  
12 them to move forward? Is it government utilities or what?

13 MR. CULLER: Partially government utilities. They  
14 are spending much more for oil than we are.

15 COMMISSIONER HENDRIE: Well, I think fundamentally  
16 in one of these countries the electricity rates are  
17 controlled by a multitude of independent rate commissions  
18 regionally which satisfies their own local interests and pay  
19 no attention to regional considerations or the overall  
20 national effect of depressing a particular energy supply.

21 MR. STASZESKY: We have two more gentlemen we have  
22 brought here, Mr. Chairman.

23 CHAIRMAN AHEARNE: I can recognize when one has a  
24 stirring message there is a tendency to get wrapped up in it.

25 (Laughter.)

1 MR. STASZESKY: Gordon, would you like to go next,  
2 please.

3 CHAIRMAN AHEARNE: Floyd, you have a larger volume.

4 MR. CULLER: Yes, I do, and I will make it  
5 available to you.

6 MR. STASZESKY: I might say we have the day. I  
7 presume that you gentlemen may not.

8 CHAIRMAN AHEARNE: You are right.

9 MR. STASZESKY: We would be happy to continue the  
10 discussion as long as you wish, but I would like to have an  
11 opportunity for Gordon and Herman to make their comments.

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1 I cannot see a utility president this year risking  
2 his shareholders' equity by order a nuclear plant under  
3 today's uncertain regulatory climate.

4 Valkorae-1, thirty-one months after it went  
5 commercial, has already paid for itself to give you some  
6 feel. The differential in the oil costs and the fuel costs  
7 has already recovered for Korea the value of the cost of the  
8 plant that they paid us to build the plant.

9 While that happens of course GPU stands on the  
10 brink of bankruptcy helpless to clean up Three Mile Island-2  
11 or put Three Mile Island-1 back on line.

12 While we built Owi and just brought it on line in  
13 Japan, sixty-one months after the signing of the contract  
14 with Kansai Electric Salem-2, a sister unit adjacent to an  
15 already licensed plant, is unable to be licensed.

16 A magnificent shipyard stands idle in  
17 Jacksonville, Florida, with no license to build a floating  
18 nuclear plants more than eight years after application for  
19 such a license.

20 Now, nuclear business represents less than nine  
21 percent of Westinghouse's sales bill. So it is not  
22 particularly important to our company. But in my judgment  
23 it is vitally important to the industrial base of America.

24 What is going to happen in the nuclear business in  
25 the United States is first we are going to close up most of

1 our manufacturing capacity. As you have already noticed, we  
2 are going to close up our very large Tampa facility.  
3 Westinghouse at least is going to keep its engineering  
4 expertise perhaps gradually dispersing it outside the United  
5 States.

6 One of the great tragedies of our inability to  
7 quickly reach decisions in the United States is that we are  
8 going to lose our great leadership that we have had in the  
9 safety arena. If we look at the past we have sold plants to  
10 U. S. safety standards. Those standards have been  
11 recognized as viable safety standards and as the safest and  
12 the most cost competitive in the world.

13 Because of our inability to arrive at decisions in  
14 the United States each country is now embarking on its own  
15 set of standards. The French are eagerly working on their  
16 set of standards. There is a good chance the British will  
17 develop their own set of standards. The Japanese are on the  
18 verge of deviating from American standards.

19 The tragedy of that is that instead of having  
20 worldwide that recognize the leadership of the United States  
21 we are going to have a proliferation of standards and, in my  
22 judgment, a weakening of safety standards around the world.  
23 So we are going to have less safe plants around the world  
24 than we were going to have in the past.

25 COMMISSIONER GILINSKI: Could I just interrupt you

1 and ask you what kind of standards you are talking about?

2 MR. HURLBERT: Total regulations. Total regs.

3 Each of these countries are going to develop their own set  
4 of regs. As you know, the German regs. are not any  
5 different but their concept is different.

6 COMMISSIONER GILINSKI: But we certainly have a  
7 more, at least at this point I think, a more complete set of  
8 standards than anyone else. I was wondering what it is  
9 about them that causes others to go off on their own.

10 MR. HURLBERT: Let me answer first your question  
11 of why the rest of the world is moving very rapidly in  
12 nuclear. Nuclear is only the cheapest if you build it  
13 rapidly. The cost of nuclear isn't in the fuel, the cost of  
14 the uranium and the fuel fabrication. It isn't even in the  
15 enrichment. The cost is the capital cost. The reason that  
16 these are economic plants overseas are that they can be  
17 built rapidly.

18 Most plants in the world are built where effective  
19 we get a construction permit and an operating license to the  
20 existing set of regulations. We build the plant to a set of  
21 standard regulations. In the past it has been primarily  
22 U. S. standard regulations as of the date of the plant  
23 order. That reduces immeasurably the cost of the plant and  
24 in my judgment substantially improves the safety because  
25 there isn't the rip and tear that we have with changes in

1 regulations on nearly a daily basis.

2 Now, I would just like to add a little bit on what  
3 is going on in the world. In the next 18 months we will be  
4 competing for business for two in Korea, two in Italy, two  
5 in Taiwan, four in France, that will be through our  
6 licensee, two in Spain, four to six in Japan, two in  
7 Belgium, two in China, two to twenty in Mexico, two in South  
8 Africa and we will be talking with Ireland, Portugal,  
9 Greece, Egypt and Israel who will be talking about it but I  
10 don't think have the wherewithal to build.

11 COMMISSIONER BRADFORD: Two to twenty in Mexico?

12 MR. HURLBERT: Two to twenty in Mexico.

13 COMMISSIONER BRADFORD: Twenty by when?

14 MR. HURLBERT: They want them onstream by the Year  
15 2000. Portillo would like to award two before his speech in  
16 September and it will be like England, an order for one or  
17 two and an option for 18. But they are going to move  
18 forward just because of economics.

19 Now, we are going to build a lot more in the  
20 United States, too, because the need is there. America has  
21 been sleep industrially. We are going to have to  
22 reindustrialize this country and we will. We have  
23 awakened. But it is not going to happen and they are not  
24 going to build nuclear plants until we can get the  
25 uncertainty out of the licensing process. We need

1 expeditious licensing.

2           In the short term what is going to happen is how  
3 fast we are going to license units that are now under  
4 construction, including Diablo-1 and Three Mile Island-1.  
5 It is going to depend on how soon we start granting  
6 construction permits. It is going to be determined by  
7 whether we expeditiously handle the floating license because  
8 it is a forerunner of what we really need which is a generic  
9 plant license within an envelope and site banking  
10 independent and a construction permit and an operating  
11 license essentially at the same time. Once a plant is  
12 licensed, once you obtain a license on that particular plant  
13 no reg. changes apply unless there is a significant safety  
14 issue. With those things we will sell one hell of a lot of  
15 nuclear power plants. It is going to happen and it is just  
16 a question of how long.

17           We have an Administration and we have a Congress  
18 that will pass the laws that it takes to make this happen  
19 where you do not have the statutory authority to do it. I  
20 am hopeful that your leadership under the climate that we  
21 have now will let that happen so that we can get on with the  
22 job and have the same standard of living for our children  
23 that we have ourselves.

24           Thank you very much.

25           COMMISSIONER BRADFORD: When you say a

1 construction permit and an operating license at the same  
2 time, does that mean that you all are really prepared to  
3 build a plant on the basis of a design that would be  
4 licensed at the CP stage without making significant changes  
5 from that until the time the plant is completed and ready to  
6 be operated?

7 MR. HURLBERT: Yes.

8 COMMISSIONER GILINSKI: But we haven't had that  
9 situation by and large up to now. It seems to me that is  
10 one of the elements in this uncertainty you speak about.  
11 Clearly we all want the system to work better and more  
12 smoothly and more predictably.

13 MR. HURLBERT: The uncertainty is what kills us.

14 COMMISSIONER GILINSKI: Of course. But a  
15 comparison has been made with France. Well, you have got  
16 one vendor selling basically one reactor to one buyer, to  
17 one utility that does its own construction. You have got a  
18 very different governmental system, too. You have got one  
19 highly centralized state and not the system we have here of  
20 50 states.

21 Here we are dealing with several vendors and a  
22 dozen or so architect/engineers. We are involved with  
23 upwards of 60 utilities and we have got 50 states that have  
24 their interests in all of this. So it is just a very  
25 different situation.



1 I must say I was impressed. I had a brief  
2 experience on a licensing board which ended because the  
3 utility withdrew its application. But in that case they  
4 were expanding on a site which had been approved earlier  
5 which was well established on which they had three  
6 reactors. They were adding two in fact identical reactors.  
7 In that case the NPC staff review took literally six  
8 months. The hearing didn't go forward but I would guess  
9 would have certainly not taken more than a year and might  
10 have taken six months.

11 What I am trying to say is that given the same  
12 conditions that you point to with approval from abroad I  
13 think one can get the same results here. It is that we  
14 haven't had the same conditions on the industrial side.

15 MR. HURLBERT: Well, that is not quite true,  
16 Commissioner. In Japan you have a half a dozen utilities  
17 and you have three vendors. There it is done essentially as  
18 I am saying it is done and there we build them in about five  
19 years.

20 CHAIRMAN AHEARNE: Gordon, one of the issues that  
21 is often raised at least to us is that the utility and the  
22 vendor when they come in with a license application have not  
23 solidified all of the major features of the reactor. So one  
24 of the claims that is made is that when it comes time for  
25 the operating license the plant that has been built may not

1 resemble the plant for which the construction permit was  
2 applied. Is that an accurate description?

3 MR. HURLBERT: I am not saying that we have opted  
4 well either as a supplier industry, as architect/engineers  
5 or as utilities. I am suggesting that the industry is in a  
6 position in my judgment at least from our point of view to  
7 move forward on the basis that I have suggested. Obviously  
8 you would have to ask the utilities, the architect/engineers  
9 and other vendors. But there is no reason why you cannot  
10 generically license a plant in my judgment. There is no  
11 reason why that can't be generically licensed within an  
12 envelope of that site. That site has to have certain  
13 seismic characteristics and so on for maybe two or three  
14 plants. There is no reason why that can't be done. There  
15 is no reason why you can't license sites and then you can  
16 put a predetermined plant on that site.

17 That is of secondary importance, though. Of  
18 primary importance is no reg. changes once you have got an  
19 operating permit. There is a very persuasive argument why  
20 that is all right I think unless there is a major new  
21 decision.

22 CHAIRMAN AHEARNE: But my question really is, let  
23 us say that the NRC decides and if necessary the Congress  
24 agrees or the NRC decides and it is not necessary for  
25 Congress to agree that if a plant receives a construction

1 permit then it has an operating license against the regs.  
2 that were in existence at that time. Do you think the  
3 industry is prepared to make the other side of it that there  
4 will be no major changes in that plant?

5 MR. HURLBERT: I think so.

6 CHAIRMAN AHEARNE: And that the basic information  
7 will be available at the time of the construction?

8 MR. HURLBERT: I think so.

9 COMMISSIONER GILINSKI: Let me ask something else  
10 about your statistics about Japan about the time it takes to  
11 build a plant there. I am interested to hear what you say.  
12 There was a report I think by the Rockefeller Foundation  
13 Group on Energy which compared the length of time it took to  
14 go from concept to operation in various countries. As I  
15 recall, Japan was pretty much up with the United States on  
16 average.

17 MR. HURLBERT: Ah, but there is a big difference.  
18 Once the site is selected then it is go. Then we can build  
19 it. They have a very, very difficult time obtaining sites.  
20 They just gave 130-man fishing village I think \$8 million of  
21 reimbursement for the fishing rights to get the latest site  
22 where we are going to build the next two. They have a very,  
23 very difficult job getting sites. That is a long and  
24 time-consuming thing. That is true in many parts of the  
25 world. Italy has an unbelievably difficult time. Spain has

1 a difficult time. But once the site is selected and they  
2 say go, then we build the plant.

3 COMMISSIONER GILINSKI: Well, one could have them  
4 use a separate site approval from the building of the plant  
5 and approval of the design now I think sufficient to  
6 accommodate the things you are talking about. It can  
7 improved somewhat by widening the class of applicants and so  
8 on, and I am all for that and I think everyone else here is.

9 I think we really do have the tools if industrial  
10 organizations will come in with essentially complete designs  
11 which they haven't up to now. I mean, we have been faced  
12 with preliminary designs. That is the reason for jockeying  
13 at later points because the design was not there. It is not  
14 like building an airplane. It has been more like building  
15 an airport.

16 (Laughter.)

17 MR. HURLBERT: Well, certainly the industry has to  
18 get its act together, too, and that includes our customers,  
19 the architect/engineers and the vendors. The opportunity is  
20 here if we, being all of us, and you get our act together.  
21 I don't mean to take too much time.

22 CHAIRMAN AHEARNE: Perhaps Mr. Hill might like to  
23 go ahead.

24

25



1           Productivity is directly related to energy.  
2 Unless we do something about the energy piece of that  
3 equation we are not going to recoup and gain our rightful  
4 position as a worldwide power again.

5           The only options we have in this country for the  
6 next 20 or 25 years that I am aware of, and we are working  
7 on every one of the renewable resources we know how to work  
8 on, but the only options we have got are coal and nuclear.  
9 There just aren't any others.

10           We are going down the drain very fast on nuclear.  
11 If the present Administration that just went in yesterday  
12 doesn't immediately do something relative to the nuclear  
13 option we will have it any longer. That is my personal  
14 opinion.

15           COMMISSIONER GILINSKI: May I interrupt you to ask  
16 you what you have in mind there?

17           MR. HILL: Well, what I really have in mind is I  
18 thin we have got to have a strong forceful voice that says  
19 we have got to have nuclear in this country; somebody. We  
20 have not been saying that. We have been talking to each  
21 other. The general public really does not conceive that we  
22 have to have nuclear today. We have to do something to  
23 influence that I think if we are going to do what we have to  
24 do.

25           My numbers agree with Gordon's. I think there are

1 not going to be any orders placed on nuclear plants until  
2 '83 or '84, at least that is the way I read it and that is  
3 pretty close with what Gordon says.

4 CHAIRMAN AHEARNE: Do you agree with Floyd's  
5 argument?

6 MR. HILL: Well, I might disagree with a couple of  
7 his numbers. I don't know as the load growth in this  
8 country is going to be three and a half percent.

9 CHAIRMAN AHEARNE: Which side would you put it on?

10 MR. HILL: I would say it would be closer to two  
11 and a half to three.

12 CHAIRMAN AHEARNE: Okay. So you would say that  
13 the demand will be less.

14 MR. HILL: But nevertheless, the real problem is  
15 still there by whatever number you pick. Just as fast as  
16 the utilities' reserve margins start down, and they have  
17 already started down, then we are going to have some lack of  
18 electricity in various parts of this country. Therefore, we  
19 are not going to have a productive nation and we are not  
20 going to be able to provide the jobs we have got to provide  
21 for the youngsters coming up. We are not going to take care  
22 of the minorities. They are not getting jobs today. This  
23 is going to cause social revolution and it is all related to  
24 energy. I think that is what Floyd said very clearly.

25 I just want to tell you that General Electric is



1 not in this business fundamentally because it is a great  
2 money-maker.

3 (Laughter.)

4 MR. HILL: General Electric is in this business  
5 and intends to try to continue its option of being there  
6 when needed simply because we look at it as some other  
7 social responsibility. This doesn't make up any great  
8 income producer for General Electric as a percent of its  
9 total. So that is not why we are there. We are there  
10 because we truly believe that it is something that has to be  
11 done for this country.

12 Let me cite a couple of instances. This is not in  
13 criticism, believe me, of anything. I just want to cite  
14 some examples.

15 We currently have got three BWR reactor plants  
16 that still do not have construction permits, Adams Creek,  
17 Black Fox and Skagit even though the PSARs were submitted in  
18 1973 through '75. Now whose fault is it? I don't know if  
19 it is ours or if it is somebody else's, but collectively we  
20 have got to do something about that. All three of these  
21 were ordered in 1973 with up to three to five years of  
22 construction and \$100 to \$200 million sunk utility cost per  
23 project. Someone is paying that bill; the consumer is  
24 paying it.

25 CHAIRMAN AHEARNE: But I am sure at least on one,

1 as you know, on Skagit they shifted the site.

2 MR. HILL: I understand that. All I am saying is  
3 collectively as a country we have to do something about  
4 this. That is the point I am trying to get across.

5 By contrast in Taiwan Oshang was also ordered in  
6 1973. Construction was completed this past October and fuel  
7 is being loaded. That is a fundamental difference of what  
8 you can do overseas versus what we are doing here. So  
9 collectively we have got to do something about it.

10 There are four BWR reactors that now require  
11 operating licenses which you fellows know better than I do,  
12 LaSalle-1, Grand Gulf, Zimmer and Susquehanna. These four  
13 reactors were ordered in 1967 through '71. The PSARs were  
14 submitted in 1975 through the year 1977 and fuel loading is  
15 expected this year. Look at the difference in the time  
16 cycle.

17 By contrast Tokai-2 and Fucshima-6 were ordered in  
18 October of 1971, fuel was loaded in Tokai in December of '77  
19 and in Fucshima on January of 1979 and Tokai has been  
20 operating for 26 months and Fucshima for 16.

21 COMMISSIONER GILINSKI: Can I ask you about those  
22 cases. Did they have the site approved at that point?

23 MR. HILL: I am not positive I can answer that.

24 COMMISSIONER GILINSKI: That makes a big  
25 difference.

1           MR. HILL: I believe that these are comparable  
2 times with respect to the situation.

3           COMMISSIONER GILINSKI: Well, when we are  
4 reviewing a plant we are reviewing the site at the same time.

5           MR. HILL: I understand. I am just sorry I don't  
6 have the answer for you. That is all.

7           CHAIRMAN AHEARNE: As you know, in many of these  
8 countries you mentioned, in Taiwan and Korea, for example,  
9 the site selection is very much a government action.

10          MR. HILL: I understand.

11          COMMISSIONER GILINSKI: As it is largely in  
12 France. It is a different political system.

13          MR. HILL: I am not talking about France. I am  
14 talking about Japan, Taiwan.

15          CHAIRMAN AHEARNE: As Gordon just pointed out, as  
16 you know in Japan the site selection process is a very  
17 careful development negotiated settlement. Once the site is  
18 selected a large part of the hurdle that in this country  
19 comes at the same time as the application is filed and  
20 proceeds a pace with it.

21          MR. HILL: I am aware of that.

22          COMMISSIONER GILINSKI: Incidentally, in raising  
23 questions about all these figures I don't want you to get  
24 the impression that I don't think that we ought to be doing  
25 better, all of us collectively.

1 MR. HILL: I understand.

2 COMMISSIONER GILINSKI: It is just that I think  
3 that in making these comparisons we need to be very careful.

4 MR. STASZESKY: I guess, Commissioner Gilinski, I  
5 can't restrain myself from commenting ---

6 (Laughter.)

7 MR. STASZESKY: --- on the question you were  
8 raising about sites. Filgrim-2 does not have a construction  
9 permit today. It was docketed in the Fall of 1973. It is  
10 on a site that has an operating reactor on it.

11 COMMISSIONER BRADFORD: Don't we have a problem  
12 with a number of these cases that are being sited in that  
13 they are all before hearing boards?

14 CHAIRMAN AHEARNE: The General Counsel would like  
15 to say something. He has finally come up out of the  
16 audience.

17 MR. BICKWIT: I have been listening to this with  
18 great interest. My feeling is that what you are saying here  
19 is essential for the generic propositions that you are  
20 putting forward, that you would not be able to make the  
21 points in the way that you are making them without citing  
22 these examples and therefore I think it is legitimate even  
23 though we do have proceedings.

24 MR. HILL: I am just drawing some comparisons.  
25 That is all. That is my point.

1           The two Japanese plants that I talked about use  
2 the same reactor and contain the design of the LaSalle plant  
3 which was ordered in 1970. It is constructed and is  
4 awaiting its NRC operating license. There is a fundamental  
5 difference between what has happened.

6           Now, I guess in conclusion all I really want to  
7 say is that I believe we have a new environment that is  
8 coming up, I hope. I believe we ought to take advantage of  
9 that collectively and we need collectively for the good of  
10 this country to have the nuclear option available.

11           CHAIRMAN AHEARNE: Thank you.

12           Frank, is that it?

13           MR. STASZESKY: That completes our presentations.  
14 We would be happy to respond to questions.

15           CHAIRMAN AHEARNE: Let me ask you a question based  
16 upon perhaps not your role as AIF but more as a utility  
17 executive. One of the issues that is obviously out here is  
18 that there is a projection of increased need in electrical  
19 generation. There is the concern that nuclear power is  
20 being able to meet that due to regulatory problems amongst  
21 others, so certainly the reason you guys are here is  
22 because you see regulatory problems.

23           There is the issue that has been raised several  
24 times of why aren't utilities, however, willing to go  
25 ahead. I guess the answer is that the length of time it

1 takes between commitment and operation is too long. How  
2 much shorter does that have to be to make a break point to  
3 where a utility is willing to make that kind of a  
4 commitment, or is the cost of a plant so high that unless  
5 utility commissions are willing to put construction work in  
6 progress into the rate base and they still wouldn't be  
7 willing to do it?

8 MR. STASZESKY: I cannot give you a break point,  
9 you know, like seven years or ten years, Mr. Ahearne,  
10 because I simply don't have that number.

11 CHAIRMAN AHEARNE: No, I understand.

12 MR. STASZESKY: But I think I can answer it in a  
13 little bit different way. A generating unit today, a new  
14 nuclear power plant today, and in some respects coal is not  
15 far behind, but the nuclear plant today, its final costs  
16 without construction work in progress in the rate base is  
17 double the actual cost of the plant. In other words, a \$2  
18 billion plant could be built for a billion dollars for the  
19 actual hardware, engineering ---

20 CHAIRMAN AHEARNE: Construction and labor.

21 MR. STASZESKY: --- and the actual cost of the  
22 plant. The balance of the cost is inflation and allowance  
23 for funds used during construction, interest, which is  
24 capitalized into the plant.

25 So it is because that is increasing at that rate,

1 because of the high inflation rates, double digit inflation  
2 and the inflation related to time, of course, plus the  
3 accounting requirement of building the interest costs, the  
4 carrying costs into the final costs that with uncertainty as  
5 to when that comes to an end there is no way you can go  
6 forward.

7           So I think we have two things to contend with.  
8 One is to reduce the time so that the interest costs are  
9 reduced and so that the effects of inflation are reduced,  
10 and secondly, to reduce inflation. Inflation is the great  
11 enemy of this country. I don't think anyone in this room  
12 would argue with that or probably any thinking person in the  
13 country. We must get inflation down.

14           But even if we did have inflation down to some  
15 reasonable number, if we don't know when we start when we  
16 are going to end and then we continue to have the interest  
17 building into the cost of the plant, that is simply not a  
18 financially viable thing to do.

19           CHAIRMAN AHEARNE: So you don't see any  
20 construction work in progress treatment as being essential  
21 to solving the problem, but putting some kind of specific  
22 certainty, or whatever you want to call it, into the  
23 regulatory framework you feel would be the critical element?

24           MR. STASZESKY: I believe that is a critical  
25 element because then at least we could calculate with some



1 what the final costs are but at the moment we don't know the  
2 costs. The only way to cope that I can see with the present  
3 situation is to shift the burden of the increased costs to  
4 someone else. In other words, if there is an uncertainty of  
5 what the final cost is, then someone with an infinite  
6 resource will have to assume the responsibility to meet the  
7 final costs.

8           If we could determine the final costs with  
9 assurance we could then make a judgment that we could or  
10 could not finance the plant.

11           CHAIRMAN AHEARNE: Do you see utilities being  
12 willing at the time of going forward with their construction  
13 application to agree with the vendor or architect/engineer  
14 that that is it, here is the complete design, the  
15 essentially complete design and we aren't going to make any  
16 changes?

17           MR. STASZESKY: You know, you have to be very  
18 careful with what is in people's minds when they use the  
19 word "complete." If that meant that they had made  
20 absolutely no change whatsoever, I think that is unlikely.  
21 Things happen as you go along and you make minor changes in  
22 design. The basic principles of design that would be  
23 concerned with safety, the basic principles of meeting  
24 regulations, I believe we could go forward with assurance  
25 that we could meet what is in place at the time we are

1 making the commitment.

2           The problem is that over these long periods of  
3 licensing time in fact the regulations do change. Items  
4 that are settled in the process, early in the process,  
5 become reopened later in the process if it isn't closed up  
6 early on.

7           So when you have a process that runs three years,  
8 four years or seven years, almost infinite, you know people  
9 are making changes in what is required of the utility. It  
10 isn't just your requirements, it is EPA's requirements, you  
11 know, the world doesn't stand still.

12           But, on the other hand, these same requirements  
13 are visited on the operating plants. So I think we have to  
14 approach this with reason. When once it is agreed that a  
15 given fundamental design, and actually the nuclear steam  
16 supply design doesn't change during the course of the  
17 process ---

18           CHAIRMAN AHEARNE: How about the balance of plant?

19           CHAIRMAN AHEARNE: The balance of plant won't  
20 change from any safety or meeting a regulatory requirement  
21 point of view. It may change from the point of view of  
22 improving the efficiency it it is, let's say, a pump or a  
23 heater or a device. I mean, solid state gets build into  
24 controls at an increasing rate and these are in fact  
25 better. I think those kinds of changes could be evaluated

1 outside of the given plant process on a generic basis to  
2 assure that whatever change is taking place in the  
3 components that go into plants do not introduce or infringe  
4 on the regulations and standards that were in effect at the  
5 time that the plant was committed.

6           Obviously if a change is made during the course of  
7 the design or even during the course of the construction  
8 that is so important, some fundamental issue has been found  
9 that wasn't known at the time the plant started, then it  
10 should be visited on all the operating plants. But if it is  
11 not of sufficient importance for that, then I say it is not  
12 of sufficient importance to upset the process that was set  
13 in motion when the construction permit was issued.

14           CHAIRMAN AHEARNE: Let me ask a final question and  
15 then I will turn it over to Vic. Once the plant has got its  
16 construction permit and is working down that line to get an  
17 operating license the argument at least that a bunch of our  
18 staff makes is that you can back up when the operating  
19 license material has to be submitted in order usually, and I  
20 recognize that we are now running into what would be called  
21 unusual situations, but usually such that when the unit has  
22 completed construction and is ready to fuel load the  
23 operating license hearing can be completed.

24           If that is true, then your thesis would be that the  
25 engineering change orders required because of changing

1 regulatory environment stretch out that time from  
2 construction permit to operating license; is that correct?

3 MR. STASZESKY: Yes.

4 CHAIRMAN AHEARNE: That would then be the  
5 principle regulatory problem that is embedded; is that  
6 correct?

7 MR. STASZESKY: Well, it seems to me that there  
8 are two problems. One is, first of all, the time of the  
9 frontend between docketing and receiving the construction  
10 permit. Actually when the PSAR is submitted that is based  
11 on a body of regulation and standards which are understood  
12 at that time. Through the review process changes may occur  
13 so you come back and you change. This keeps stretching  
14 things out.

15 I think even in that period of time it is  
16 important to define what body of standards and regulations  
17 this particular plant is going to have to meet and move  
18 forward expeditiously to see will it or won't it and get  
19 that straightened out.

20 Now, suppose that took one year or 15 months. If  
21 in month 11 or month 14 a regulation is changed, I think we  
22 should look at see is it absolutely necessary to put that  
23 back into this process.

24 MR. CULLER: That is Gordon's idea of sort of  
25 grandfathering basically, the argument being that if you

1 approve the plant initially, the construction permit in  
2 concept and operating permit, that reactor is likely to be  
3 safe and you go with the regulations then in progress. The  
4 next reactor takes on the new standards that are there in  
5 effect.

6           COMMISSIONER GILINSKI: But, Floyd, this is all  
7 part of an overall deal which allowed us to get started  
8 early. The deal was basically, yes, so far as we can see,  
9 this is the basis on which the plant can be built and  
10 operated but if we find anything along the way that is  
11 pretty important and we think ought to be included it is  
12 going to have to be included. That is really the basis on  
13 which everyone went forward.

14           Now, when things then come up you can't say, wait  
15 a minute, you said it was safe before so it is safe now.  
16 Well, we have learned more and we have discovered along the  
17 way we have learned quite a few things. Now, that is not to  
18 say that every decision was a right one or that every  
19 change, you now, in retrospect had to be made, but that was  
20 the basic arrangement. I don't think one can complain about  
21 it when we discover one or another important safety problems.

22           Now, it seems to me to have a firmer arrangement,  
23 and I think one can have that, and I think it would be an  
24 improvement, it requires a change on both sides. I think a  
25 prerequisite for that is that applications be, I won't use

1 the word "complete" but essentially complete in the sense  
2 that instead of dealing with a reactor that is in an  
3 engineering sense 20 percent designed one is dealing with  
4 one that is substantially designed.

5 In those circumstances I think this agency can  
6 conduct a review that is a much faster one and also, after  
7 having initially approved the basic design, can stick more  
8 firmly to those decisions.

9 It is not surprising when one deals with a  
10 preliminary design, and in fact at the end of a construction  
11 permit proceeding you may still be dealing with a reactor  
12 which is, I don't know what, maybe 30 percent or maybe 40  
13 percent, or it may be less than that, designed in an  
14 engineering sense that there is a lot of uncertainty about  
15 the process.

16 Since by and large the vendor part really is  
17 fairly standard and is complete, that means the balance of  
18 plant is where one needs to put a lot of attention and to  
19 try to standardize that aspect of it.

20 CHAIRMAN AHEARNE: Gordon, in your experience in  
21 dealing with overseas plants can you contrast the amount of  
22 design work that is done on the balance of plant going in as  
23 opposed to here? Is it the same?

24 MR. HURLBERT: Well, it depends a great deal.  
25 Some plants here are essentially duplicates of one that has



1 been built before and the architect/engineering work is  
2 essentially done. Some of course we are starting right from  
3 scratch with a new architect/engineer and a new nuclear  
4 steam supply system. We of course try to sell duplicate  
5 plants overseas because you save all the costs of the  
6 architect/engineering and you save costs because you have  
7 got as-built drawings.

8           The big different is that we only design and build  
9 to the regs. as of the date of contract signing. That is  
10 the big, big difference. When we build one here in the  
11 states our rip and tear and the time is half the cost of  
12 building the plant. Regs. change to the point where half  
13 the time of our people are rip and tear. The result is that  
14 the productivity is just terrible. It just affects our  
15 craft people terribly to weld a pipe today and tear it down  
16 tomorrow. It just won't work. It isn't the union and it  
17 isn't the work ethic, but it is the rip and tear that we  
18 do. Over there we just build it.

19           Now, lessons learned at Three Mile Island, they  
20 reviewed every one and one or two they thought and we  
21 recommended were substantial enough that they ought to put  
22 it in, the ones that affecting the retrofitting here in the  
23 states. The rest of them, most our foreign plants are not  
24 being built to the rest of them.

25           It is the rip and tear, the changes, that we



1 estimate cost about \$500 million on a nuclear plant, \$250  
2 million in construction and \$250 million in interest and  
3 inflation.

4 COMMISSIONER GILINSKI: What fraction of that rip  
5 and tear do you attribute to the NRC changing its mind and  
6 what fraction is simply less than idea construction  
7 practices?

8 MR. HURLBERT: Ninety percent is NRC changes in  
9 regs. We have got a perfect comparison because we build  
10 them overseas and we build them in the United States.

11 The point I want to make is that in my judgment  
12 the safety is better when there is not so much rip and  
13 tear. The risk of defective workmanship and the risk of  
14 making a mistake grossly outweighs the changes that are made  
15 except those changes where we retrofit.

16 CHAIRMAN AHEARNE: You are saying the quality  
17 control is better.

18 MR. HURLBERT: Well, human nature being what it is.

19 COMMISSIONER GILINSKI: Let me ask you, how do you  
20 compare the quality of construction work here and abroad?

21 MR. HURLBERT: Well, I think they are are equal.  
22 We have elaborate quality control systems here and we have  
23 elaborate quality control systems abroad. I think that a  
24 plant in Japan or a plant in Korea or a plant in Yugoslavia  
25 or in Boston are built to equal standards.

1           MR. HILL: I would agree with that. I have been  
2 all over those plants in Japan and all over them here and  
3 there is no difference fundamentally.

4           CHAIRMAN AHEARNE: Any more questions, Vic?

5           COMMISSIONER GILINSKI: Well, let me just sort of  
6 ask a summary question. What do you see as what is holding  
7 up utilities from buying nuclear plants now and in the near  
8 future?

9           MR. HURLBERT: The uncertainty.

10          COMMISSIONER GILINSKI: Are they buying coal  
11 plants.

12          MR. HILL: Yes, they are putting coal plants in.

13          COMMISSIONER GILINSKI: What is the increase in  
14 the capacity that has been ordered, say, in the last year or  
15 two years, or whatever? Do you know that, Floyd?

16          MR. CULLER: I don't.

17          MR. WALSKE: I can answer that. In 1979 they were  
18 at grossly six gigawatts of coal. I don't know whether  
19 there were any calculations against those gross orders, but  
20 we cancelled, as you know, much more nuclear than that.

21                 In 1980 they were at two and a half gigawatts of  
22 coal and I don't know what they cancelled. We cancelled  
23 around 10 plus or minus a little bit gigawatts of nuclear.

24                 Mind you, there were a lot of figures tossed  
25 around this morning. We started out talking about

1 additional plants for the Nineties. I don't know what  
2 Floyd's number is exactly, but I guess it is at least 150.

3 MR. CULLER: At least 150 gigawatts nuclear.

4 MR. WALSKE: I would have said maybe 200 of nuclear  
5 and 200 of coal additional orders are needed for the  
6 Nineties. My point is you combine the two together. On the  
7 order of the rates now at 30 or 40 gigawatts a year then we  
8 are talking about next to nothing.

9 COMMISSIONER BRADFORD: Do the utilities disagree  
10 with you or why aren't they placing those orders?

11 MR. WALSKE: I am not a utility, but I can't  
12 resist giving an opinion.

13 COMMISSIONER BRADFORD: There is something other  
14 than just uncertainty at work there.

15 MR. WALSKE: The first thing is the cost  
16 escalation through regulation which I think Gordon has  
17 detailed very well and the others have also detailed very  
18 well.

19 The second thing Frank mentioned, and it is  
20 exceedingly important, and that is bringing inflation under  
21 control because that obviously affects costs.

22 The third thing is that over the years since '73  
23 utility profits have been squeezed as prices have gone up.  
24 In order for the utility commissions to be a little bit  
25 responsive to the customer, and I think Bill Lee of Duke

1 Power commented in November that the deficiency is such that  
2 utilities get about two-thirds of the return on equity that  
3 they would need in order to have a viable beat inflation  
4 program if you saw these other things that we were talking  
5 about, the construction licensing problem plus the inflation  
6 problem. They are still at only about two-thirds of the  
7 profitability level. If you convert that into electric  
8 rates it probably means that they need a one-time increase  
9 of about 10 or 15 percent on rates and then they need to  
10 track inflation and increased costs from that point on.

11 MR. HURLBERT: Let me answer that question as I  
12 see it. They don't need any more orders at the present  
13 time. They had substantial excess plants on order when the  
14 '73 oil crunch came, substantial.

15 MR. STASZESKY: Well, they weren't excess when it  
16 came; they were excess after.

17 (Laughter.)

18 MR. HURLBERT: I stand corrected. The reserve  
19 margins in many parts of the country are still excessive by  
20 what they would like to have. So that is why there haven't  
21 been any plants ordered. They really didn't need them.

22 CHAIRMAN AHEARNE: That is why a number were  
23 cancelled.

24 MR. HURLBERT: And why a number were cancelled.  
25 This year they will order about ten gigawatts of coal-fired

1 plants and next year they will order about 15 gigawatts and  
2 the year after that they will order about 20 gigawatts of  
3 coal-fired plants. There were not any required new orders  
4 from our point of view in the Frost Belt. All of the new  
5 orders and all of the load growth, Frank is still working  
6 off his excess reserve margin. It will all be on the West  
7 Coast, the Rocky Mountains and the Southeast.

8           We are getting pretty tight in a number of places  
9 in the country right now. Jacksonville rotated blackouts  
10 and Gulf States is getting pretty tight. The Rocky Mountain  
11 region is getting pretty tight. The Pacific Coast is  
12 getting pretty tight, although they just bought four  
13 coal-fired plants. So it is just now coming to where we  
14 have worked off our backlog and now is the critical time.

15           From our point of view, half of those coal-fired  
16 plants would be nuclear plants if we could get our act  
17 together between the architect/engineers, the vendors, the  
18 utilities and the regulatory body.

19           COMMISSIONER BRADFORD: When you talk about  
20 uncertainty then are you talking about uncertainty as to  
21 whether the plants will ultimately be licensed at all or  
22 uncertainty as to how much they will cost compared to coal?  
23 Because just looking at Floyd's projections here I assume  
24 that if the utilities and the people who lend the money had  
25 faith in those projections and had faith also that the

1 demand would be there then the money to build nuclear plants  
2 would be forthcoming and the orders would also.

3 MR. HURLBERT: All of my cost calculations show  
4 that you have got to depend on how long it is going to take  
5 to build it and you have to depend on what its up-time is  
6 going to be and what its capacity factor is going to be  
7 before you can make an intelligent decision on cost.

8 Those costs are based on reasonable construction  
9 schedules and reasonable up-times. It is the uncertainty of  
10 how long it will take so therefore how much it will cost.

11 COMMISSIONER BRADFORD: What are the construction  
12 schedules and the capacity factors?

13 MR. CULLER: These assume ten years for nuclear.

14 COMMISSIONER GILINSKI: That is why I asked  
15 earlier whether you thought you had made reasonable  
16 assumptions about the real world.

17 MR. CULLER: We use all of the architect/engineers  
18 and Gordon's people and GE in assembling these data. It is  
19 not going to be right everywhere but it is reasonably  
20 current and it is a reasonable assessment of what it takes  
21 in time. There is a schedule of them in the report for  
22 various sources. Sixty-one or 62 is the average for nuclear  
23 and I think 65 for coal in the projections for the near term  
24 and a little bit better in the far term.

25 COMMISSIONER BRADFORD: Then if the time really



1 were ten years and the capacity factor were to be 60 percent  
2 I am still having trouble defining the uncertainty that is  
3 preventing people from ordering nuclear as against coal over  
4 the next few years. Is it a sense that in fact the plants  
5 won't be licensed?

6 MR. STASZESKY: I would like to offer some  
7 response. In the first place all of our economic analysis  
8 indicates that nuclear is the most economic final overall  
9 cost for kilowatt hours for the Northeast where I am  
10 familiar with. I believe this is true also in many other  
11 parts of the country, but I am just going to talk about the  
12 area where I have confidence that I know exactly what I am  
13 talking about. That varies a little bit, depending on who  
14 is making the estimates, but it is in the order of 15 to 20  
15 percent better, more economical, for nuclear.

16 That looks at the same questions we were talking  
17 about earlier of what kind of environmental requirements and  
18 other regulatory requirements would you anticipate at this  
19 point which is what Floyd was forecasting for coal and other  
20 alternatives as well as for nuclear. So we would prefer to  
21 build nuclear.

22 Now, for my company when lead times were shorter  
23 we did a rolling ten-year forecast of what our requirements  
24 were and when we saw new generation required out in that  
25 period then we built it into our forecast base which



1 includes a financial forecast which is part of that  
2 forecast. It isn't just what our needs are going to be but  
3 so that we can also start our financial planning.

4           Because the lead time is stretched out so far we  
5 are not doing that on a 15-year base. On a 15-year base,  
6 including and anticipating that Pilgrim-2 will be in service  
7 we would need additional capacity in 1992. We determined  
8 that actually last year. Our forecast this year doesn't  
9 tell us anything different. It says the same thing, that we  
10 will need additional capacity in '92.

11           So we have built into our financial planning  
12 forecast the financial requirements for that unit. Now, in  
13 fact, for that particular unit we were not going to build a  
14 nuclear unit. That is not what is in our forecast.

15           CHAIRMAN AHEARNE: Why?

16           MR. STASZESKY: But be that as it may, we put  
17 money into 1981 to plan for that unit and that is scheduled  
18 for September. So the question before us is will we go  
19 forward and go to our board of directors for a commitment of  
20 those funds in September for a unit at that time. I don't  
21 know if we will or we won't.

22           The problem that we really have to examine is what  
23 are the uncertainties associated with that investment and  
24 really coming to what happened, you know, why don't people  
25 get these orders down, and our forecast of inflation

1 problems, the ability to recover investment, the lead time  
2 and what seems to be going on in our forecast of regulation  
3 for that unit.

4           Incidentally, that unit was anticipated to be a  
5 coal-fired unit that would use gasified or liquefied coal,  
6 probably gasified, and would be a combined cycle frontend.

7           The answer as to "why" was because that is  
8 relatively efficient, but because of our mix and the mix in  
9 all of New England and all of the nuclear power that is  
10 coming into play in New England, Millstone-3 is being built,  
11 Seabrook is being built and so forth, the mix of nuclear  
12 versus non-nuclear does affect what the ultimate capacity  
13 factor will be on the units and what the final cost per  
14 kilowatt will be. So for that point in time for us that was  
15 the right choice.

16           CHAIRMAN AHEARNE: Are you saying that because of  
17 those other factors that the economics broke against nuclear  
18 for that unit?

19           MR. STASZESKY: Just for that unit, yes. But if  
20 we just look for a unit, coal versus nuclear, nuclear comes  
21 out cheaper. Actually what we are shooting for in New  
22 England is 50 to 55 percent nuclear.

23           CHAIRMAN AHEARNE: Is it incorrect to conclude  
24 from what you said, Frank, that had the economics broken the  
25 other way, nuclear ahead, you would have gone nuclear in

1 spite of these uncertainties that are being talked about?

2 MR. STASZESKY: We would have put it in our plan.

3 CHAIRMAN AHEARNE: Okay. As you pointed out, you  
4 are still not sure.

5 MR. STASZESKY: When the time comes to commit we  
6 will look ahead and say how confident am I that this plant  
7 will be licensed in a timely way and that I know what the  
8 final cost will be. That break point for us is September of  
9 this year in our plan.

10 Now, if that had happened to be nuclear, I agree  
11 with these gentlemen, that unless it was something  
12 tremendously different from what I see today we would not  
13 commit a nuclear plant and I don't know who would based on  
14 the uncertainty that is out there which comes to the final  
15 question.

16 If you believe Floyd's numbers, which I do, not  
17 the exact numbers, that if we don't have nuclear we are  
18 going to have a shortfall of electric supply in this country  
19 with very dire results. I do believe in that.

20 So the question is what does a utility do if he  
21 doesn't get down there with his order either for a nuclear  
22 plant or some other long lead-time plant, and coal is no bed  
23 of roses I might add, the answer, and it is not in the  
24 customer's interest and it is not in the country's interest,  
25 but the answer is that at the last minute, and the last

1 minute may be five years or something like that, when you  
2 say we can't wait a day longer and you go out and you buy a  
3 gas turbine or something. Then the country suffers in many  
4 ways. It has a higher cost of electricity, the national  
5 security is damaged and that is exactly what happens.

6 MR. CULLER: There is another source of  
7 uncertainty and basically it is the nuclear plants are now  
8 subject to being down with frequency and the uncertainty  
9 that is given perhaps by the whole attitude of questioning  
10 by review after review stretching long into time. The  
11 questions of safety lead to the uncertainty in the public  
12 mind and on the part of the utilities as to whether or not  
13 nuclear is going to make it. So that there are several  
14 sources of uncertainty in addition to the economics.

15 CHAIRMAN AHEARNE: As time is running out we would  
16 like to turn to the gentleman who is on my right and ask  
17 whether he would like to make any comments.

18 COMMISSIONER HENDRIE: There are, as all of you  
19 have noted in various ways this morning, an assortment of  
20 restraints that now operate to keep new orders from  
21 appearing and that apparently are going to continue to  
22 operate for some time in that way. Some of those are within  
23 this agency's purview and some of them aren't.

24 I guess my own sort of horseback cut at it would  
25 be that about half the problems are here and half of the

1 problems are in other places, including not notably the  
2 assorted regulatory commissions, the state commissions that  
3 all the utilities have to deal with.

4           Nevertheless, that doesn't say that for any of us  
5 we ought to say, well, we are only a part of the problem and  
6 go and get the rest of it fixed up and come back here. I  
7 think it would be useful for everybody to try to improve the  
8 situation.

9           Now, if you are ever going to build a plant  
10 rapidly or at least rapidly once you have come to the  
11 conclusion that you want a nuclear plant and have begun to  
12 commit appreciable funds to it so that then the interest  
13 problem begins to roll two things have got to happen.

14           One of them is there has to be some level of prior  
15 agreement on the plant design so that it is not restrained  
16 unduly by the necessary length of staff review processes and  
17 arguments over design features. Well, we have a batch of  
18 what are called standard designs out there that have some  
19 level of staff approval. In principle at least these could  
20 get churned through once more for Three Mile Island related  
21 things and there would then be available at least a limited  
22 number of reasonably well agreed to plant configurations.

23           Now, I say a limited number because my own view is  
24 that it is going to have to go beyond the nuclear steam  
25 supply and the agreed-upon parts of those designs. You are

1 going to have to go out and cover the essential safety  
2 systems in the balance of plant, the auxiliary systems.  
3 Those are the places that have hung us repeatedly before.

4           Nevertheless, there is a lot of stuff along that  
5 line that has been accomplished or is in the mill on a hold  
6 status since Three Mile Island and I think we might very  
7 well get there. Okay, so that is sort of the design side.

8           But the other side is that siting plants is going  
9 to continue to be a hassle at some places more than others  
10 but not easy any place. That means if you are going to be  
11 able to go rapidly and efficiently once you start committing  
12 heavy funds to a plant that you have to get some  
13 corresponding level of agreement of the siting.

14           So it seems to me from the utility's standpoint  
15 you have got the following problem. You can't have an  
16 economically viable nuclear project unless you can do it  
17 rapidly and you can't do it rapidly unless you can get  
18 started on the arguments over siting and the inevitable  
19 hearings and arguments and compromises and so on and you get  
20 yourself into sort of a chicken and egg situation.

21           You aren't going to want to start on that siting  
22 venture unless you are confident you can have a viable  
23 nuclear project and make an adequate case for it on the  
24 economics and so on, but you can't make that case until you  
25 have got the siting set up. So now you are bound.



1           I wonder how we are going to achieve the situation  
2 where utilities or somebody is willing to come forward and  
3 start carrying out the site examinations and proposing for  
4 consideration and review the sites that we need. I suppose  
5 to at least some extent and on some systems that already  
6 have plants you can come in with putting more units on  
7 existing sites and that has the advantage that we have  
8 looked at those sites and either we like them or we don't  
9 like them. Some of the existing sites I don't think we  
10 would be very happy to see proposals for new units. Please  
11 don't bring me Indian Point-4. You know, I have got enough  
12 to worry about.

13           (Laughter.)

14           MR. HURLBERT: I can't stand another Indian Point.

15           (Laughter.)

16           COMMISSIONER HENDRIE: I can remember when we were  
17 almost up to Indian Point 6 back -- well there was a point  
18 in the early Seventies or maybe '69.

19           Anyway, it is not quite clear to me of how do we  
20 get to a place where utilities or state siting boards or  
21 somebody has got the funds and the willingness to go ahead  
22 and fight a series of site battles, because there are going  
23 to be battles, and go through hearing processes and get  
24 approvals on site contingent on, you know, reactors that  
25 fall within some prescribed envelope there in a circumstance



1 when you are not going to be able to say that you have very  
2 much assurance that there will ever be a viable nuclear  
3 generating plant project to occupy that site.

4           That is a problem for you it seems to me in all  
5 kinds of ways, justifying the expenditure of the funds for  
6 that site, examination, review and the licensing process to  
7 a rate commission when you can't say for use that you are  
8 going to build a plant there and generate some power and all  
9 sorts of similar difficulties.

10           I don't ask you the question of what are you going  
11 to do about that. I would be interested to comment. I  
12 would like to point out that having brought the process of  
13 new orders and a licensing process which, if not ideal, at  
14 least had some forward motion, having brought all that to a  
15 stop or havind had it brought to a stop for us by the events  
16 of the past two years, there is problem in getting it  
17 started again. As is the case with most pieces of  
18 machinery, getting the parts moving together again to  
19 achieve a steady state dynamic condition is pretty hard.

20           MR. STASZESKY: Mr. Hendrie, I would just comment  
21 that I am not positive of the solution but I am reasonably  
22 certain that all it needs is leadership. We have an example  
23 in Massachusetts. We have a Governor who is pro-growth and  
24 pro-business and pro-energy not because it is going to do  
25 something for him personally but because he has the same  
concepts

1 that Floyd was trying to lay out and that these two  
2 gentlemen have both mentioned, which is that for the welfare  
3 of society and the growth for the people who exist in the  
4 world today, in the United States today, who are going to  
5 form family units, who are going to have anticipations and  
6 expectations and certainly the minorities of our country who  
7 have the most to gain from growth in society need increased  
8 energy supplies. That is what our Governor seeks.

9           The fact of the matter is today the unemployment  
10 rate in Massachusetts is 4.7 percent, whereas previous to  
11 his administration it was difficult to get permission to  
12 build anything, whether it be, and never mind a nuclear  
13 power plant, whether it be an oil refinery or some kind of a  
14 manufacturing facility other than high technology which  
15 doesn't have many impacts on the environment. These  
16 licenses are now issuing, but what is the difference? The  
17 difference was the leadership and the political leadership  
18 of the Commonwealth of Massachusetts.

19           My response to your question of how is this  
20 brought about, I think it is brought about through  
21 leadership and not by sitting back and wringing our hands  
22 and saying what can we do. We have to get people in place  
23 who are willing to say I believe this is important for the  
24 welfare of my state or my country and then he has to get out  
25 and tell the people that he believes that. I don't think we

1 have seen that in the past four years. So that is my  
2 response.

3 I wonder if I could offer one other comment,  
4 Mr. Ahearne, again just from a personal experience point of  
5 view reinforcing this growth in electricity because I think  
6 there are a number of people in society who may question,  
7 you know, the growth figures. They say, well, we aren't  
8 really going to need it. So there is always a reluctance to  
9 get started with it and that is the problem when something  
10 has a long lead time. It is difficult to really get people  
11 convinced that something is going to be needed 10 years away  
12 or 12 years away.

13 It is just difficult to get the process moving  
14 when most people are more concerned with the fact of  
15 inflation and the increase in their disposable income is  
16 actually in a negative direction based on inflation.  
17 Newspapers aren't interested in what is going to happen 10  
18 or 12 years from now. So it is difficult to get people's  
19 attention. But the fact is that this growth is happening.

20 In the City of Boston this year, 1981, 1982, 1983,  
21 1984, in those four years there will be \$1 billion of new  
22 commercial construction, hotels, office buildings, growth.  
23 Now, in Boston we have a district steam heating system.  
24 Unfortunately, the only source of fuel for that district  
25 steam heating system is oil and we burn the cheapest oil

1 there is. It is residual oil and, unfortunately, it is half  
2 percent oil which increases the cost. But, nevertheless, it  
3 is cheaper oil than anyone else can buy.

4 We cannot sell the district steam heating system  
5 to these new major buildings. Why not? Because the people  
6 putting up those buildings say even if your cost is less  
7 today it isn't going to be tomorrow. Oil is absolutely an  
8 uneconomic thing for us to put our confidence in oil to  
9 supply the energy requirements of those buildings, the space  
10 heating.

11 Out of seven new hotels presently committed in the  
12 City of Boston four of them are totally electric. We didn't  
13 sell them. They sold themselves. That load is coming on.

14 MR. CULLER: Mr. Chairman, may I comment.

15 CHAIRMAN AHEARNE: We are about to bring this  
16 meeting to a close.

17 COMMISSIONER BRADFORD: I have a comment, too.

18 MR. CULLER: Quickly on the siting. There is the  
19 importance of the source term on siting and the degraded  
20 core hearings have great influence on siting and I think you  
21 recognize this. It is one of the uncertainties now present  
22 in the nuclear picture.

23 COMMISSIONER BRADFORD: As one who has been both a  
24 state regulator and now a regulator on this Commission ---

25 (Laughter.)

1           COMMISSIONER BRADFORD: --- I guess a hundred  
2 percent of the problem is as Joe divided it up, but it does  
3 give me some perspective on the phrase "regulatory  
4 uncertainty" which somehow seems to have come into the  
5 lexicon at just about the time that I came into regulation.

6           (Laughter.)

7           COMMISSIONER BRADFORD: It isn't I think simply a  
8 matter of whimsicality in the regulatory agencies or  
9 leadership in the sense that it comes and goes depending on  
10 who is in charge at the top at the time. In this agency as  
11 I see it regulatory uncertainty in the sense that I think I  
12 have been hearing it from you all this morning comes from a  
13 set of very specific events and concerns.

14           To some extent it is that the plants as designed  
15 and then built, as we talked about earlier, simply are not  
16 always the plants that we think that we have licensed and  
17 there are just a number of specific cases that one can  
18 sight. We think we have licensed plants with qualified  
19 equipment and then it turns out on a closer look that the  
20 equipment isn't always qualified. We think we have licensed  
21 plants that can't have fires to do a given amount of damage  
22 and then when we go back and look a few years later we  
23 discover that the fire protection configurations aren't  
24 quite what we thought we had licensed. We think we have  
25 licensed full proof scram systems and then we have an

1 episode like the Browns Ferry one of last year with regard  
2 to hydrogen control and some specific containments, and one  
3 can go on like that.

4 I think the overall sense of regulatory  
5 uncertainty that you have does trace back to a set of  
6 specific causes. Now, it may well be that there are things  
7 in our licensing process, things in the ways we set  
8 schedules or set deadlines and sometimes have to shut plants  
9 down that can be improved.

10 The fundamental cause or the reason we do these  
11 things does stem from sets of events that continue to show,  
12 most recently at Indian Point, that the plants have a way of  
13 fooling both those who design them and those who regulate  
14 them. That doesn't happen because Jimmie Carter is  
15 President for one four-year period and it won't necessarily  
16 stop because Ronald Reagan is President for the next four  
17 years or eight years or however long.

18 I agree with Joe that there may be a lot to be  
19 gained out of early siting. It may that what is forthcoming  
20 in terms of what we will learn about iodine will offer some  
21 encouragement and there may be ways that we can improve the  
22 process. But at the bottom it won't wash to say that the  
23 problems that you and we have now come simply from something  
24 called regulatory uncertainty because that uncertainty does  
25 have a real basis and the basis is in the way the plants are

1 designed and built. You have acknowledged it today as well,  
2 but I just wanted to re-emphasize that there is a problem on  
3 your side of the table as well as on ours.

4 I did have a couple of questions, but I think it  
5 is better to do them on the phone.

6 CHAIRMAN AHEARNE: When you go into an outreach  
7 program you reach out and you hear some things which you  
8 know and some things you don't know and some things you like  
9 and some things you don't like. I think it has been an  
10 interesting morning and we will just have to see to what  
11 extent both sides go forward.

12 Thank you very much.

13 (Whereupon, at 12:05 p.m., the meeting concluded.)

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NUCLEAR REGULATORY COMMISSION

This is to certify that the attached proceedings before the

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in the matter of: MEETING WITH AIR ON THE FUTURE OF NUCLEAR POWER PLANTS

Date of Proceeding: January 21, 1981

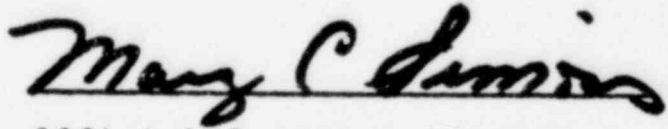
Docket Number: \_\_\_\_\_

Place of Proceeding: Washington, D. C.

were held as herein appears, and that this is the original transcript thereof for the file of the Commission.

Mary S. Simons

Official Reporter (Typed)



Official Reporter (Signature)