

# NUCLEAR POWER 2010 PROGRAM

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HEARING  
BEFORE THE  
COMMITTEE ON  
ENERGY AND NATURAL RESOURCES  
UNITED STATES SENATE  
ONE HUNDRED NINTH CONGRESS

FIRST SESSION

ON

THE DEPARTMENT OF ENERGY'S NUCLEAR POWER 2010 PROGRAM

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APRIL 26, 2005



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## NUCLEAR POWER 2010 PROGRAM

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TUESDAY, APRIL 26, 2005

U.S. SENATE,  
COMMITTEE ON ENERGY AND NATURAL RESOURCES,  
*Washington, DC.*

The committee met at 9:04 a.m., in room SD-364, Dirksen Senate Office Building, Hon. Pete V. Domenici, chairman, presiding.

### OPENING STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. The hearing will please come to order.

I want to say to the witnesses first thank you both. I know that you are both very busy and we appreciate your taking time to come here today. We will try to be as brief, yet productive as we can.

And Senator Bingaman was unfortunately tied up in a Finance Committee hearing. And he has been working hard on issues in that committee and he will be here as soon as possible. But we are going to proceed without him and indicating through his staff that we are to proceed.

It is obvious the purpose of the meeting. It is to evaluate the progress of the Department and their Nuclear Power 2010, NP 2010 Program. We would like to get a better overall sense of the commitment the administration or lack of commitment, whatever the case is—I think it is a commitment—regarding nuclear power.

Thank you for coming, Senator Craig.

The program, we hope, will be discussed in the context of an integrated American strategy through the administration for a renaissance of nuclear power in our country.

Currently we have 103 power plants that are operating here in our country. These reactors provide a little over 20 percent of the total generation. It is all free of greenhouse gas emissions. And that is an important diversity with reference to our supply.

We all know that they provide many things and we all know that we are engaged in a very dedicated and firm effort with reference to nuclear waste. I am not frightened of the issue. I think we are going to put ourselves in a position where science—we are going to do it on a scientific basis where we can provide a solution.

Everyone knows there are many stumbling blocks. One of them obviously is the high up-front capital costs. The second is, although we have a new regulatory scheme or system, the fact that it is untried in its totality also is something that is a drag on proceeding.

But I believe that it is a legitimate new process and I think it is going to work and I think industry is beginning to understand

that with some statutory help and some language help in the bill, they are going to be able to proceed.

But lack of progress on the spent fuel management is a stumbling block, but I believe it is going to be worked out.

Now, nuclear plants are being operated and built elsewhere in the world. Four of these plants are under construction in Japan. I think that is correct. Two in China, two in Taiwan, two in Korea, one in Finland, and France is close a final legislative action to move them ahead.

So I said many years ago that we needed a renaissance in this area. Clearly we are moving. I am delighted to have been a part of that. I hope I will be part of really seeing that renaissance occur. I am enthusiastic speaking now to the Nuclear Regulatory Commission.

The pending early sites permits, ESPs, for three utilities are under review. I hear that there may be more on the horizon. This is a key step on the road to new plants in the United States.

Additionally there are three consortia, NuStart, Dominion, and TVA, that have been awarded moneys in a cost-share arrangement by 2010, NP 2010, to put together a combined construction and operating license, a COL, for submittal to the NRC.

This too is one of those areas where we open the door for new plant construction down the line and, in this case, not too far down the line.

Now, having said that, I am very pleased that a number of Senators on this committee are energized by the idea of having nuclear power in our diversification portfolio and that I think two of them are right here. There are more than the two that are advocates.

And before we proceed with the testimony, and I do thank both of you, I want to ask Senator Craig, Senator Alexander in the reverse order because he was here early, waiting, if you have any comments, starting with you, Senator Alexander, and then, Senator Craig, and then we will proceed.

**STATEMENT OF HON. LAMAR ALEXANDER, U.S. SENATOR  
FROM TENNESSEE**

Senator ALEXANDER. Thank you, Mr. Chairman. I am here mainly to listen.

But to underscore the urgency of this hearing and what we are talking about, natural gas prices are at record highs, threatening to move tens of thousands, maybe hundreds of thousands of manufacturing jobs overseas, threatening to bankrupt farmers, and threatening to cause homes to be too expensive to heat and cool.

And one way to reduce the price of natural gas is for us to move ahead with nuclear power because virtually all of our new electricity plants are natural gas.

So I think a part of this hearing, Mr. Chairman, is to help the American people understand that gas prices at the pump are one problem, but I think natural gas prices are a bigger problem.

And I do not see any other sustained solution for the next few years to that, as well as to clean air and clean energy generally other than what you call a renaissance of nuclear power.

So I am anxious to hear what the witnesses have to say and to join you and Senator Craig and Senator Bingaman in creating a

framework in which nuclear power can succeed. We invented it. We have operated in the Navy since the fifties without a single incident. We ought to be able to move ahead with it.

The CHAIRMAN. Thank you, Senator.  
Senator Craig.

**STATEMENT OF HON. LARRY E. CRAIG, U.S. SENATOR  
FROM IDAHO**

Senator CRAIG. Well, Mr. Chairman, you have laid out all of the issues that are before us that are of extreme importance to us. And there is no question the two gentlemen in front of us this morning are an important player in all of it.

What I would hope to hear from you all this morning is where the potential stumbling blocks may be. Can we do construction operating licenses through the Nuclear Regulatory Commission? Do you have the money? Do you have the staff? Can we move these kinds of things forward?

NP 2010, Mr. Secretary, have you got the budgets necessary to carry it off or are we giving lip service to an idea that is important in helping industry facilitate it?

All that Senator Alexander has said, all that Senator Domenici has said is true. There are a lot of industries looking at us at this moment saying we have got to build base load in the decade ahead. And the only way to get it done right now based on technologies and clean energy and emissions concerns is nuclear.

I also find it fascinating when we talk about gas prices, in our ability to cite LNG facilities, this is not without its problems too. And there is always complications involved.

Government has to get involved in this in a proactive way to knock down the barriers and to clear the path forward in so many phases of our energy ramp-up again.

And we simply got to get at it. That is what this committee is all about. I am anxious to hear your testimony.

Mr. Chairman.

The CHAIRMAN. Thank you very much.

I want to insert in the record an editorial op-ed piece by John Rich in this morning's "Washington Post" entitled "The Key to our Energy Future" and then it is all about nuclear power.

The writer is a director general of the World Nuclear Association. He was a U.S. Ambassador to the International Atomic Energy Agency and other U.N. agencies in Vienna from 1993 to 2002. It is an excellent piece.

The CHAIRMAN. And before I yield to Senator Bingaman, I do want the record to reflect that James Asselstine, the managing director of Lehman Brothers was scheduled to be here, but his mother passed away on Sunday afternoon and he was with his family today.

So I want to extend our condolences to him and his family and we are sorry for their loss.

Mr. Asselstine contacted the committee incidentally and offered to submit his testimony, although he could not be here, and we will accept that. It will be received and briefed for us by our staff.

[The prepared statement of Mr. Asselstine follows:]

PREPARED STATEMENT OF JAMES K. ASSELSTINE, MANAGING DIRECTOR,  
LEHMAN BROTHERS, INC.

Mr. Chairman and members of the Committee, thank you for the opportunity to appear before you today. My name is Jim Asselstine. I am a Managing Director at Lehman Brothers, where I am the senior fixed income research analyst responsible for covering the electric utility and power sector. In that capacity, I provide fixed income research coverage for more than 100 U.S. electric utility companies, power generators, and power projects. As a research analyst, I also work closely with the large institutional investors who have traditionally been a principal source of debt financing for the power industry. In addition, I served as a member of the Secretary of Energy Advisory Board's (SEAB) Nuclear Energy Task Force, and assisted in the preparation of the Task Force's January 10, 2005 draft report entitled "Moving Forward with Nuclear Power: Issues and Key Factors."

I appreciate your invitation to testify at today's hearing regarding the status of the Department of Energy's Nuclear Power 2010 Program. Mr. Chairman, in your letter of invitation, you asked that my testimony focus on the financial community perspective on the growing interest in the future of nuclear energy in this country, especially on the potential for new reactor orders for the first time in thirty years.

With respect to our existing nuclear plants, the financial community has an increasingly positive view of the value of nuclear assets based upon their strong regulatory and economic performance. By way of background, we currently have 103 operating nuclear units in the United States. These units are located in 31 states and are operated by 27 different companies. Together, these plants represent about 97 gigawatts of generating capacity, or about 12 percent of total U.S. capacity. Because these are baseload plants that operate with high reliability, these units produce about 20 percent of total U.S. electric output. The plants consist of two reactor types: 69 are pressurized water reactors; and 34 are boiling water reactors. Of our existing fleet, the last unit to enter commercial operation was TVA's Watts Bar 1 unit in June 1996.

Following the enactment of the Energy Policy Act of 1992, analysts and investors focused considerable attention on the transition arrangements as we moved from regulated to competitive markets, and especially on the ability of the utilities to recover their stranded costs. (Stranded costs represent the difference between the book value of the utility's assets and their market value in the competitive market.) In many instances, capital investment in the existing nuclear plants represented a substantial portion of the utility's stranded costs. To date, about half of the states have adopted restructuring plans for the power industry. In essentially all cases, these plans have provided the utilities a fair opportunity over the transition period to competitive markets to recover most or all of their stranded costs. Further, the states have provided for the continued recovery and collection of nuclear plant decommissioning costs from retail ratepayers, recognizing that nuclear plant decommissioning is a health and safety requirement and a financial obligation that was largely incurred during the period of regulated operations. We have also seen considerable consolidation in the ownership and operation of the U.S. nuclear plant fleet. This consolidation has taken place through traditional mergers, purchases of nuclear units by other utilities, corporate restructurings, and new operating arrangements. Taken together, these industry restructuring arrangements have treated the existing nuclear plants in a fairly benign manner.

We have also seen significant improvement in the regulatory, operating, and economic performance of the existing plants over the past decade. The number of significant events reported to the Nuclear Regulatory Commission has declined substantially, as has the average duration of refueling outages. Average capacity factors for the U.S. nuclear fleet have improved significantly, and production costs have declined. As a consequence, a well-run single nuclear unit now has production costs, including fuel, operations and maintenance expenses, ongoing capital requirements, general and administrative expenses, and taxes, of about \$20/megawatt-hour, and large, multi-unit plants have production costs of below \$20/megawatt-hour. These production costs compare very favorably with other forms of generation, including coal-fired and gas-fired power plants. With the current high natural gas price environment, nuclear units, like coal-fired plants, are viewed by both the industry, and analysts and investors, as attractive assets.

One issue affecting analyst and investor perceptions of the performance of the existing nuclear plants is the need for effective inspection and maintenance practices to maintain the material condition of the plants. As a result of the extended shutdown of FirstEnergy's Davis-Besse plant, the financial community is sensitized to the adverse economic impacts of poor maintenance practices that result in a substantial degradation of the physical condition of important plant equipment. The in-



dustry will need to continue to pursue aggressive inspection and maintenance programs to ensure that material condition problems are identified and corrected at an early stage, before they result in serious degradation of important safety equipment. Avoiding similar Davis-Besse situations in the future, and ensuring the continued strong economic and regulatory performance of the existing plants will be important factors in building financial community support for new nuclear plant commitments in the future.

As analysts and investors consider possible future nuclear plant commitments by the industry, they are likely to focus on two key questions: is the proposed new nuclear plant cost competitive with other available alternatives for new baseload generating capacity? And, are the construction completion, and regulatory approval and licensing, risks for a new nuclear plant adequately addressed to give the financial community confidence that the new plant can be brought into commercial operation within the expected time and budget? Both the financial community and the industry itself are likely to require that new nuclear plants be cost competitive with other baseload generation alternatives, most notably gas-fired and coal-fired generation. As we move to more competitive power markets, industry decisions on new generation, and how the financial community perceives those decisions, will be driven by the relative cost, and the risks and uncertainties associated with the available alternatives. As discussed above, the strong operating performance of the existing plants demonstrates that production costs for a new nuclear plant should be very competitive with other alternatives, especially if the new plant design represents an evolutionary step beyond the existing plant designs.

The other variable is the capital cost of building the plant. Here, new nuclear units, and for that matter, new coal plants, face some potentially significant challenges when compared with gas-fired generation. Nuclear and coal plants have a more complex construction process, and take considerably longer to build, than gas-fired plants. This results in higher capital costs and higher interest costs during the construction period. Also, a longer time period is required to recover the investment after the plant has entered commercial operation. Taking into account these factors, I suspect that a new nuclear plant will need to have a capital cost in the range of \$1,000-\$1,200/kilowatt in order to be cost-competitive with the other available alternatives. Based upon the presentations received by the SEAB's Nuclear Energy Task Force, it appears likely that the fourth or fifth, and subsequent, units of a particular reactor design type can meet this cost target, but that the initial three to four units for each design type cannot. The difference is due to cost efficiencies in the construction of subsequent units and especially to the first-of-a-kind engineering, or FOAKE, costs needed to develop a sufficiently complete design to receive a final standard design approval from the Nuclear Regulatory Commission. According to the industry, these FOAKE costs are likely to be in the \$300-\$500 million range for each major reactor design type. Absent a backlog of firm orders for subsequent units, the reactor manufacturers are unlikely to absorb these FOAKE costs themselves, and adding them to the initial unit, or first few units is likely to make those units uneconomic when compared with other available alternatives. For this reason, the SEAB's Nuclear Energy Task Force recommended a cost-sharing mechanism under which the Federal government would pay fifty percent, up to a cap of \$200 million, of the FOAKE costs for each of up to three major reactor types. The Task Force also recommended that the Federal government charge a royalty payment of \$12 million per reactor for the first 50 reactors using these designs to recover the government's contributions to the FOAKE costs over time.

As to the construction completion, and regulatory and licensing, risks, analysts and investors will likely need a high degree of assurance that a new nuclear unit will be built at a predictable cost and on a dependable schedule. The industry and the financial community remember that a number of the existing plants that received their operating licenses in the 1980s and 1990s experienced delays due to regulatory or licensing issues that arose after most or all of the capital investment in the plant had been made. These delays were caused by a number of factors, including construction issues, quality assurance weaknesses, coordination issues between plant design and construction work, the lack of design standardization, changing regulatory requirements, and the mechanics of the two-stage licensing process, which resulted in a number of cases in litigation at the pre-operation stage. The Energy Policy Act of 1992 and subsequent actions by the NRC have put in place a new regulatory process that should result in the resolution of licensing issues at an early stage in the process before large capital commitments to build the plant have been made. This new regulatory process provides for the pre-approval of new, standardized plant designs, allowing for the resolution of regulatory issues and the completion of substantial design work before construction work begins. The process also provides for the pre-approval of nuclear plant sites. As is the case with the de-

sign approval process, the use of early site permits should allow major siting questions to be resolved before a decision is made to proceed with a new plant. Finally, and perhaps most importantly, the new process provides for the issuance of a combined construction and operating license. The objective of the combined license, together with an agreement on the regulatory standards to be applied by the NRC in monitoring the construction process, is to resolve all key safety and regulatory issues before the start of plant construction, and to minimize the risk of delays in plant operation after the capital investment has been made.

The NRC and the industry are now implementing and validating the standard design approval and early site permit features, and combined license applications could be submitted to the NRC as early as 2007-2008. The Department of Energy's Nuclear Power 2010 Program provides critical support for testing the design and early site approval, and combined license processes. This will provide some assurance that the new regulatory process will work as intended. Unfortunately, however, some uncertainty will remain until the first few plants have successfully completed the entire process of receiving a combined license, completing construction, and entering commercial operation. Until we gain this experience for the initial plants, both the industry and the financial community are likely to require some added measures to mitigate this construction completion and initial plant commissioning risk.

The nature and extent of these mitigation measures is likely to depend upon the financing arrangements to cover the construction costs of a new nuclear plant. Historically, our existing nuclear units were financed by electric utilities as part of their regulated utility operations. Typically, the utility would demonstrate that the new nuclear unit was needed and represented the best available alternative. Following state regulatory approval and receipt of a construction permit from the NRC, the utility would proceed with construction. Most construction costs were met by the utility with a combination of cash from its other utility operations, and the proceeds of new debt and equity issuance by the utility or its parent company. Recovery of most of the investment in the plant would not take place until after the plant had received an operating license from the NRC, the plant had entered commercial operation, and the state regulators had determined that the investment in the plant was prudent and recoverable from ratepayers. Although there were some unpleasant surprises in terms of state regulatory disallowances of some investments in the current generation of nuclear units, this system worked fairly effectively as a means to finance new plant construction in the 1980s and 1990s. Going forward, a regulated utility that elected to build a new nuclear unit could finance that plant as part of its regulated utility operations. Investors are likely to be most comfortable with this financing approach because they have access to all of the assets and cash flows of the company's regulated utility business.

Given the move to deregulated power markets in many regions of the country, however, it is perhaps equally likely that a future nuclear unit would be built and operated by a competitive generation company. Investors have been willing to invest in generation companies that have a substantial component of operating nuclear plants in their generation mix, especially if those plants have a solid track record of operating performance, are cost-competitive in their regional markets, and the generation company has stable revenues tied ultimately to retail customers or load-serving entities. Although it would be challenging, it is conceivable that a large competitive generating company with a diverse portfolio of operating assets, could finance the construction of a new nuclear unit with appropriate mitigation of construction completion and initial commissioning risk. Another alternative would be to finance a new nuclear unit through a consortium of a number of experienced nuclear companies, including utilities or generation companies, and manufacturers and suppliers, and perhaps even customers. The consortium approach has the advantage of limiting the financial risk to any single party, but presents other potential operational difficulties.

The most challenging alternative would be to attempt to finance a future nuclear plant on a stand-alone basis without recourse to another company or companies with other assets and revenues. Given the uncertainties associated with an untested licensing process, the length of the construction process, and the cost of the project, this non-recourse project financing approach does not appear to be feasible without substantial financial risk mitigation features such as a loan guarantee or direct government loan.

The SEAB's Nuclear Energy Task Force concluded that some Federal government financial incentives are needed, in combination with contractual provisions among the project participants, to ensure the dual objectives of cost competitiveness and mitigating commissioning risks to ensure the availability of financing, for a limited initial group of new nuclear plants. The Task Force also found that the relative

value of different financial incentives is likely to vary depending upon the financing arrangements used for the plant. Accordingly, the Task Force recommended that the Federal government provide a package of financial incentives that would be sufficient to permit financing under all of the different financing arrangements, and allow project sponsors to select individual financial incentives up to a total cost to the government of \$250 million per reactor for the first four reactors using each approved major design type. The Task Force recommended the following financial incentives: a Federal loan guarantee or direct government loans; a Federal power purchase agreement; accelerated depreciation; an investment tax credit; and a production tax credit. Mr. Chairman, I believe that a limited array of government financial incentives for a limited number of initial units, similar to the elements recommended by the SEAB's Nuclear Energy Task Force, in combination with appropriate contractual provisions for the project and with the benefits of the Department's Nuclear Power 2010 Program, should be sufficient to obtain the needed financing for a new nuclear plant under each of the different potential financing arrangements.

Finally, Mr. Chairman, I believe the financial community, like the industry, will look for two additional elements before supporting new nuclear plant commitments. The first of these is continued progress toward development of a long-term storage solution for spent nuclear fuel. The second of these is extension of the Price-Anderson Act to make the nuclear liability indemnification system available to new nuclear plants. It is doubtful that the industry or the financial community would proceed with a new plant commitment without this system in place. Mr. Chairman, I appreciate the invitation to provide testimony on this important initiative. Thank you.

The CHAIRMAN. Having said that, Senator Bingaman.

**STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR  
FROM NEW MEXICO**

Senator BINGAMAN. Thank you very much, Mr. Chairman.

I gather you already mentioned that I am sort of caught between two hearings today, so I appreciate the chance to at least make this statement. I think this is a very important subject and I appreciate the witnesses being here.

Mr. Asselstine, as you indicated, is also a witness I had looked forward to hearing. His testimony, as I understand it, deals with the whole issue of financing options for new nuclear power plants which is an important issue we do not get into in great depth in this hearing.

But I do think that much of our focus needs to be on what are the appropriate financial incentives that the Government should try to provide both for new generation nuclear plants, but also IGCC power plants.

And I know that Senator Alexander has taken quite an interest in that. I think that I need to understand that better. I think the whole committee probably does.

And I look forward to learning what I can from the testimony at this hearing and then have a chance to look into that as well more in the future.

Thank you.

The CHAIRMAN. Thank you, Senator.

Let us proceed now with our witnesses.

First of all, both of the gentlemen that are before us we know very well they have distinguished records, serving on behalf of their country, one the current Chairman of the Regulatory Commission.

The Honorable Nils Diaz is well known by all of us. And also we have with us the Honorable Clay Sell, Deputy Secretary. We know him well. We appreciate your taking the job you have.

And now we will proceed with you, Mr. Secretary, first, then the Chairman.

**STATEMENT OF CLAY SELL, DEPUTY SECRETARY,  
DEPARTMENT OF ENERGY**

Mr. SELL. Thank you, Mr. Chairman, Senator Bingaman, Senator Craig, Senator Alexander, members of the committee.

It is a pleasure to be here today to discuss the Department of Energy's Nuclear Power 2010 Program. I have submitted written testimony that I ask be made a part of the record and I would like to summarize it briefly.

The CHAIRMAN. It will be.

Mr. SELL. But before I begin that summary, I would like to address the questions that you raised in your opening statement.

You asked if the administration was, in fact, committed to a renaissance of nuclear power and we, in fact, are. And one of the reasons it has been easy to come to that decision is because it is the right decision and, second, because of the great leadership you and this committee have provided in leading the way to that decision.

Senator Alexander raised the questions about natural gas and the incredibly high prices. And, in fact, Senator Alexander, the United States has the highest natural gas prices in the world and it is having a significant effect not just on the cost of electricity but it is having a tremendous effect on the petrochemical industry, fertilizer manufacturers, and that affects the cost of food and the cost of farming.

And so nuclear power, it is important to address that specific problem as well as advance coal technologies as well.

In these times of growing dependence on foreign energy and increasing concerns about air emissions, nuclear power's advantages over other methods of electricity production are gaining renewed prominence.

Nuclear power is the only currently available technology that can reliably produce the large amounts of base-load electricity our country needs without emitting any pollution or greenhouse gases.

Moreover, nuclear power does not have to depend on any foreign resources which helps strengthen our energy security and helps keep more of America's energy dollars here at home.

But despite these benefits, the last time construction began on a new nuclear plant in this country was back in the 1970's and no new projects are currently in the works.

The 103 nuclear plants in America today are operating safely and economically, providing about 20 percent of our Nation's electricity. But during their development and construction, the builders and owners of many of these plants had to overcome some major financial and regulatory problems.

Plants that originally were projected to cost under a billion dollars ended up costing several billion dollars and taking years longer to complete than anticipated which caused serious financial hardship in the utility sector.

One reason for this was the overall economy at the time. The late 1970's when many of these plants were under construction were times of high inflation and double digit interest rates, conditions

that had a huge financial impact on capital-intensive projects like power plants.

The country had also ended up with a complex, lengthy, difficult and uncertain and often contentious process for siting and licensing nuclear power plants which drove construction and development costs as well as investment risk premiums so high that the capital markets would no longer support new nuclear projects.

As a result, the newest nuclear plant now in operation was ordered in 1973. The last new plant order came in 1978. But because of the high cost and regulatory uncertainties, all the plants ordered after 1973 and before the last order in 1978 were canceled.

In the nearly three decades since, however, advances in technology and management improvements have made U.S. nuclear power plants some of the safest, most efficient, and most cost-effective industrial facilities we have.

And new reactor designs will make the next generation of nuclear plants even safer and more efficient than the current fleet. But the high project development costs, regulatory uncertainties, and licensing concerns of the past remain in place, dimming the prospects of building any new commercial nuclear power plants.

Addressing these regulatory and financial challenges is the goal of the Nuclear Power 2010 Program. This program is designed to work with industry in a 50/50 cost-share arrangement to demonstrate the Nuclear Regulatory Commission's new one-step licensing process.

It is also designed to identify suitable sites for new plants and certified new state-of-the-art designs to pave the way for an industry decision to build new advanced light-water reactors in the United States in the next few years.

The President's fiscal year 2006 budget, to go to Senator Craig's question, supports the successful completion of the Nuclear Power 2010 initiative with a request of \$56 million. That is an increase of \$6 million over the current year.

And the administration is committed to cover half the cost of the full \$1.1 billion Nuclear Power 2010 Program over the next 6 years.

The program is making good progress toward its goals. We are moving ahead with two major cost-share projects with utility lead consortia to demonstrate streamline siting and licensing procedures for two new advanced reactor designs.

Today I am pleased to announce that the Department has finalized a cooperative agreement with one of these consortia, the NuStart team, consisting of nine major utility companies along with equipment manufacturers, General Electric, and Westinghouse, which will initiate the team's process of establishing a project schedule and budget and then site selection.

Mr. Chairman and members of the committee, your leadership and guidance has been essential to the progress this important program has achieved thus far. And on behalf of Secretary Bodman and our colleagues at the Department of Energy, we look forward to your continuing counsel and support in the days and years ahead.

I would be pleased to answer any questions you may have. Thank you.

The CHAIRMAN. Thank you very much.

[The prepared statement of Mr. Sell follows:]

PREPARED STATEMENT OF CLAY SELL, DEPUTY SECRETARY, DEPARTMENT OF ENERGY

Mr. Chairman, Senator Bingaman, and Members of the Committee it is a pleasure to be here to discuss the Department of Energy's Nuclear Power 2010 program

For most of our nation's history, America's vibrant economy and society have benefited from the abundant energy options we have had available. Even though we have increased our oil imports in recent decades, most of the energy used in the United States—including energy for home heating and electricity—is produced domestically. Our coal, oil, natural gas, nuclear, and renewable resources all contribute to a diversified and reliable energy picture.

However, we are entering a new era in energy supply. As highlighted in the President's *National Energy Policy*, forecasts indicate that our need for energy—even with ambitious energy efficiency measures across all sectors of the economy—will continue to grow as our economy grows. The Energy Information Administration forecasts that by 2025, the United States will import 68% of its energy for transportation uses and 38% of its total energy supply. Most notably, the U.S. will experience an increasing dependence on imported natural gas, which is increasingly important for generating electricity. Increased natural gas imports will require us to expand our capacity to accept shipments of liquefied natural gas.

Providing adequate and reliable supplies of electricity, while reducing emissions and meeting the other challenges, will require the development and application of advanced technologies. New technology can help us to exploit renewable energy sources when they are practical, and enable coal—which generates more U.S. electricity than any other fuel—to continue as a viable, long-term element of our energy supply. In addition, the President made it clear in his State of the Union address that we must also consider new nuclear power plants as part of our long-term energy picture.

NUCLEAR POWER TODAY

Today, American utilities operate 103 nuclear power plants. These efficient and reliable facilities provide one-fifth of the nation's electricity. These plants are emissions-free and can operate year-round in all weather conditions—unlike renewable sources such as wind, solar and hydro.

Over the past 15 years, nuclear utilities in the United States have become better managed, and have improved both efficiency and safety. In the early 1990s, U.S. plants were available to produce electricity only 70% of the time on average. These plants are now producing power more than 90% of the time. More efficient operation has allowed nuclear plants to produce more energy than ever before, adding availability equivalent to 25 new power plants since 1990—without building a single new plant.

The companies that today own and operate the nation's nuclear generating units have demonstrated that they are excellent operators with the ability to manage and operate the plants in a safe, cost-effective, and reliable manner. As a result of this success, essentially all U.S. nuclear plants are expected to apply for renewed licenses to stay in operation into the middle of the century. There will also be some new generation, with The Tennessee Valley Authority restarting a third unit at the Browns Ferry Nuclear Plant in Alabama that ceased operating in 1985. TVA expects to invest \$1.8 billion to bring this unit on line and add 1,280-megawatt (electric) generating capacity to the TVA system in the spring of 2007.

CHALLENGES FACING NUCLEAR ENERGY'S FUTURE

Four basic challenges to the deployment of new nuclear power plants have been identified by the utility and financial markets: regulatory uncertainty; financial uncertainty; permanent nuclear waste disposition; and Price Anderson indemnification. While the Department is working to address all four challenges, the Nuclear Power 2010 program is specifically focused on addressing regulatory and financial uncertainties. Regulatory uncertainty is centered on building industry confidence in the Nuclear Regulatory Commission's untested, combined licensing process to expedite construction and commissioning of new plants. Financial uncertainty, while potentially related to regulatory uncertainty, is based on the owners and operators of nuclear plants being able to accurately estimate the cost of a new plant and manage cash flows between the time the decision is made to build and the time the plant becomes operational and begins making money. Since February 2002, the Department has been working with industry to develop and execute a roadmap for address-

ing the regulatory and financial uncertainties hindering the near-term deployment of new nuclear power plants.

The Nuclear Power 2010 Program is designed to work with the nuclear industry in a 50/50 cost-shared arrangement to establish a market-driven, public-private effort to address the technical, regulatory and institutional challenges to new plant construction. The program's basic missions are to demonstrate the new Nuclear Regulatory Commission licensing processes, identify suitable sites for new plants, and certify state-of-the-art (or "Generation III+") designs for new nuclear power plants. The goal of the Nuclear Power 2010 program is to facilitate an industry decision to build and operate at least one new advanced light-water reactor plant in the United States early in the next decade.

#### NUCLEAR POWER 2010

While it is too early to determine success, the Nuclear Power 2010 program appears to be on the right track. Three utilities—Dominion Energy (North Anna, Virginia), Entergy (Grand Gulf, Mississippi), and Exelon (Clinton, Illinois)—are working with the Department to obtain "Early Site Permits" for three sites across the country the first time this important regulatory tool has ever been used. The Nuclear Regulatory Commission is reviewing the three Early Site Permit applications submitted by the utilities in the fall of 2003 and is expected to make decisions on the permits in 2006. The successful demonstration of the Early Site Permit regulatory process in pre-approving plant sites will avoid the problems in siting that substantially increased the cost of some plants in the 1980s and partially contributed to the abandonment of others. The results from these 50% cost-shared partnerships with industry also will include a streamlined and predictable Early Site Permit process for future applicants and a catalogue of lessons learned by the power companies from navigating the process. The Early Site Permit application and approval process, like all major Federal government construction projects, includes critical public participation in open meetings and through the National Environmental Policy Act Environmental Impact Statement process.

The Department is also working with the Tennessee Valley Authority (TVA) to conduct a detailed evaluation of the cost and schedule requirements for deploying an NRC -certified General Electric Advanced Boiling Water Reactor (ABWR) at TVA's Bellefonte site in Alabama. In addition to TVA, the team includes General Electric, Toshiba, Bechtel, USEC, and Global Nuclear Fuels. The final report from this study is expected in September of this year and will be considered in any decision regarding the viability of proceeding with this advanced reactor design at the site. Geological and seismological evaluations as well as transmission access and site infrastructure surveys are being conducted, with completion scheduled for the end of 2005. The Department has also recently received two new proposals from power companies to explore additional sites for new nuclear power plants, including existing nuclear sites and "greenfield" sites. The Department expects to make decisions on whether to proceed with these two new projects by the end of next month (May 2005).

In November 2004, the Department took another step forward in the Nuclear Power 2010 program by awarding two major cost-shared projects to utility-led consortia to implement plans that could lead to the construction and operation of new plants. Learning from the experiences of the early 1990s, when the Department directly funded U.S. reactor vendors for design certification activities, the Department is requiring these projects be led by utilities—the ultimate owners and operators. Central to this effort, these projects will provide first-time demonstration of the Nuclear Regulatory Commission's combined Construction/Operating License (COL) process. These utility-led projects could result in the first license applications for a new nuclear power plant beginning in 2007. The two consortia are the Dominion Energy-led project with General Electric and Bechtel and the NuStart Energy-led project that includes nine power companies (Entergy, Exelon, Constellation, Florida Power & Light, Southern Company, Progress Energy, TVA, Duke and EDF North America), General Electric, and Westinghouse. While the Department is committed to a 50/50 cost-share for the regulatory demonstration and technology certification activities, the actual cost of construction of any new nuclear plants will be borne completely by the project sponsors. The Department is committed to this seven-year, \$1.1 billion effort of which 50 percent would be non-Federal funding. The Department did experience a delay in initiating these two projects as a result of a change by Dominion in its preferred reactor technology, which occurred just prior to the planned issuance of its cooperative agreement in December 2004. We believe that Dominion's change from the Atomic Energy of Canada Limited Advanced CANDU Reactor, ACR 700, to the General Electric Economic Simplified Boiling Water Reactor,

tor, ESBWR, resulted from the longer-than-expected certification schedule set forth by the Nuclear Regulatory Commission for the AECL reactor. This longer certification schedule did not meet Dominion's deployment plans. The selection of the GE reactor technology affected the issuance of the Dominion cooperative agreement as well as the scope and funding for the NuStart project, because the GE technology is also part of that project. The Department asked these two consortia to work out an equitable arrangement and resubmit their cost proposals such that the work on the GE technology was split between the two projects. These cost proposals and cooperative agreements were re-evaluated by the Department's procurement staff prior to finalizing the cooperative agreements. In addition, intellectual property rights and royalty payment terms and conditions took longer to negotiate than expected.

The Department finalized its cooperative agreement with Dominion Energy on March 31, 2005, and Dominion has initiated the planning phase of the project, which will establish the detailed project schedule and baseline budget. Later this fiscal year, the Dominion-led project will submit a design certification application for the General Electric Economic Simplified Boiling Water Reactor (ESBWR) to the Nuclear Regulatory Commission. The Dominion team is focused on deploying the General Electric ESBWR technology at Dominion's North Anna site in Virginia.

The Department will finalize its cooperative agreement with the NuStart Energy team today, at which time the consortia will initiate the planning phase of the project to establish the detailed project schedule and baseline budget. Later this fiscal year, the NuStart-led project will complete its site selection process, which could result in the identification of a single site for a new reactor or multiple sites. The NuStart Energy team is focused on developing the General Electric ESBWR and Westinghouse AP1000 advanced reactor technologies.

Without the construction of new plants, nuclear power's contribution as a percentage of the nation's total energy mix will steadily decline. Nuclear power helps to maintain a more diversified energy supply and it has no emissions; nuclear power today comprises almost 75% of all the non-emitting power generation in the country.

The President's FY 2006 budget supports the successful continuation of the Nuclear Power 2010 initiative in FY 2006 with a request of \$56 million (an increase of \$6.4 million compared to FY 2005).

#### CONCLUSION

Our nation cannot rely on any single energy technology to secure its future. A broadly diverse energy supply has served us well in the past and must be available for the future. Nuclear energy should be a part of that diverse portfolio as we look to support our growing economy while limiting air emissions and enhancing America's energy independence.

The Department of Energy's goal is to work with the private sector, our overseas partners, and other agencies to assure that the benefits of nuclear technology continue to increase the security and quality of life for Americans—and other citizens of the world—now and into the future.

This concludes my prepared statement. Your leadership and guidance has been essential to the progress the program has achieved thus far and your support is needed as we engage the tasks ahead.

I would be pleased to answer any questions you may have.

The CHAIRMAN. Chairman Diaz.

#### STATEMENT OF DR. NILS J. DIAZ, CHAIRMAN, NUCLEAR REGULATORY COMMISSION

Dr. DIAZ. Thank you, Mr. Chairman, Senator Craig. It is a pleasure to be here, to appear before you to consider Nuclear Power 2010. My full testimony has been submitted for the record.

On behalf of the Commission, my statement today will focus on actions the Commission has taken, and is taking to ensure the continued safe, and secure civilian uses of nuclear technology and to provide a stable, efficient, and predictable framework for licensing and regulation.

In particular, I will address actions relating to early site permits, design certification, and combined license applications for new reac-



tors. We take very seriously our commitment to enable the beneficial use of safe and secure nuclear power.

Mr. Chairman, the bottom line is that the NRC is prepared to discharge its responsibilities regarding licensing of new nuclear power plants. New enhancements and resources are continually being assessed.

The new process in Part 52 established three new components of our licensing structure: design certification, early site permit, and combined license.

First, the NRC developed a standard design certification process by which the NRC extensively reviews the proposed reactor design and then, if appropriate, approve the design through public rule-making.

The Commission has already certified three new reactor designs, is nearing completion of a fourth design, and is prepared to receive a fifth application in the summer of 2005. Discussions are ongoing for several additional reactor design applications.

Part 52 also includes an early site permit process which allows early resolution of site-related issues, including certain environmental issues.

The NRC received three early site permit applications in late 2003 for sites at which operating reactors already exist in Virginia, Illinois, and Mississippi.

Schedules are in place to complete the safety reviews and environmental impact statements in approximately 2 years from the date of an application. I would like to say, Mr. Chairman, that we are on track.

Finally, Part 52 provides for a combined construction/operating licensing process which allows applicants to seek, in a single application, a license authorizing both construction and operation, prior to construction.

This leads to combining adjudication of licensing issues in one hearing instead of the two hearings utilized previously.

Furthermore, the efficiency of NRC's safety-focused reviews would be substantially increased if applicants utilize an early site permit and certified design in their combined license applications.

We believe this process will provide the needed stability and predictability in licensing reviews for new nuclear power plants, key components of which, I may add, have been or are being demonstrated by the new reactor design certifications and the ongoing work on the early site permit applications.

The NRC is using experience gained from the license renewal process to improve the efficiency of Part 52 combined license application reviews.

The Commission has also worked actively to ensure that its adjudicatory proceedings are conducted in a fair, effective, and disciplined manner now and in the future.

Based on our experience, an application needs to be complete. It needs to be of high technical quality and responsive to staff questions to enable and enhance the NRC's ability to make the appropriate safety determinations, meet our review schedules, and stay within resource estimates.

In conclusion, Mr. Chairman, I am here to assure you that the Commission is fully committed to making sure that our agency is ready to meet the expected demand for new reactor licensing.

The Commission believes the agency is prepared to accept and process applications in accordance with the applicable laws and regulations, continuing to focus on safety and utilizing risk-informed and performance-based regulations as appropriate.

The Commission must determine the additional resources for nuclear reactor licensing that will be needed to fully support and expand the Nuclear Power 2010 initiative.

Although specific plans are not yet available from the industry, the NRC may be faced with up to five combined license applications beginning in 2007 or 2008. To meet expected demand, NRC will need to begin preparatory activities soon to accommodate such large growth.

The Commission has benefited from strong congressional oversight and counsel, and stakeholder interactions, and we will continue to keep Congress informed about the impact of new reactor activities on the NRC.

Thank you and I welcome your comments and questions.

The CHAIRMAN. Thank you very much.

And both of your statements are in the record as you submitted them.

[The prepared statement of Dr. Diaz follows:]

PREPARED STATEMENT OF DR. NILS J. DIAZ, CHAIRMAN,  
NUCLEAR REGULATORY COMMISSION

INTRODUCTION

Thank you, Mr. Chairman and members of the Committee. It is a pleasure to appear before you as you consider "Nuclear Power 2010—New Nuclear Power Generation in the United States." My testimony today on behalf of the Commission will focus on actions the Commission has taken and is taking to ensure the continued safe and secure uses of nuclear technology and to provide a stable, efficient, and predictable framework for licensing and regulation of the civilian uses of nuclear materials. In particular, I will address actions relating to early site permits, design certification, and combined license applications for new reactors.

The U.S. Nuclear Regulatory Commission (NRC) is dedicated to the mission mandated by Congress—to ensure adequate protection of public health and safety, common defense and security, and the environment—in the application of nuclear technology for civilian use. In carrying out this mission, the Commission is mindful of the need to enhance safety, security, and regulatory predictability, when appropriate and justified. We take very seriously our commitment to enable the safe and secure beneficial use of nuclear power.

REGULATORY FRAMEWORK FOR NEW REACTOR LICENSING

The NRC is prepared to discharge its responsibilities regarding licensing of new nuclear power plants, though enhancements and resources are continually being assessed. In 1989, the NRC instituted a new combined construction/operating license process through the promulgation of 10 CFR Part 52, as an alternative to the separate construction and operating licensing steps specified in 10 CFR Part 50. The process was later addressed by Congress in the Energy Policy Act of 1992. The Part 52 licensing process is designed to resolve safety and environmental issues, including emergency preparedness and siting issues, early in the process and, thus, to provide a more stable, efficient, and predictable regulatory framework for utilities that might wish to pursue a new reactor license.

Part 52 established three new components of our licensing structure—design certification, early site permit, and combined operating license. First, NRC developed a standard design certification process by which the NRC extensively reviews a proposed reactor design and then, if appropriate, approves the design through public rulemaking. The Commission has already certified three new reactor designs and

codified them in the regulations, making them available for new plant orders. The proposed design certification rule for a fourth design was recently published for public comment. The NRC is also prepared to receive a fifth design certification application in the summer of 2005. As a result of experience gained during previous design certification reviews and to promote additional regulatory effectiveness, the NRC encourages early communication with potential applicants to identify unique design features or challenging licensing issues through the pre-application process. Currently, the NRC is engaged in conducting pre-design review or preliminary review discussions on six additional reactor designs, so we could receive several more design certification applications in the near future. I cannot stress enough the need for applicants to provide complete and high quality technical information.

The NRC also established a process for obtaining an early site permit, which allows applicants to seek approval of sites for new reactor units separate from an application for a construction permit or combined construction/operating license. By obtaining an early site permit, applicants can resolve site-related issues, including certain environmental issues, before the early site permit is issued. The NRC received three early site permit applications in late 2003 for sites at which operating reactors already exist in Virginia, Illinois, and Mississippi. Schedules are in place to complete the safety reviews and environmental impact statements in approximately two years from the date of an application. In fact, the NRC staff has already issued draft safety evaluation reports on all three early site permit applications. Also, draft environmental impact statements for two of the three early site permit applications have been issued for public comment. The NRC staff is currently reviewing the public comments received on these documents. The mandatory adjudicatory hearings associated with the early site permits are currently ongoing; conclusion of these hearings is, in part, dependent upon completion of all associated staff reviews. While I am pleased to be able to provide this information on the status of the reviews of the three early site permit applications, the Commission serves in an adjudicatory capacity in reviews of our Licensing Board's decisions and, thus, it would be inappropriate for me to address substantive issues associated with the resolution of these early site permit proceedings.

Finally, Part 52 provides for a combined construction/operating license process which allows applicants to seek, in a single application, a license authorizing both construction and operation. This leads to combining adjudication of licensing issues in one hearing, instead of the two hearings that have attended the licensing process utilized previously. Furthermore, the efficiency of NRC's safety-focused reviews would be substantially increased if applicants utilize an early site permit and certified design in their combined license applications. We believe this process will provide the needed stability and predictability in licensing reviews for new nuclear power plants, key components of which have been, or are being, demonstrated by the new reactor design certifications and the ongoing work on the early site permit applications. The NRC is working to clarify and refine the 10 CFR Part 52 licensing process further in order to incorporate recent experience gained from design certification reviews, current early site permit reviews, discussions with nuclear industry representatives, and input from the public. I am convinced that these measures, individually and in combination, are providing a means to enhance safety for nuclear power generation in the future.

License renewal for existing operating reactors provides another example of how the NRC has sharpened the safety focus of its licensing process. The NRC has received license renewal applications for 48 reactor units and has approved 20-year extensions for 30 reactor units; an additional application covering two reactor units was recently returned to a licensee as unacceptable for docketing. These reviews have been consistently completed in a timely fashion, meeting the NRC's schedule of 22 months for completing a review without a hearing request and 30 months when a hearing is requested. NRC is using experience gained from the license renewal process to improve the efficiency of Part 52 combined license application reviews. The agency is committed to a continuing holistic improvement of our regulatory review processes, with a sharpened focus on matters important to safety. This has been well demonstrated by the use of disciplined review processes in many licensing activities, including the review of applications for license renewals and for power uprates. Our experience to date is that an application that is complete, of high technical quality, and responsive to staff questions has a direct impact on the NRC's ability to make the appropriate safety determinations, meet our review schedules, and stay within resource estimates.

The Commission has also worked actively to ensure that its adjudicatory proceedings are conducted in a fair, effective, and disciplined manner, now and in the future. For example, the Commission revised its rules of practice for agency adjudication early last year and has just published a final rule that adopts model mile-

stones for presiding officers to use in scheduling and managing hearings. The Commission continues to exercise oversight of the adjudicatory process.

#### NEW REACTOR CONSTRUCTION

Licensing of new reactors requires a revised approach for inspecting new reactors during construction and pre-operational testing. Key challenges include establishing a state-of-the-art construction inspection framework; ensuring that safety is built into each phase, whether it be design, construction, or operation; ensuring the availability of an adequate number of qualified inspection personnel; ensuring that appropriate information systems are in place to efficiently and effectively perform the necessary inspections, tests, analyses, and acceptance criteria verifications; and responding to the anticipated use of multi-national modular construction techniques.

The industry is presently considering the construction of new plants in a modular fashion, with many of the modules fabricated at locations away from the plant site, including facilities located abroad. The industry's estimate for completing construction varies by plant design, but has been in the range of about 60 months and could be decreasing as new modular techniques are added.

The NRC is paying special attention to human resource requirements, especially the need for the construction inspection staff to have the requisite combination of construction knowledge and inspection skills. The NRC is utilizing the know-how of our senior inspectors with construction experience and incorporating their insights and lessons learned into the revised construction inspection program, procedures, and training. The NRC is actively revising its construction inspection program to provide an enhanced safety focus and ensure timely support to all phases of the license application and construction processes. We are working with industry and public stakeholders as we go through this revision process and are confident that our revised program will be well established and in place before new construction would begin.

#### RESOURCES FOR THE EXPECTED DEMAND FOR NEW REACTOR LICENSING

The FY 2006 President's budget request includes \$37 million for the NRC's continuing work on new reactor licensing, including review of the three early site permit applications, review of two standard design certification applications, and development and updating of the agency's regulatory structure to accommodate new, advanced reactor designs. The demand for new reactor licensing is now expected to grow more rapidly than previously anticipated and budgeted. These demands have been identified in response to the Department of Energy's Nuclear Power 2010 Program solicitations, industry letters, and press releases.

Although specific plans are not yet available from the industry, the NRC may be faced with a significant increase in its workload for new reactor licensing, including receipt of up to five combined license applications beginning in 2007-2008. To meet this expected increased demand, NRC would need to begin preparatory activities soon to accommodate such large growth. This includes ensuring a state-of-the-art regulatory framework and conducting associated technical activities, obtaining sufficient NRC staff and contractors in the relevant disciplines, securing space, developing and conducting training, and putting in place the appropriate organizational structure that would allow timely completion of the newly anticipated work. The NRC will also have to assess how to manage such a workload in light of other high priority activities, such as security and fuel cycle work. In short, NRC must determine the additional substantial resources for nuclear reactor licensing that will be needed to fully support the Nuclear Power 2010 initiative.

#### SUMMARY

The Commission is dedicated to enabling the safe and secure use and management of radioactive materials and nuclear technology for beneficial civilian purposes. To that end, the Commission is fully committed to making sure that our agency is ready to meet the expected demand for new reactor licensing. The Commission believes the agency is prepared to accept and process applications in accordance with the applicable laws and regulations, continuing to focus on safety and utilizing risk-informed and performance-based regulation as appropriate. The NRC's Part 52 processes are safety-focused and should be stable, efficient, and predictable. We are also addressing our challenges. These include ensuring a strong regulatory and oversight framework; meeting the NRC's resource needs associated with the potential for receiving multiple combined license applications; establishing our technical and legal staff and contractor requirements early; and seeking additional funding as needed. We will continue to work with stakeholders to address issues associated with implementation of our licensing process. The Commission has benefitted

from strong Congressional oversight, and we will continue to keep Congress informed about the impact of new reactor activities on the NRC.

I appreciate the opportunity to appear before you today, and I welcome your comments and questions.

The CHAIRMAN. I am going to ask some questions first of the Chairman. And later on, after Senator Craig, I will talk more on some subjects that are much different than these.

Let me now ask, how much funding, additional funding, if any, would the NRC need in its 2006 and 2007 budget to ensure that you at the NRC are fully ready to review new reactor license applications as you currently envision them?

Dr. DIAZ. Mr. Chairman, if the present expectations are to be realized, we will need approximately \$20 million in 2006 and about an equal amount in 2007 to have the structure, personnel, infrastructure, and the resources needed to aggressively address the schedule that is being presented to us.

The CHAIRMAN. Now, Mr. Chairman, for new construction, new plant construction, domestically and internationally, do you have any ideas on ways to better enhance the construction and safe operations of new nuclear power plants?

Dr. DIAZ. I believe we are trying to get to that issue, sir, because fundamentally what is happening is that the world has become a smaller place. And the regulatory infrastructure that exists in the world is not capable of handling an expanded nuclear reactor deployment.

Therefore, we are considering different types of initiatives that will allow us to pair with our regulatory colleagues abroad and be able to ensure that those issues regarding components, major components that could be handled in regulatory space, without going into the licensing capability of the other nations, to make sure we have a smoother process.

We are all too different, Mr. Chairman, and sometimes I think it is imperative that we realize that the safety of these plants and the analysis that we can conduct and the technical aspects of it are very similar. And so efforts in this regard would actually help everybody in the world.

The CHAIRMAN. How much repetitive work is required to be performed as an applicant moves from one part to another? Are there provisions in the regulations whereby an applicant for a combined construction and operating license does not have to repeat the work that was performed to secure an early site permit? That was part of the problem before. I just ask, do we have anything that might minimize that?

Dr. DIAZ. I believe we do, Mr. Chairman. The early site permit, which really goes at the heart of qualifying a site for a reactor, be it an existing site or a green site, has in it a series of processes including an environmental impact assessment that will be and should be used by the combined license applicant.

Now, in this way, the combined license application, which will be a major Federal action, will actually be banking on the environmental impact on the sites, and the determinations that were made for the early site permit.

So there might be some small overlap, but there is no significant duplication. They can utilize what has already been determined and adjudicated and go forward from that point on.

The CHAIRMAN. One last question, which includes an observation and a question.

Last year's conference report on the energy bill provided for a number of sources of energy, wind, solar, and nuclear and others, what is called a production tax credit, meaning a credit for actual production, a relationship between the credit and the production dollars.

Senator Bingaman raised the issue before he had to leave for another meeting that he would have been interested in talking to the Lehman Brothers' operative executive who could not be here.

And the reason as stated by Senator Bingaman was because there remains an issue that is practical and surrounds all the issues we have discussed and that is will the marketplace, that is the capital available institutions, will they fund plants in the future based upon the history that Senator Craig raised and that you raised talking about 1973, 1978 as being terminal years for this program.

Now, the question then is, what can we do to have more certainty of construction finality once a nuclear power plant is fully licensed and the construction license is issued and work is started?

I already know we will get the after-market people in and talk to Senator Bingaman and anybody else who will not have a chance to have a formal hearing, but they are going to say that is the issue.

Can they put the money in, will the market let them, if during that construction, which might be much less than before, if there is great risk that it could be stopped for non-safety issues, non-substantive?

Is there anything being considered to maybe make that problem less in the future and, if so, could you describe it?

We are working on something legislatively and hope we are vetting it with you, but either of you. Perhaps, Secretary, you could start and then go to the chairman.

Mr. SELL. Mr. Chairman, the Department and the administration have taken a very hard look at the question that you have posed.

And it has been our observation and a conclusion that we have drawn as a result of the work that we have done that there is considerable confidence that the cost of building a new nuclear plant, the life-cycle cost, is competitive today with a new natural gas plant, given where prices are, or a coal plant.

The concern is one that is brought forward from this experience in the 1970's, is from the industry, that they have told us that we think we can build the plant in 5 years at a competitive cost. Our concern is the risk of a catastrophic delay on the back end due to a failure in the licensing process.

And so in the past, where your effort here in the Congress and the emphasis has been on a need for construction incentives on the front end, it is our belief at the administration that that is really not the most important thing.

The most important thing is providing certainty on the back end that an investor that chooses to make a commitment to a nuclear plant can with some level of confidence enjoy the benefits of that investment within a 5-year construction period.

And so the effort of the administration has focused on the back end. And there are a number of proposals under review that I am not prepared to make an announcement on today, but we would look forward to working with the Congress moving forward in finding an appropriate way to address that risk.

The CHAIRMAN. Thank you very much.  
Chairman.

Dr. DIAZ. Yes. Thank you, Mr. Chairman.

I do believe that the process that we have established and several components of it have been tried and have been functional. The key one, though, the actual combined construction operating license as you remarked is untested.

I do believe that up to the point where we have the hearing on the combined construction operating license, we have these processes very well down pat.

I think the industry is concerned with the next step. Once you actually receive a license for construction and operation, the process continues. And then we enter into—if you look at this little graph in here, into that little black box in there or blue box, it is called verification.

The verification is a system that is being really developed to verify that the conformance with NRC regulations is there. In other words, have the licensee build the plant and have the programs in place that they actually stated in their applications.

It is kind of a trust and verify, Mr. Chairman. It is saying, yes, we are going to give you a license, but then we are going to verify that you are conducting your construction, you are establishing your programs in the way that they should be.

And if that is so, that does not open that process to abuse or to inquiries or to delays. If there is a problem in that process, if it is a minor problem, it still goes forward.

However, it does contain the fact that in that process, there is a substantial difference between the actual construction or the actual programs and what the licensees put in their applications, that could be contested. And in that case, there is a concern in that regard.

The CHAIRMAN. Thank you very much on those questions to both of you.

Senator Alexander.

Senator ALEXANDER. I want to make sure I have a clear understanding of what happens at the end, this uncertainty period.

You have your combined license and the utility has to satisfy inspections, tests, analyses, acceptance criteria before the plant operation begins.

Dr. DIAZ. Correct, Senator.

Senator ALEXANDER. Now, that is your examination, correct?

Dr. DIAZ. Yes. We examine. However, I think it should be clear that the licensee proposes the inspections, tests, analyses, and acceptance criteria. We review them and then we inspect to make sure that they are in compliance with what they have proposed.

Senator ALEXANDER. But you come to your conclusion based upon your review of their proposed conditions?

Dr. DIAZ. Right.

Senator ALEXANDER. Then the plant may be turned on at that point?

Dr. DIAZ. That is correct. If they satisfied all the conditions.

Senator ALEXANDER. If they have satisfied you. All right. Now, then there may be judicial review of that, of your decision; is that correct?

Dr. DIAZ. No, sir. There is no judicial review unless there is a substantial nonconformance, unless there is someone that comes forward and prove—and the burden of proof is it has to be a substantial issue, not a minor issue—that the licensee has not complied with the license as given.

Senator ALEXANDER. But an aggrieved party, someone who does not like your decision, may ask for a hearing; is that correct?

Dr. DIAZ. But they cannot get it unless there is a substantial issue.

Senator ALEXANDER. Who do they ask? The Federal Court?

Dr. DIAZ. No. Well, they can always go to a Federal Court, sir, as you know. But they first have to come to the NRC and ask for a review or adjudication on that.

Senator ALEXANDER. So they could ask for a hearing, but there is a high threshold before they get the hearing?

Dr. DIAZ. There is a high threshold because we have determined that if all of these technical aspects and legal aspects of the license are complied with and the inspections, tests, analyses, and acceptance criteria are acceptable to the NRC, then, therefore, there should not be a substantial issue.

So there is a burden of proof on whoever intervenes at that time to prove that there is a substantial issue.

Senator ALEXANDER. I understand. But you do not think that someone might not be able to go into the Federal Court and challenge your decisions?

Dr. DIAZ. I think that they can certainly do that, sir.

Senator ALEXANDER. If they were to do it, and I guess this is getting to the point, can you authorize or would you authorize the plant to go ahead on an interim basis while you were considering whether to hold a hearing yourself or during the pendency of any court application unless the court ordered you not to?

Dr. DIAZ. Yes, sir. We can do that. If we do not believe there is a substantial issue and we make the determination there is a reasonable assurance of protection of public health and safety, the plant could start and the judicial processes will continue on.

Senator ALEXANDER. So your intention would be to allow the applicant to recommend the standards, you review the proposed standards, and you come to a conclusion, and then you authorize the plant to be turned on even if someone is asking for a hearing?

Dr. DIAZ. If there is no substantial safety issue that has been shown, correct.

Senator ALEXANDER. Let me ask one other question. The Navy has operated since the 1950's dozens, maybe a few hundred nuclear reactors. I guess the number is classified.



I jokingly suggested to some of my colleagues maybe our best nuclear power program would be to build ten new aircraft carriers and park them and plug them in. And we could build them fast and cheaper.

The Navy apparently trains its officers in a 14-month training school. They have not, as I understand it, had one single incident with a reactor during that whole period of time.

What can we learn from the Navy's experience since the 1950's about how to have this renaissance of nuclear power on shore that Senator Domenici talks about?

Dr. DIAZ. Sir, we have been learning from the Navy from the very beginning. Half of my staff are Navy "nukes" one way or another. But the reality is that that process continued for many years.

One of the issues is that, of course, the plants in the submarines and the carriers are plants that go in harm's way. They have substantial investments made in how strong these plants are and how they will be functional under battle conditions and all kinds of conditions. They also use different kinds of fuel.

So the principles are the same. The new plants are coming in under design certification processes that are actually relaxations, if you want to, from the nuclear Navy programs because they do not have to meet certain criteria that they have.

But in many ways, they are excellent plants. They have significantly enhanced the safety criteria that has been used in the design of these plants.

So we keep learning and working with the nuclear Navy. I believe that the products that the industry has put forward are quite adequate for the present demands of this country.

Senator ALEXANDER. Thank you, Mr. Chairman. I think it helps the American public understand, since a lot of what we are battling here is public impression, is that I believe nuclear carriers, nuclear-powered carriers, submarines are welcome in any port in the United States; is that correct?

The CHAIRMAN. In the world.

Dr. DIAZ. Correct.

Senator ALEXANDER. But at least in the United States which is where we would like. I mean, do they ever dock off California, off the coast of California?

Dr. DIAZ. I think they do.

Senator ALEXANDER. I imagine they do.

Dr. DIAZ. San Diego, yes.

The CHAIRMAN. They do in Europe, too, though, do they not?

Dr. DIAZ. They do in Europe. We have ports in Europe and Spain and in the United Kingdom.

The CHAIRMAN. And the point of Senator Alexander's inquiry here is that nobody clears out the port. There is civilian boats all over the place, right, when they park it there?

And one of our big concerns is convincing Americans that it is not very dangerous to move things around. I mean, that is why right now we are talking about building new plants right where existing ones are because if you are going to locate them elsewhere, the question is going to always be how do you move the nuclear waste. That is still one of our problems.

But out in the ocean, they are moving it around all the time with nobody running around saying I am going to get in front of this boat and drown like they do here.

They are going to put themselves in the road and it is over my dead body you drive the train or whatever, which is kind of bothersome as I see it because the amount of travel over the amount of time in the waters of the world without an accident is an incredible number which I use frequently to try to convince an audience that moving it around is not very serious. Moving it around in water in a port ought to be more serious than moving it on the road, right? If it gets in the water, it goes everywhere. It flows.

So, anyway, great line of questioning. Now, we are going to yield to Senator Craig.

And, Senator, I want to say that your enthusiasm for nuclear power has been a tremendous part of moving this ahead and I thank you for supporting what I have been trying to do.

And you made your State a leader in the civilian side and we are pleased with what is going on there. And we hope you will continually review what is being done so we will have the benefit of your evaluation.

Senator CRAIG. Well, Mr. Chairman, thank you very much for that kind comment. I think we already recognize the importance of this industry to our country and as we look toward future energy sources.

Commissioner Diaz, let us talk about siting for a moment as a component of this combined effort. How many current reactor sites has sufficient area at site for the construction of one or more new nuclear units?

Dr. DIAZ. Senator, I believe that the majority of the reactor sites are capable of adding one or two more units on-site.

So the present existing fleet have that capability. Some of them are better situated than others because of the need for cooling capabilities, the need for the infrastructure. But the reality is the majority of them would be capable of adding another nuclear power plant on-site.

Senator CRAIG. Based on one of the inevitable problems with siting which occurs in any new major facility, whether it be nuclear or non, is the issue of not in my back yard attitude that is prevalent in some areas of our country.

What advantages beyond a current operating reactor on-site in an area does a current site offer this in any expedited way toward moving a combined construction and operating license approach?

Dr. DIAZ. I think there is a significant advantage of an existing site because the people of the town, the communities are already well informed. We have had for years, and our licensees have programs to keep the communities informed and participating in the processes.

So we find that the majority, not all—we always have a little problem in some parts of the Northeast where the questioning attitude of our communities in there is extraordinary. And we consider that a clear challenge. We are always working with them.

But the reality is that at many of the existing sites, the communities are well educated. They know what nuclear power is. They realize that a lot has been done to protect the public from any po-

tential hazards. They actually know what the emergency preparedness issues are. They have been working on it.

So I think there is a significant social/political advantage with existing sites besides all the things you mentioned from the infrastructure and so forth.

Senator CRAIG. So it is significantly a perceptual problem that you overcome by the presence of the current facility?

Dr. DIAZ. You are absolutely correct.

Senator CRAIG. You mentioned in your testimony that the NRC has approved three design certification applications and is close to approving a fourth.

Has there been any efficiencies gained in reviewing these applications?

Dr. DIAZ. Significant efficiencies. We started this process back in 1989 and because there was really not a major driver, we went through a very, very thorough process.

Things we did, for example, the Westinghouse AP600 took almost 8 years to do, we now have been able to do the AP1000, which is similar in nature, in 2½ or 3 years.

So there is significant efficiency that has been gained. Most of those are gained in the area of light-water reactors. We know light-water reactors back and forward. We know what the issues are. We can handle light-water reactors a lot better than we can handle any other type of reactors.

Senator CRAIG. Clay, you mentioned in the announcement of this 2010 approach and the agreement that has just been struck with NuStart Energy Development a combination of project schedule, budget, and site selection.

What kind of efficiencies do you expect to gain from this new issuance as it relates to the long-term approach that we have conceptually perceived under 2010?

Mr. SELL. Senator, the real value that we see in funding these consortiums is further testing the early site process and then getting the two new reactor designs certified, both the new GE economic safe boiling water reactor and the AP1000 reactor.

And so the goal of Nuclear Power 2010 is for the Government to help substantially improve the new one-step licensing process and to get these two new reactor designs certified.

And we think the two consortiums that we have chosen, the Dominion led team and the NuStart team, will go a long way toward doing that, resulting, we believe, ultimately in the application of a combined construction operating license in the next few years.

Senator CRAIG. My next question, Clay, was going to be give us a timeframe. What do you expect based on these new relationships and the expenditure? What do you expect to see from it? I mean, you have basically explained what you expect to see from it. When do you expect to see it?

Mr. SELL. We have laid out a program that runs through approximately 2011. And during that period, we expect to help fund the efforts that will result in an NRC certification of the AP1000 as early as the end of this year and of the GE reactor within a year or 18 months thereafter.

Once the design is certified, then there is still at least 2 to 2½ years of the first-of-a-kind engineering and design work that needs

to be done. And this Department, the Department of Energy, is committed to funding half of those costs.

But that does leave the possibility of a—that timeframe leaves the possibility of, we think, a very reasonable possibility of an application for combined license in the 2008, 2009 timeframe.

Senator CRAIG. With the money that you have got in the budget, the money that you are allocating in relation to these startups, Commissioner Diaz, you have talked about a need for additional resources, 20 plus in 2006, 20 plus in 2007.

Tell us about your relationship here. What is the relationship we should understand between DOE and 2010 and the NRC and DOE 2010, these combined approaches and the necessary funding that will need to be put forth.

Mr. SELL. Well, ultimately, of course, Senator Craig, the NRC is the regulator and that entity is completely independent from the Department of Energy.

Senator CRAIG. I understand the independence. There is also a very direct relationship here with timing and resource.

Mr. SELL. I believe, and Chairman Diaz, I am sure, will disagree with me if he holds a different view, but I believe the funding that we have committed is consistent with the time line and the resources that will be available to the NRC in order to accomplish the objectives that I have laid out. But I will see if the chairman agrees with that.

The CHAIRMAN. Do not forget, Mr. Chairman, you are independent.

Dr. DIAZ. Yes, sir.

Senator CRAIG. And we all know that is an important line, both in reality and in perception as it relates to the process and the public's understanding of the process.

But I just want to make sure that the right hand and the left hand, although very separate on this body and on most, have some element of coordinated activity as it relates to budgets and requirements.

Dr. DIAZ. I believe that we are coordinating our activities. I believe that in the technical arena, we are trying to make sure that the NRC has the technical manpower, the resources, and the infrastructure to be able to address the issues in a manner that the Department of Energy is laying them out.

We do have some, I will call it small, difference in timing in which we are hearing that we might have to be fully prepared to address a combined license application by as early as late 2007, or the beginning of 2008.

We cannot ramp up our manpower overnight. So if that is going to happen, we need to actually have the infrastructure that needs to be there and I think these are the issues that are coming out lately.

I do believe, Senator Craig, that we are coordinating our activities. I do believe that we could do a little better and I believe that Deputy Secretary Sell and I are seeing issues that need to be addressed. We will put our staff to work together, maintaining the clear separation that is required by law.

Senator CRAIG. I am running way over on time. Can I have one last question?

Assuming you have the dollar resources, can you find the person power?

Dr. DIAZ. The answer, sir, is yes. We are going to hire them away from the industry. We are going to have hiring programs. We are looking right now. We are not waiting. We are bringing the people in.

We have established a training program. We are establishing the training to do model work construction. We are looking at every single one of these aspects and this is why I believe we are a little busy, but I believe we are ready, sir.

Senator CRAIG. Thank you. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Craig.

Senator Salazar, we welcome you and thank you for coming. You are a very participating senator and that means we look forward to you giving us your ideas as you put the energy bill together and nuclear power.

We have not heard much from you about it, so it is good that you are here today, not that you have to tell us how you feel, but we are glad to have you here.

Senator CRAIG. But we would like to know.

#### **STATEMENT OF HON. KEN SALAZAR, U.S. SENATOR FROM COLORADO**

Senator SALAZAR. That is why I am here, to learn.

But, Mr. Chairman, let me just say thank you again for your leadership of this committee and thank you as well for your efforts to make sure that we have a bipartisan energy bill that we will hopefully all get done this year. Your leadership is a keystone to making this happen and I appreciate the leadership that you bring.

This is an area where I personally am going to learn about and I am struck by the article which Senator Domenici shared with me this morning where it is stated among other things that we have 440 nuclear reactors in 30 countries, producing 16 percent of the world's electrical energy base.

And I am struck by that because it seems to me that we have a great information gap in terms of what is actually occurring with nuclear energy production in our world and in our country and what the people of the United States know about this.

I was in France not so long ago with Senator Alexander. And I remember one of the conversations I think we had with one of the foreign ministers where they talked about how so much of the nuclear energy or so much of the electrical energy in France comes from nuclear production.

So this is an area where I think we as Americans probably for the last 20, 30 years have really not been very well informed about what some of the progress is that has been made in this arena.

I have a couple of questions for you, Chairman Diaz, if I may. One is, I understand that there are three sites that have been put forward for early site permitting in Illinois and Mississippi and Virginia. And I was wondering if you could tell us what the status is of the early permitting process with respect to those three sites. When will we get to the point where you have a permit in hand for the applicants of those projects?

Dr. DIAZ. All these three sites are in adjudication. So if you see me choosing my words carefully, it is because there are some things that I am not allowed to discuss.

But the three permits are doing well. We have issued, as of today, the safety evaluation reports on all three sites. Two of the sites have their draft environmental statements and one is coming shortly.

We believe we are on track to conduct and finish these processes within their established schedules, meaning that it would take about 24 months for the entire review and about 12 months for adjudication.

So it takes about 36 months for the process. We are on track to complete the early site permit phase on all three sites as scheduled.

Senator SALAZAR. Let me ask you where the community is. We will just take one of those States, Illinois. And I do not know the answer to this question, so I just want to get your sense of where the community in Illinois is relative to supporting the process that you have undertaken.

Where is the Governor? Where is the Illinois congressional delegation? Are they involved? Are they supportive? Are they on the sidelines watching what is going on? Tell me the level of the local and State government as well as the congressional delegation view of the Illinois project.

Dr. DIAZ. In looking at the three sites, each site is completely different. In the south, there is stronger support and more unified support for their site than there is in Illinois.

However, we are finding that the community is well informed. There are issues that are in adjudication and we deal with those processes in a very fair and equitable manner.

So I do believe that the communities are seeing that the NRC is diligent in answering their questions. I do believe that once these processes are finished that most of the answers will be given and understood.

There is always going to be some opposition. After all, this is nuclear power and we always expect to have some dissent and some opinions that do not go along with what the record is.

But those are always there and we deal with them in a very open manner. We try to go to these communities and discuss the issues with them.

I do believe that the congressional part of it has not seen any significant opposition at the present time. I think we have done a reasonable job of explaining the process.

One of the things the NRC has done now is we do have congressional-focused parts of the staff that actually go to the States and interact with both the communities and the local congressional people in an effort to make communications better.

Senator SALAZAR. May I ask two more questions, Mr. Chairman? I see my light is up.

The CHAIRMAN. Go ahead.

Senator SALAZAR. I will ask one question to you, Chairman Diaz, and then to you, Mr. Sell, another question.

I think since Chernobyl happened some decades ago, there has been kind of a freeze on consideration of nuclear energy and very controversial, I think, in this country.

If you could just summarize for me in a minute or so, minute and a half, what the key lessons are and what the changes have been based on, I know, a huge evaluation of what went wrong there.

And then for you, Mr. Sell, if you would comment on the issue of waste just very briefly. If, in fact, Yucca Mountain does not come on line the way that has been envisioned, what does that do then to the NP 2010 effort? What is the impact on it?

Dr. DIAZ. Senator, the nuclear power plants in the United States today are at a very good state of safety and security. We are very confident that the changes that have been in place for almost a generation now have made these plants better managed, safer and more secure.

We believe that the U.S. fleet is probably the best fleet of nuclear power plants in the world. We occasionally have a problem. We identify the problems. We deal with the problems.

So from the standpoint of a regulator, I am very satisfied that the fleet right now complies with every appropriate regulation, and they actually, in many cases, exceed our expectations for safe and secure operation of nuclear power plants.

Senator SALAZAR. Thank you.

Mr. Sell.

Mr. SELL. Senator, the "Nuclear Waste Policy Act" required that the Department of Energy begin accepting spent nuclear fuel in 1998. We were not successful in doing that.

The Yucca Mountain project is critical and it underlies every aspect of the discussion that we have had today. And the Government is absolutely committed to meeting its obligations under the "Nuclear Waste Policy Act" to accept and permanently dispose of spent nuclear fuel.

We are very confident in the science that underpins our decision to recommend the Yucca Mountain site as the appropriate location for that. The political difficulties in moving forward have proved great.

But in order to move forward with nuclear power in a manner the administration desires and in a way that I think many in Congress hope to, it is important that we make progress and eventually open Yucca Mountain for its stated purpose. And we are confident that we can do that.

Senator SALAZAR. Thank you.

The CHAIRMAN. Thank you for your questions and thank both of you for your answers.

Senator Alexander, do you have anything further of these witnesses?

Senator ALEXANDER. No, Mr. Chairman.

The CHAIRMAN. Senator Craig.

Senator CRAIG. I have nothing.

The CHAIRMAN. Mr. Chairman, let me just for the record talk with you a little bit about current law with reference to challenges of this process of permitting and construction and opening it.

As I understand it, none of the statements by you to Senator Alexander are meant to say parties in the United States that want

to challenge the sufficiency of a nuclear power plant's designs and safety features. They have a right to go to court, right?

Dr. DIAZ. Absolutely, sir.

The CHAIRMAN. And that is part of the up-front activities under current law so that after the planning, designing, and before the licensing, the issue is the adequacy of what is going to be built, right?

Dr. DIAZ. That is correct.

The CHAIRMAN. Now, at that point, somewhere in there, they can appeal to you that there is an insufficiency in that process and in what has come out of that process, right?

Dr. DIAZ. That is correct.

The CHAIRMAN. And then they have a right to appeal and obviously the issue is going to be the adequacy for the public safety and compliance with law of that process and those construction designs, et cetera, right?

Dr. DIAZ. That is correct.

The CHAIRMAN. Now, the difference between that and past law is after that is done and there is a final, you—if your appeal is final because they do not go anywhere or the court hears it and says, no, it is right, then the difference is that we do not rely any longer in the law, under the law, and subsequent appeals to the courts other than as provided in the new statute which talks about the fact that we have done up front what we have done is prima facie evidence that the plant is safe and, therefore, the contest, if any, is with reference to complying with what has been permitted in terms of design, construction requirement, et cetera; is that correct?

Dr. DIAZ. That is correct. And operational programs, programmatic programs. That is exactly correct, sir.

The CHAIRMAN. Now, Senator Alexander, we had talked a number of times about America's past activities. And clearly we have both spoken about the incessant ability to go to court and the regularity—you can go one time, two times, and then how long it takes, as if the way we chose as a Nation to purify on behalf of the public, to make certain that the courts are the only way to do that. So we have said go to court. If the court approves it, surely the public is safe. And we have found that if that was the case, it always was something else. It was an invitation to get nothing done, right?

And so when we did the new law, some of the people here, staff were participants. Some of the Senators who helped write it are not here, but the writing of the new law tried to take into account what I have just described and not deny an opportunity to go to court, but to say when and how.

And I assume there could be a challenge of the whole statute. But we are not talking about that right now. That may be done, but the question there will be when they can raise that too. And I assume it is when they have a right to go to court, they challenge that.

But this whole new process is what we are using in conjunction with the new program that Senator Craig talked about, NP what, 2010? That process in conjunction with 2010 which is to help the companies go through this experiment, that is the new process which you conclude and the department concludes may, in fact, ex-



pedite in an appropriate way the licensing and opening of a plant; is that correct?

Dr. DIAZ. That is correct. It should expedite it. I would like to again repeat that the American public will have an opportunity that is open to contest every single aspect of the plant licensing, construction, and siting at one hearing point. After that has been resolved, then the NRC can license the facility and then these ITAAC issues will come in.

One of the key things is to do those things correctly. And if the licensee does all that it does and gives us all the information and does the right thing, then there is a substantial burden of proof to say that they did not, I believe it is a fair process. We are committed to making it as equitable as possible to all parties involved and I believe it does lead to efficiencies in completing this licensing in a very good manner.

The CHAIRMAN. Senator Salazar, I just wanted to answer one of the questions you asked. In kind of a rifle shot way, you asked about public support.

There is a presite being considered at the Grand Gulf site, which is in Mississippi. And incidentally in that case, the local city council closest to the public political group has passed a resolution supporting the construction of a new reactor next to the current reactor.

Now, that is not everywhere, but that is surely a change from when you were referring to immediately post Chernobyl and Three Mile Island atmosphere.

Having said that, for myself, I want to thank both of you on the issue of nuclear power.

Sometimes I say let us do it and then I look at the information and I say none of us are ever going to be around when it happens, because timelines are so long. But it looks to me like that horizon is getting shorter and we may, in fact, see some real action.

Let us proceed by thanking you and ask for the next witness. Thank you both very much.

Could we have the next witness, please. The next witness is Mr. Michael Wallace, executive vice president of the Constellation Energy and the president of the Constellation Generation Group.

Again, former submarine officer, right?

Mr. WALLACE. That is correct, Mr. Chairman. I am proud to have served my country as a submarine officer.

The CHAIRMAN. Did you train in Idaho?

Mr. WALLACE. Indeed I did, the S1W prototype. And it was that training and experience that has launched me on the path that brings me here today. Thank you, sir.

The CHAIRMAN. Thank you.

**STATEMENT OF MICHAEL J. WALLACE, EXECUTIVE VICE  
PRESIDENT, CONSTELLATION ENERGY GROUP, BALTIMORE,  
MD**

Mr. WALLACE. Mr. Chairman, Senator Craig, Senator Alexander, Senator Salazar, members of the committee, thank you for the opportunity to appear before you today.

I have prepared a statement for the record and I ask your permission to enter that statement in the record and then provide short summary this morning.

The CHAIRMAN. That will be done.

Mr. WALLACE. Thank you.

As you indicated, I am executive vice president of Constellation Energy and president of the Constellation Generation Group.

I want to take just a minute to tell you about Constellation Energy. Constellation Energy, a Fortune 200 company based in Baltimore, is the Nation's leading competitive supplier of electricity to large commercial and industrial customers and the Nation's largest wholesale power seller.

Constellation Energy also manages fuels and energy services on behalf of energy-intensive industries and utilities. The company delivers electricity and natural gas through the Baltimore Gas & Electric Company, its regulated utility in Maryland. We are the owners of 107 generating units at 35 generating locations in 11 States totaling 12,500 megawatts of generation capacity.

In 2004, the combined revenues of the integrated energy company totaled more than \$12½ billion, and we are the fastest growing Fortune 500 company over the past 2 years.

Our portfolio based on electricity production produced is approximately 50 percent nuclear, 35 percent coal fired, 7 percent gas, and 5 percent renewables.

We own and operate the Calvert Cliffs nuclear plant in Maryland and the Nine Mile Point and Ginna nuclear plants in Upstate New York.

Constellation is part of the NuStart consortium that is preparing an application to the NRC for a license that would allow us to build and operate a new nuclear plant.

Additionally, in December of last year, Constellation submitted a proposal to the Department of Energy for studies that could lead to an application to the Nuclear Regulatory Commission for an early site permit as part of the Nuclear Power 2010 Program.

So as you can tell, we have a vested interest in the continued success of Nuclear Power 2010 and we are bullish on the future of nuclear power.

Although I am testifying here today on behalf of Constellation, this testimony is supported by our trade association, the Nuclear Energy Institute.

The United States has 103 reactors operating today which represent 20 percent of our electricity. Over the past 10 to 15 years, these plants have achieved dramatic improvements in reliability, safety, and productivity.

Despite the impressive gains in reliability and output, however, the time has come to create the business conditions under which we can build new nuclear plants in the United States.

We believe there are compelling public policy reasons for new nuclear generating capacity. New nuclear plants will help maintain the fuel and technology diversity that is the core strength of the U.S. electric supply system.

New nuclear power plants provide future price stability that is not available from electric plants generating from natural gas. And,

finally, new nuclear power plants will play a leading role in meeting U.S. clean air goals and reducing greenhouse gas emissions.

The Department of Energy's Nuclear Power 2010 Program is an essential foundation in the joint government/industry partnership to build new nuclear power plants.

The committee and in particular the chairman deserve credit for your leadership in ensuring adequate funding for the program in the 2005 fiscal year.

Nuclear Power 2010 is designed to demonstrate the new licensing system for nuclear power plants including the process of obtaining early site permits and combined construction operating licenses and resolving generic combined licensing issues.

It is an industry DOE cost-share program that includes sharing the cost of the detailed design and engineering work necessary to prepare COLs. This work is essential because it allows industry and the NRC staff to identify and resolve technical and regulatory issues that must be settled before companies can undertake high-risk, capital-intensive construction projects like new nuclear plants.

The Nuclear Power 2010 Program is the springboard that launched a tangible and visible industry commitment to new plant construction. The industry's commitment to Nuclear Power 2010 includes a planned investment of \$650 million over the next several years on design, engineering, and licensing work which will create a business foundation for decisions to build.

Three companies have applications for early site permits under review. In addition to these three, Constellation and possibly one other company are also considering ESP applications.

The industry is developing at least three applications for construction and operating license, the first expected to be filed in late 2007, the second and third in 2008.

As you know, the administration has proposed \$56 million for the Nuclear Power 2010 program in the 2006 fiscal year. The \$56 million funding proposed for 2006 is sufficient for the ESP and COL demonstration projects underway.

It is not adequate, however, to cover more recent expressions of interest from Constellation and others and additional resources will be necessary to ensure the program is viable into the future.

It is also important to recognize that Nuclear Power 2010 is a multi-year undertaking. Certainly future funding and program stability are a big concern for the industry.

One other concern with the Nuclear Power 2010 Program surrounds the time it has taken the DOE to award the grants. In the case of NuStart, we submitted our application in 2004 and we were not notified that we received the grant until November 2004.

I might add it is my understanding that today we may be in a position with the Department of Energy to begin the process of final sign-off on the application.

As for Constellation's early site permit application, we submitted it almost 4 months ago and have yet to receive final word from Department of Energy.

The DOE Nuclear Power 2010 Program is necessary but not sufficient as a step toward new nuclear plant construction. We must address other challenges as well.

Limited Federal investment in a limited number of new plants for a limited period of time is necessary and appropriate to overcome the financial and economic hurdles facing the first few plants built.

It is important to understand why Federal investment stimulus and investment protection is necessary and appropriate.

Federal investment stimulus is necessary to offset the higher first-time cost associated with the first new nuclear plants.

Federal investment protection is necessary to manage and contain the one type of risk that we cannot manage, namely the risk of a regulatory failure, including court challenges that delays construction or commercial operation.

Only the successful licensing and commissioning of several new nuclear plants can demonstrate that the licensing risks and uncertainties have been resolved.

Industry and investor concern over the potential regulatory impediments may require techniques like the stand-by default coverage and stand-by interest coverage contained in S. 887, introduced by Senators Hagel, Craig, and others.

We recommend that the Federal Government's investment include incentives identified by the Secretary of Energy's Advisory Board Nuclear Energy Task Force in its recent report.

That investment stimulus includes secured loans and loan guarantees; second, transferable investment tax credits that can be taken as money as expended during construction; third, transferable production tax credits; and, fourth, accelerated depreciation.

The limited portfolio of incentives is necessary because it is clear that no single financial incentive is appropriate for all companies because of differences in the marketplace, namely whether the markets they serve are regulated or competitive.

In addition, I would be remiss if I did not thank the chairman and the committee for the support for three additional programs that will assist in the construction of new nuclear plants in the United States.

One, sustained progress with the Yucca Mountain project is essential. This includes the funding necessary to maintain the schedule, ensure timely filing of the license application, and access to the full receipts of the nuclear waste fund.

Two, renewal of the "Price Anderson Act" which provides the framework for the industry's self-funded liability insurance. I am pleased to note that this is included in the recent House passed energy bill.

And, three, updated tax treatment of decommissioning funds that would provide comparable treatment for unregulated merchant generating companies and regulated companies.

This provision included in the energy tax legislation passed recently by the House would allow all companies to establish qualified decommissioning funds and ensure that annual contributions to those funds are treated appropriately as a deductible business expense.

The U.S. electricity business and our Nation are paying the price today for our inability to strike an appropriate balance between what was expedient and easy in the short term and what was prudent and more difficult in the long term.

We are paying the price today for 10 to 15 years of neglect of long-term imperatives and the oversupply of base-load generation in the 1990's.

The United States faces a critical need for investment in energy infrastructure, including the capital-intensive, long lead time, advanced nuclear and coal fire plants that represent the backbone of the U.S. electricity supply system.

While some may not realize it, the United States faces an imminent energy crisis today. Electric power sales represent 3 to 4 percent of our gross domestic product. But the other 96 to 97 percent of our \$11 trillion a year economy depends on the 3 to 4 percent.

We cannot afford to gamble with something as fundamental as energy supply and the biggest problem we face with nuclear energy is not having enough of it.

Thank you again, Mr. Chairman, and the members of the committee, for your support and that of your outstanding professional staff for nuclear power and for your continued and strong support of the Nuclear Power 2010 Program.

With that, I will be pleased to take your questions.

[The prepared statement of Mr. Wallace follows:]

PREPARED STATEMENT OF MICHAEL J. WALLACE, EXECUTIVE VICE PRESIDENT,  
CONSTELLATION ENERGY

Mr. Chairman, members of the Committee, thank you for the opportunity to appear before you today.

I am Michael Wallace, Executive Vice President of Constellation Energy and President of Constellation Generation Group. I want to take just a moment to tell you about Constellation Energy. Constellation Energy, a Fortune 200 company based in Baltimore, is the nation's leading competitive supplier of electricity to large and industrial customers and the nation's largest wholesale power seller. Constellation Energy also manages fuels and energy services on behalf of energy intensive industries and utilities. The company delivers electricity and natural gas through the Baltimore Gas and Electric Company (BG&E), its regulated utility in Maryland. We are the owners of 107 generating units at 35 different locations in 11 states, totaling approximately 12,500 megawatts of generation capacity. In 2004, the combined revenues of the integrated energy company totaled more than \$12.5 billion and we are the fastest growing Fortune 500 Company over the past two years.

Our portfolio based on electricity produced is approximately 50 percent nuclear, 35 percent coal-fired, 7 percent gas-fired and 5 percent renewables. We own and operate the Calvert Cliffs nuclear plant in Maryland, and the Nine Mile Point and Ginna nuclear stations in New York State.

Constellation is part of the NuStart consortium that is preparing an application to the NRC for a license that would allow us to build and operate a new nuclear plant. Additionally, in December 2004, we submitted a proposal to the Department of Energy (DOE) for studies that could lead to an application to the Nuclear Regulatory Commission for an Early Site Permit as part of the Nuclear Power 2010 program. So, as you can tell, we have a vested interest in the continued success of Nuclear Power 2010, and we're bullish on the future of nuclear power.

Although I am here testifying today on behalf of Constellation, this testimony is supported by our trade association, the Nuclear Energy Institute (NEI).

My statement this morning will address four major issues:

1. The strategic value of our 103 operating nuclear power plants, and the compelling need to build new nuclear plants to preserve our nation's energy security, meet our environmental goals, and sustain our economic growth.
2. The critical importance of the Department of Energy's Nuclear Power 2010 program as a platform from which to launch the next generation of nuclear power plants in the United States.
3. The need to recognize that the Nuclear Power 2010 program does not address all of the challenges facing companies interested in building new nuclear power plants, and that additional joint investment initiatives by the federal government and the private sector will be necessary.

4. The urgent need for comprehensive energy legislation that squarely addresses the critical need for additional investment in our electricity and energy infrastructure, including advanced nuclear and coal-fired generating capacity, electric and natural gas transmission, and other areas. Construction of the next nuclear power plants in the United States will require some form of investment stimulus, but I know I speak for the entire electric sector when I say that the need for investment stimulus extends well beyond nuclear power. This sector is starved for investment capital, and new federal government policy initiatives are necessary to reverse that trend and place our economy and our future on a sound foundation.

#### THE STRATEGIC VALUE OF NUCLEAR POWER AND THE NEED FOR NEW NUCLEAR POWER PLANTS

The United States has 103 reactors operating today. Nuclear power represented 20 percent of U.S. electricity supply 10 years ago, and it represents 20 percent of our electricity supply today, even though we have six fewer reactors than a decade ago and even though total U.S. electricity supply has increased by 25 percent in the period.

Nuclear power has maintained its market share thanks to dramatic improvements in reliability, safety, productivity and management of our nuclear plants, which today operate, on average, at 90 percent capacity factors, year in and year out. Improved productivity at our nuclear plants satisfied 20 percent of the growth in electricity demand over the last decade.

Due, in part, to excellent plant performance, we've seen steady growth in public support for nuclear energy. The industry has monitored public opinion closely since the early 1980s and two key trends are clear: First, public favorability to nuclear energy has never been higher; and second, the spread between those who support the use of nuclear energy and those opposed is widening steadily: 80 percent of Americans think nuclear power is important for our energy future and 67 percent favor the use of nuclear energy; 71 percent favor keeping the option to build more nuclear power plants. Six in 10 Americans agree that "we should definitely build more nuclear power plants in the future." Sixty-two percent said it would be acceptable to build new plants next to a nuclear power plant already operating.

The operating nuclear plants are such valuable electric generating assets that virtually all companies are planning to renew the operating licenses for these plants, as allowed by law and Nuclear Regulatory Commission regulations, and operate for an additional 20 years beyond their initial 40-year license terms. Sixty-eight U.S. reactors have now renewed their licenses, filed their formal applications, or indicated to the Nuclear Regulatory Commission that they intend to do so. The remaining 35 reactors have not yet declared because most of them are not yet old enough to do so. We believe that virtually all U.S. nuclear plants will renew their licenses and operate for an additional 20 years. At Constellation, we are proud that our Calvert Cliffs station was the first U.S. nuclear plant to renew its license. At the time, the license renewal process was a novel concept. Today, thanks to efficient management of the process by the Nuclear Regulatory Commission, it is a stable and predictable licensing action. Ten years from now, we hope and believe that the issuance of combined construction/operating licenses for new nuclear plants—a novel concept today—will be similarly efficient and predictable.

Although it has not yet started to build new nuclear plants, the industry continues to achieve small but steady increases in generating capability—either through power uprates or the restart of shutdown nuclear capacity. The Tennessee Valley Authority is restarting Unit 1 at its Browns Ferry site in northern Alabama. This is a very complex project—fully as challenging as building a new nuclear plant—and it is on schedule and within budget at the midpoint of the project.

However, despite the impressive gains in reliability and output, there are obviously limits to how much capacity we can derive from our existing nuclear power plants. The time has come to create the business conditions under which we can build new nuclear power plants in the United States. We believe there are compelling public policy reasons for new nuclear generating capacity.

First, new nuclear power plants will continue to contribute to the fuel and technology diversity that is the core strength of the U.S. electric supply system. This diversity is at risk because today's business environment and market conditions in the electric sector make investment in large, new capital-intensive technologies difficult, particularly the advanced nuclear power plants and advanced coal-fired power plants best suited to supply baseload electricity. More than 90 percent of all new electric generating capacity added over the past five years is fueled with natural gas. Natural gas has many desirable characteristics and should be part of our fuel

mix, but over-reliance on any one fuel source leaves consumers vulnerable to price spikes and supply disruptions.

Second, new nuclear power plants provide future price stability that is not available from electric generating plants fueled with natural gas. Intense volatility in natural gas prices over the last several years is likely to continue, thanks partly to unsustainable demand for natural gas from the electric sector, and subjects the U.S. economy to potential damage. Although nuclear plants are capital-intensive to build, the operating costs of nuclear power plants are stable and can dampen volatility of consumer costs in the electricity market.

Third, new nuclear plants will reduce the price and supply volatility of natural gas, thereby relieving cost pressures on other users of natural gas that have no alternative fuel source.

And finally, new nuclear power plants will play a strategic role in meeting U.S. clean air goals and the nation's goal of reducing greenhouse gas emissions. New nuclear power plants produce electricity that otherwise would be supplied by oil-, gas- or coal-fired generating capacity, and thus avoid the emissions associated with that fossil-fueled capacity.

In summary, nuclear energy represents a unique value proposition: new nuclear power plants would provide large volumes of electricity—cleanly, reliably, safely and affordably. They would provide future price stability and serve as a hedge against price and supply volatility. New nuclear plants also have valuable environmental attributes. These characteristics demonstrate why new nuclear plant construction is such an imperative in the United States.

#### THE CRITICAL VALUE OF THE NUCLEAR POWER 2010 PROGRAM

As I said earlier, the Department of Energy's Nuclear Power 2010 program is an essential foundation in the joint government/industry partnership to build new nuclear power plants. This committee and, in particular, you, Mr. Chairman, deserve great credit for your leadership in ensuring adequate funding for this program in the 2005 Fiscal Year.

Nuclear Power 2010 is designed to demonstrate the various components of the new licensing system for nuclear power plants, including the process of obtaining early site permits (ESPs) and combined construction/operating licenses (COLs), sharing the cost of the detailed design and engineering work necessary to prepare COLs, and resolving generic licensing issues. This work is an essential risk-management exercise because it allows industry and the NRC staff to identify and resolve scores of technical and regulatory issues that must be settled before companies can undertake high-risk, capital-intensive construction projects like new nuclear plant construction.

The Nuclear Power 2010 program is the springboard that launched a tangible and visible industry commitment to new plant construction. The industry's commitment to Nuclear Power 2010 includes a planned investment of \$650 million over the next several years on design, engineering, and licensing work, which will create a business foundation for decisions to build. Three companies have applications for early site permits under review at NRC. In addition to these three, Constellation and possibly one other company are also considering ESP applications. The industry is developing at least three applications for construction/operating licenses; the first will be filed in 2007, the second and third in 2008.

As you know, the administration has proposed \$56 million for the Nuclear Power 2010 program in the 2006 fiscal year. The \$56 million funding proposed for 2006 is sufficient for the ESP and COL demonstration projects already underway. It is not adequate, however, to cover more recent expressions of interest from Constellation and others, and additional resources will be needed to ensure this program is viable into the future.

It is also important to recognize that Nuclear Power 2010 is a multi-year undertaking. Certainty of future funding and program stability are a big concern for industry. However, our biggest frustration with the Nuclear Power 2010 program involves the time it has taken the DOE to award the grants. In the case of NuStart, we submitted our application in April 2004 and we were not notified that we received the grant until November 2004. As for Constellation's ESP application, we submitted it almost four months ago and have yet to hear from DOE.

To support the ESP and COL demonstration projects currently underway and future projects, we anticipate that the Department of Energy will need to significantly increase funding for Nuclear Power 2010 over FY 2006 levels.

The process of developing the first COL applications, certifying new designs and completing NRC review of the first ESP and COL applications will take some time. We are looking for ways to accelerate that process, and the Congress may be able

to help there—by ensuring sufficient funding for Nuclear Power 2010 and even accelerating that funding; and by providing NRC sufficient resources to ensure that the commission has adequate manpower to conduct licensing reviews and meet aggressive but realistic schedules.

THE NUCLEAR POWER 2010 PROGRAM DOES NOT ADDRESS ALL THE CHALLENGES FACING  
NEW NUCLEAR PLANT CONSTRUCTION

The Department of Energy's Nuclear Power 2010 program is a necessary, but not sufficient, step toward new nuclear plant construction. We must address other challenges as well. Our industry is not yet at the point where we can announce specific decisions to build. We are not yet at the point where we can take a \$1.5 billion to \$2 billion investment decision to our boards of directors. We do yet not have fully certified designs that are competitive, for example. We do not know the licensing process will work as intended: That is why we are working systematically through the ESP and COL processes. We must identify and contain the risks to make sure that nothing untoward occurs after we start building. We cannot make a \$1.5—\$2 billion investment decision and end up spending twice that because the licensing process failed us.

The industry believes federal investment is necessary and appropriate to offset some of the risks I've mentioned. We recommend that the federal government's investment include the incentives identified by the Secretary of Energy Advisory Board's Nuclear Energy Task Force in its recent report. That investment stimulus includes:

1. secured loans and loan guarantees;
2. transferable investment tax credits that can be taken as money is expended during construction;
3. transferable production tax credits;
4. accelerated depreciation.

This portfolio of incentives is necessary because it's clear that no single financial incentive is appropriate for all companies, because of differences in company-specific business attributes or differences in the marketplace—namely, whether the markets they serve are open to competition or are in a regulated rate structure.

The next nuclear plants might be built as unregulated merchant plants, or as regulated rate-base projects. The next nuclear plants could be built by single entities, or by consortia of companies. Business environment and project structure have a major impact on which financial incentives work best. Some companies prefer tax-related incentives. Others expect that construction loans or loan guarantees will enable them to finance the next nuclear plants.

It is important to preserve both approaches. We must maintain as much flexibility as possible.

It's important to understand why federal investment stimulus and investment protection is necessary and appropriate.

Federal investment stimulus is necessary to offset the higher first-time costs associated with the first few nuclear plants built.

Federal investment protection is necessary to manage and contain the one type of risk that we cannot manage, and that's the risk of some kind of regulatory failure (including court challenges) that delays construction or commercial operation.

The new licensing process codified in the 1992 Energy Policy Act is conceptually sound. It allows for public participation in the process at the time when that participation is most effective—before designs and sites are approved and construction begins. The new process is designed to remove the uncertainties inherent in the Part 50 process that was used to license the nuclear plants operating today. In principle, the new licensing process is intended to reduce the risk of delay in construction and commercial operation and thus the risk of unanticipated cost increases. The goal is to provide certainty before companies begin construction and place significant investment at risk.

In practice, until the process is demonstrated, the industry and the financial community cannot be assured that licensing will proceed in a disciplined manner, without unfounded intervention and delay. Only the successful licensing and commissioning of several new nuclear plants (such as proposed by the NuStart and Dominion-led consortia) can demonstrate that the licensing issues discussed above have been adequately resolved. Industry and investor concern over these potential regulatory impediments may require techniques like the standby default coverage and standby interest coverage contained in S. 887, introduced by Senators Hagel, Craig and others.

Let me also be clear on two other important issues:



1. The industry is not seeking a totally risk-free business environment. It is seeking government assistance in containing those risks that are beyond the private sector's control. The goal is to ensure that the level of risk associated with the next nuclear plants built in the U.S. generally approaches what the electric industry would consider normal commercial risks. The industry is fully prepared to accept construction management risks and operational risks that are properly within the private sector's control.

2. The industry's financing challenges apply largely to the first few plants in any series of new nuclear reactors. As capital costs decline to the "nth-of-a-kind" range, as investors gain confidence that the licensing process operates as intended and does not represent a source of unpredictable risk, follow-on plants can be financed more conventionally, without the support necessary for the first few projects. What is needed limited federal investment in a limited number of new plants for a limited period of time to overcome the financial and economic hurdles facing the first few plants built.

In summary, we believe the industry and the federal government should work together to finance the first-of-a-kind design and engineering work and to develop an integrated package of financial incentives to stimulate construction of new nuclear power plants. Any such package must address a number of factors, including the licensing/regulatory risks; the investment risks; and the other business issues that make it difficult for companies to undertake capital-intensive projects. Such a cooperative industry/government financing program is a necessary and appropriate investment in U.S. energy security.

I hope this Committee can find a place for this type of investment stimulus in the comprehensive energy legislation now being developed.

In addition, I would be remiss if I did not thank the Chairman for his support for three additional programs/provisions that will assist in the construction of new nuclear power plants in the United States:

1. Sustained progress with the Yucca Mountain project is essential. This includes the funding necessary to maintain the schedule, ensure timely filing of the license application, and access to the full receipts of the Nuclear Waste Fund.

2. Renewal of the Price-Anderson Act, which provides the framework for the industry's self-funded liability insurance. I am pleased to note that this is included in the recently House-passed energy bill.

3. Updated tax treatment of decommissioning funds that would provide comparable treatment for unregulated merchant generating companies and regulated companies. This provision, included in the energy tax legislation passed recently by the House, would allow all companies to establish qualified decommissioning funds and ensure that annual contributions to those funds are treated appropriately as a deductible business expense.

The U.S. electricity business and our nation are paying the price today for our inability to strike an appropriate balance between what was expedient and easy in the short-term, and what was prudent and more difficult in the long-term. We are paying the price today for 10 to 15 years of neglect of longer-term imperatives and the oversupply of base-load generation in the 1990's.

The United States faces a critical need for investment in energy infrastructure, including the capital-intensive, long-lead-time advanced nuclear and coal-fired power plants that represent the backbone of the U.S. electricity supply system.

While some may not realize it, the United States faces an imminent energy crisis today.

Electric power sales represent three to four percent of our gross domestic product. But the other 96 to 97 percent of our \$11-trillion-a-year economy depends on that three to four percent. We cannot afford to gamble with something as fundamental as energy supply, and the biggest problem we face with nuclear energy is not having enough of it.

Thank you again, Mr. Chairman and the other members of the committee and your outstanding professional staff, for your strong support for energy policy initiatives, for nuclear power and for your continued and strong support for the Nuclear Power 2010 program.

SENATOR CRAIG [presiding]. Thank you very much for being with the committee and thank you for, I think, an open and frank presentation.

You have just observed the House markup of an energy bill and you have also outlined inadequacies that you feel are necessary to

truly energize the industry back into the processes of building nuclear reactor generation.

How adequate is that bill based on the four criteria you laid out as necessary stimulants for investment?

Mr. WALLACE. Senator, we believe there are aspects of that bill that are moving in the correct direction.

Perhaps the most significant area that needs additional attention is to deal with the risk associated with regulatory delay or the risk that we refer to as commissioning risk which is to say a plant is fully constructed and ready to operate, but it falls prey to court challenges or other delays that would seem unwarranted in light of the safety objectives that the Nuclear Regulatory Commission will already rule on.

And we believe attention will yet be necessary to assure that those risks are adequately addressed.

Senator CRAIG. Based on what you know of the new COL process that the Nuclear Regulatory Commission is involved in, is that adequate in relation to your—well, I guess I would say it appears that it is from your opinion or your company's opinion not totally adequate as it relates to process and certainty. Could you address that and your concern there?

Mr. WALLACE. Yes, sir. We believe the process as it is established, and Chairman Diaz went through just a short bit ago, is an appropriate process. In fact, the industry had the opportunity to factor in the lessons learned from the eighties in fashioning the new ESP design certification and COL process in the "Energy Policy Act of 1992."

It should work. Our concern is until it is actually proven out, we cannot be sure that there will not be unidentified pitfalls that may fall subject to litigation or intervention that cause delays that we believe should not occur. But until several plants have been through the process, we cannot be certain they will not occur.

Senator CRAIG. The reason I linked the two together, in my conversation with a variety of industry people, it is the uncertainty of the newness where the indemnification or protection is needed in the short term.

Making the assumption that these processes work, are you suggesting or not suggesting that after the second or third construction operating occurs that these kinds of tools would continue to be necessary in the marketplace for an expanded nuclear fleet?

Mr. WALLACE. Senator, after the first several plants—and I am not sure what that exact number is, three, four perhaps—we believe that should provide adequate demonstration that the process works.

And from that point forward, new nuclear plants should be capable of being ordered on the basis of solid economic footing without any necessary Federal support.

Senator CRAIG. I have to assume that a company like yours is now planning for the future and projected future base-load needs.

In the absence of the ability to build nuclear, what would you be doing or what are you planning to do?

Mr. WALLACE. Truly, Senator, our focus is on new nuclear plants. And not to avoid the question, but we believe so solidly that that is the right thing for the future that we have redoubled our efforts

working with members of Department of Energy through NuStart and so forth to assure that new nuclear plants really do come about, that that is the right answer.

In addition, integrated, combined gasified plants or so-called clean-coal technology, we believe is also a viable base-load technology for the future.

We have a very difficult time not seeing new nuclear plants as a fundamental part of our base-load capacity in the future.

Senator CRAIG. In your decisionmaking, how large did the absence of emissions play in decisionmaking as it relates to plans to build certain types of facilities?

Mr. WALLACE. It is one of many factors that plays in support of new nuclear plants going forward in the future. Clearly with 50 percent of our megawatt hours generated by nuclear plants, we are quite proud of the environmental record that that produces and we are also quite pleased with the business sustainability that that will provide for us going forward in the future and that we are not subject to regulations that would add costs for environmental air requirements in the future.

We believe that nuclear power from an overall environmental point of view is going to be the—should be the predominant base-load capacity for the future. It is also the one that supports our objectives for energy independence and it should be the most economic once we get past the first few plants.

Senator CRAIG. I think all of us are pleased to hear that the industry is forecasting that they will file the first of three applications for construction operating license in 2007.

What from your perspective beyond what we have already visited about does the industry need from DOE and the NRC to achieve these goals?

Mr. WALLACE. Senator, we need to assure that from the NRC, there are adequate resources, personnel to be able to accomplish the reviews, to support the activity that is growing in the industry right now.

Chairman Diaz in his earlier comments recognized that there may be some step-up in submittals from the industry. I expect that will be the case. And we, therefore, look for the adequacy of resources for the NRC to support those applications.

In the case of the Department of Energy, continued support for the NP 2010 objectives to take us all the way through COL. And then frankly from the Congress, the legislation that will help us deal with the risks in the construction period and the so-called commercial operation risk or commissioning risk is also going to be important.

Senator CRAIG. Thank you very much.

Senator Salazar, questions?

Senator SALAZAR. Thank you, Senator Craig, and thank you, Mr. Wallace for your testimony.

This issue at the end of the day seems to me counts very much on whether or not we can produce nuclear power in a manner that is safe here in America.

And we obviously have a long track record here of having produced nuclear energy even though I do not think that the American public recognizes that we have 103 nuclear power plants and that

a significant percentage of our base actually comes from nuclear power.

You have just gone through your relicensing process—I do not know exactly when you did this—with respect to one of the power plants in your company. I think it is the Calvert Cliffs' relicensing process.

So let me ask you this. What lessons did you take from the accidents that happened at Chernobyl and that happened at Three Mile Island as you went forward in the relicensing process?

How has your company with respect to the nuclear power plants you have changed over the last 30 years in terms of the kind of technology and the kind of public safety measures that you are now employing?

I mean, we are now at 2005. Those incidents at Chernobyl and Three Mile Island, I think, are still very much the mindset of Americans with respect to nuclear energy. A lot of time has passed since then.

So how have you specifically in your company addressed those public safety issues and how were they addressed as you went through the relicensing process of Calvert Cliffs?

Mr. WALLACE. Senator, we as well as the entire industry learned significant lessons from the Three Mile Island event in 1979. That led to significant changes in the way we evaluate our designs, in the way we establish our emergency procedures, in the way we operate and maintain our plants.

And the changes evolved through the course of the eighties as regulations came from the NRC to focus more and more on those areas. And, frankly, the experience of the industry helped to inform some of that regulatory framework.

So our plants were improved and modified. Our training was significantly advanced. Our emergency preparedness was significantly advanced. There were a number of intensive, independent third-party reviews. The Institute of Nuclear Power Operations was created as the industry's self-monitoring and oversight group and that has grown to quite a significant reputation, in fact such that it has now expanded worldwide through the creation of the World Association of Nuclear Operators.

And that is a body where we are all policing each other recognizing that we are in a sense hostage to each other with the weakest link being the poorest performer. So we put pressure on each other in a far different way than was ever the case prior to Three Mile Island.

And I think all of those lessons, design, maintenance, operations, training, peer pressure, have created a very healthy environment that we continually improve our operations.

And, in fact, that is what has led to the track record of the nineties and even part of this century where our plants are now operating last year at a record 90.5 percent capacity factor. And it is not over yet because we continue to learn from our experiences.

Senator SALAZAR. The fleet of 103 nuclear reactors that we have in this country, have they been upgraded constantly over time and through the nineties and through this century given the lessons of the past?

Mr. WALLACE. Yes, sir. That is a very accurate way to say it. Both in the physical equipment as well as in the training of the personnel.

Senator SALAZAR. Let me ask a question concerning the siting of these facilities.

Put aside the social or political issues that obviously are inherent in any kind of application process for a new facility.

Just from a geophysical point of view, what kinds of locations are looked at relative to the siting of a nuclear power plant? What are the best kinds of geological areas that you would want as an industry to site these facilities?

Mr. WALLACE. Well, we look first for where the need for base-load capacity is going to be the greatest. And one of those areas is in Maryland where our corporate headquarters is located right now.

We expect to reach an unacceptable level of base-load capacity or, said differently, that the need for new base-load capacity will exist about 2009. And, yet, we cannot make a base-load nuclear plant operate by 2009.

So the first criteria is really where do we need the base-load electricity in order to serve the needs of the customers.

The second is where is there adequate transmission, water siting, and geological conditions that would support the criteria that go into a site, seismic criteria and the like.

Senator SALAZAR. Spend a few minutes just on that latter issue. I mean, put location aside and need. Obviously a business decision. And we know the transmission issue is always going to be a big issue, how you get the power to where it is going to be consumed.

Spend a little time elaborating for me, if you will, on the kind of geologic location that you look at with respect to the siting of these facilities. Does it matter whether it is on a coast line, on a river? Are you looking for places that have the kind of geology of the deserts or New Mexico or Nevada or the high mountains of Senator Craig's area in Idaho? What ideally geologically? When you look at a place to site a plant, what kind of place are you looking at?

Mr. WALLACE. Well, in a sense, the best place to locate the plants would be somewhere out toward the Midwest, but the problem is that is far away from where the need exists.

Senator SALAZAR. Do not address the need at this point. Why do you say that the Midwest would be the best place ideally? If you would just look at it from a geological, public Safety point of view.

Mr. WALLACE. We look for areas where there is acceptable seismic history and those are the best areas. But, frankly, they do not become very limiting because whatever the seismic history of the area we are in, a plant might be located, we factor that into the design and then meet that criteria.

So the area where the plant is needed from an electricity point of view is really the principal criteria. And then secondary to that it becomes the transmission lines and the water and the available land.

And the best sites truly are those sites that already exist today because they tend to have all of those criteria in addition to the so-

cial benefits of near population being quite understanding and accepting of nuclear power.

In fact, one of my plants in Upstate New York, Nine Mile Point, enjoys an initiative started by the mayor of the local city a couple of months ago passing a resolution encouraging us to site a new nuclear plant in that vicinity.

So we find that time and again the communities nearest our plants are the ones that understand the technology and have become quite comfortable with it and look for the economic stimulus that goes with expansion.

Senator SALAZAR. And, Mr. Wallace, if that statement, if you look across the 103 plants in this country, is that generally the case where there is community support by the surrounding community for the existence of those plants or are there places where the nuclear plants continue to create controversy among the local community as to whether or not they want the plant there?

Mr. WALLACE. I have to say that that is generally the case. I cannot speak specifically for all 103 in the country. There may be areas where there are focused issues.

But I can speak for the five plants, units, that I have responsibility for today. Until the middle of the nineties, I had responsibility for twelve units in the Midwest and Illinois. I can speak for all those communities who were very much accepting and appreciative and, if anything, encouraging the company to do more in those areas.

Senator SALAZAR. Thank you, Mr. Wallace.

Senator CRAIG. Let me ask one last question. I am sitting here considering other involvements I have had of recent as relates to siting certain types of production units and their water requirements.

What is your largest unit operating?

Mr. WALLACE. It is our Nine Mile Point unit, too, in Upstate New York.

Senator CRAIG. What is its capacity?

Mr. WALLACE. Eleven hundred and fifty megawatts.

Senator CRAIG. How much water does it require? Do you know the acre foot requirement or how you measure it?

Mr. WALLACE. I will answer it this way. We use a cooling tower, so we are not on a lake. And we draw the water from Lake Ontario. And I am not clear on what the volume of water is that we draw off Lake Ontario. And the water we draw off is merely to make up for evaporation that occurs through the utilization of the cooling tower.

Senator SALAZAR. If I may, Senator Craig, how about the acreage, sort of the size of the site? May I ask that question, sir?

Senator CRAIG. Sure.

Mr. WALLACE. Well, the size is actually quite small because we have a small pond that is not more than two acres in size. The purpose of which is to hold the water that comes drawn down from the lake and that condenses coming out of the cooling tower.

Senator SALAZAR. How about the acreage for the entire site of the plant? What kind of acreage do you have there?

Mr. WALLACE. The entire site acreage is probably about 700 acres.

Senator SALAZAR. Thank you, Senator.

Senator CRAIG. Mr. Wallace, thank you very much for taking your time to be with the committee this morning.

The chairman will not be returning, so I will conclude this and will stand the committee in adjournment.

[Whereupon the hearing was adjourned.]

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