BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition for Determination of Need for Levy Units 1 and 2 Nuclear Power Plants	)))	DOCKET NO. 080148-EI Submitted for filing: April 30, 2008

CMP
COM 5
CTR 1
ECR
GCL 3
OPC
RCA
SCR
SGA
SEC
OTH

REBUTTAL TESTIMONY OF DANIEL L. RODERICK ON BEHALF OF PROGRESS ENERGY FLORIDA

R. ALEXANDER GLENN
JOHN BURNETT
PROGRESS ENERGY SERVICE COMPANY, LLC
P.O. Box 14042
St. Petersburg, Florida 33733
Telephone: (727) 820-5587
Facsimile: (727) 820-5519

JAMES MICHAEL WALLS
Florida Bar No. 706272
DIANNE M. TRIPLETT
Florida Bar No. 0872431
CARLTON FIELDS, P.A.
Post Office Box 3239
Tampa, FL 33601
Telephone: (813) 223-7000
Telecopier: (813) 229-4133

IN RE: PETITION FOR DETERMINATION OF NEED FOR LEVY UNITS 1 AND 2 NUCLEAR POWER PLANTS

FPSC DOCKET NO. 080148-EI

REBUTTAL TESTIMONY OF DANIEL L. RODERICK

Q. Please state your name.

A. My name is Daniel L. Roderick.

Q. Did you submit Direct Testimony in this case on March 11, 2008?

A. Yes.

Q. Have you reviewed the intervenor testimony filed on behalf of PCS Phosphate-White Springs ("White Springs")?

A. Yes, I have. I reviewed the testimony of White Springs witness Peter A. Bradford.

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to respond to certain arguments advanced by Mr. Bradford. I will address three erroneous points that Mr. Bradford makes in his testimony. First, Mr. Bradford erroneously assumes that the past difficulties rather than the past successes in developing nuclear power generation will necessarily be repeated in the future. Second, Mr. Bradford provides an incomplete and inaccurate assessment of the current, approved nuclear reactor designs, like the Westinghouse AP1000, and the expected operational capabilities of such nuclear generation units. Finally, Mr. Bradford, while being far removed from the current market conditions involving the development of nuclear power generation, nevertheless suggests that

this Commission should adopt arbitrarily selected contract terms and conditions that will discourage, not encourage, the investment in nuclear generation in the State of Florida.

Q. Does Mr. Bradford make any other arguments in his testimony?

A. Yes, he does.

Q. Are you going to address his other arguments in your rebuttal testimony?

A. There is no need to do so because some of his arguments are contrary to (1) the Florida legislation amending the need determination provisions for nuclear power plants; (2) the nuclear cost recovery legislation intended to promote utility investment in nuclear power generation; and (3) the nuclear cost recovery rule adopted by this Commission to implement that legislation. Mr. Bradford concedes this is true, for example, he acknowledges at page 10, line 24 that the Florida "Legislature had every right to do this," meaning that the Legislature had the right to enact the cost-recovery provisions of the nuclear cost recovery statute. However, this does not stop him from arguing that the Commission should depart from the clear Legislative intent in this legislation under the guise of "proceed[ing] with caution." We expect, however, that the Commission will analyze our need filing on the grounds the Legislature explicitly established for need determinations for nuclear power generation plants, and that the Commission will subsequently apply the nuclear cost recovery statute and rule, including the prudence review of costs, consistent with Florida law, and not what Mr. Bradford otherwise believes should be the law of this State had he written it.

Other arguments that Mr. Bradford makes necessarily require some supporting analysis but he provides none. To illustrate, Mr. Bradford alludes to "other measures" at page 22, lines 19-20 that, according to him, "can prevent [sic] far more green house gas reductions far more quickly" than nuclear power. We assume Mr. Bradford meant to say that these "other measures" will "provide" not "prevent" green house gas reductions. Nowhere in his testimony, however, does Mr. Bradford explain what these "other measures" are much less include any scientific or technical analyses that explain how these unidentified "other measures" will in fact provide more green house gas reductions than nuclear power generation on a much more accelerated time schedule.

Likewise, Mr. Bradford claims at page 25, lines 14-15 that there is a "strong likelihood" that "energy efficiency is available at lower cost than the proposed nuclear station," which, we assume he means to say, will offset the need for Levy Units 1 and 2. Again, Mr. Bradford makes this assertion without any scientific or technical support whatsoever. He provides no analysis of any energy efficiency measures that are available to PEF that PEF is not currently employing and he does not explain how any of these measures can, in any event, offset the need for Levy Units 1 and 2. These unsupported assertions by Mr. Bradford, therefore, should be rejected without further rebuttal.

Q. Do you have any exhibits to your rebuttal testimony?

A. Yes, I have supervised the preparation of or prepared the following exhibits to my rebuttal testimony.

- Exhibit No. ____ (DLR-7), charts graphically depicting the differences between the current Nuclear Regulatory Commission ("NRC") Construction and Operating License Application ("COLA") regulatory process and the prior NRC regulatory process;
- Exhibit No. ____ (DLR-8), graphics of the Westinghouse AP-1000 advanced reactor plant showing the reduction in cable, pumps, and other material in the Westinghouse AP-1000 compared to those commercially operational nuclear power plants today;
- Exhibit No. ____ (DLR-9), a chart of the capacity factors of this nation's commercially operational nuclear power plants over the last decade; and
- Exhibit No. ____ (DLR-10), a chart of the capacity factors of the most recent nuclear power plants.

All of these exhibits are true and accurate.

II. CURRENT ENVIRONMENT FOR NUCLEAR POWER DEVELOPMENT

Q. Mr. Bradford paints a bleak picture of the current development of nuclear power generation in the United States. Do you agree with it?

A. No, I do not. First, even Mr. Bradford agrees that prior difficulties with the development of nuclear power plants in the United States, including delays and cost overruns, were not universal. As Mr. Bradford notes, the five currently operating nuclear power plants in Florida largely escaped these difficulties, as well as the Maine Yankee nuclear power plant, with which Mr. Bradford claims some regulatory experience. These examples demonstrate that generalizations about the development

of the nuclear generation in the past are difficult to make and should accordingly not be made. In fact, there are more than 100 nuclear power plants in commercial operation in the country today that, no matter their actual cost compared to the initial estimated construction cost, are some of the most efficient and lowest cost, energy producing power plants in the nation.

Additionally, the fact that there were instances where nuclear power plants faced prolonged delays, cost overruns, and, in some cases, cancellation, does not mean that those experiences will necessarily be repeated. Indeed, Mr. Bradford talks about certain of these instances as if they are occurring today, without any effort to explain the legislative, regulatory, engineering design, construction, and operational circumstances that distinguish those prior instances from the current environment or circumstances. Indeed, all of these past design and construction experiences and the experiences operating over 100 nuclear power plants in this country and hundreds of nuclear power plants worldwide over the last thirty to forty years, have led to the current advanced nuclear reactor designs and improved regulatory framework for licensing nuclear power plants we have today.

Under the prior NRC regulatory licensing regime in the 1970's, which Mr. Bradford participated in as a NRC Commissioner, nuclear power plants could be and often were under construction before their designs were even close to being completed. This led to numerous field changes, extended NRC reviews, delays, and increased costs. The NRC regulatory licensing process today is entirely different. Mr. Bradford, however, ignores these significant changes. First, the NRC has pre-approved the Westinghouse AP-1000 advanced, standard nuclear reactor design,

after years of detailed review, and incorporated that certified design into an NRC rule. This should avoid many of the design change issues that occurred in the previous generation of nuclear power plants, and should help facilitate the NRC's review and shorten the licensing process.

Likewise, the COLA process now allows a utility to obtain NRC approval of the construction and operation of the nuclear power plant at the same time. Before, in some of the instances mentioned by Mr. Bradford in his testimony, the utility had to obtain NRC approval in advance of construction and then after construction obtain a separate operating license. This dual licensing process added additional time to the process and, in the event issues were raised during the latter, operational license phase, delayed the process further leading to increased costs. The COLA process was adopted to remedy these difficulties in an effort to prevent the NRC and utilities from repeating these past difficulties in the licensing process. For an illustration of the differences in the prior regulatory process and the current COLA process please see Exhibit No. ___ (DLR-7) to my rebuttal testimony.

Q. Doesn't Mr. Bradford claim that the prior NRC licensing process was not a significant cause of delays and cost overruns?

A. Yes, he does, but he claims the process was not a "significant" cause of delays or cost overruns for no other reason than the process "invariably ended with the issuance of the requested license." (Bradford Test., p. 21, Lines 5-9). He admits, however, that the hearing process was "sometimes contentious and protracted." (Id.). A "protracted" hearing process means, of course, a lengthy one that certainly

contributed to the cost increases those utilities caught up in that "protracted" process experienced.

Mr. Bradford goes on to claim that the "real" cause of cost overruns in the past was that operational lessons "repeatedly had to be applied to plants that were partially built" leading to extra costs. His examples, including the Brown's Ferry station plant (see Bradford Test., p. 21, Lines 10-20), led the NRC to adopt advance approval for standardized nuclear reactor designs and the COLA process. The NRC took measured steps based on past experience to ensure that past problems are not repeated today in the licensing of nuclear power plants in the United States.

Mr. Bradford apparently disagrees, claiming that the past problems cannot be "fixed" by what he terms as "streamlining" the licensing process. (Bradford Test., p. 21, Line 22). But the NRC did much more than "streamline" the process. The NRC enhanced it by taking up the substantive issues of design, construction, and operation earlier in the licensing process and addressing them at the same time to ensure a speedier but still substantive license review. Mr. Bradford may have a negative opinion of the NRC process revisions, for whatever personal reasons he may have, but he has not supported his opinion here with any evidence that the revised process will not work better than the prior process. Indeed, at page 21, Lines 21-22, he concedes that a repeat of past problems in future nuclear power plants is something that "remains to be seen."

Most important to this issue, however, is what Mr. Bradford overlooks. Today, the NRC and utilities with commercial nuclear power plants have over forty years of experience operating nuclear power plants. Utilities like PEF who have

operating nuclear power plants have extensive experience with all matters of nuclear power plant operations, nuclear power plant construction as a result of capital replacements and improvements including nuclear power uprates, and scheduling forced and planned outages for construction and maintenance work and refueling. This utility experience is shared with the NRC through its regulatory review of these utility activities. These utilities also participate in industry organizations where these experiences are shared and lessons are learned. There is, therefore, a vast wealth of experience and knowledge for utilities to draw on today when developing new nuclear power plants.

This experience and knowledge simply did not exist in 1975, when the issues with the Brown's Ferry station plant that Mr. Bradford relies on for example, came up. At that time, the commercial nuclear power generation segment of the utility industry was in its infancy. That is not true today. PEF and the NRC are not proceeding with the COLA for Levy Units 1 and 2 on a blank slate. Rather, PEF and the NRC will bring their knowledge and experience, and the combined knowledge and experience of the industry over the past 40 years, into the COLA process. It is, therefore, simply a mistake to assume, as Mr. Bradford does, that the electric utility industry is destined to repeat the past problems and difficulties when the circumstances and the ability of the utilities and NRC to prepare for and respond to challenges that might arise are so different today than they were thirty to forty years ago.

Q. Does this mean that the actual costs for Levy Units 1 and 2 will not exceed the current, non-binding cost estimate for the two units?

A. No, it does not. As I testified in my direct testimony, costs could increase, or they could decrease, based on any number of factors that I have previously identified. Many of these factors, such as equipment rate and commodity price escalations, labor availability, and labor costs, are not unique to the Levy Units 1 and 2 project. Changes in construction equipment, commodity, and labor prices are factors that affect all utility construction projects, not just Levy Units 1 and 2. The same is true for inflation and increases in the cost of capital; those increases may impact the costs of generation in the same timeframe of the Levy Units no matter what PEF is building to meet customer generation needs. The non-binding cost estimate simply represents the best cost information available to the Company at this time. There is no guarantee, however, that the actual costs will not change from that estimate.

What I have said here in rebuttal does mean, however, that I believe there is an improved process in place for the licensing of Levy Units 1 and 2 that incorporates the lessons learned from past experience. Also, based on the knowledge and experience at the NRC and in the utility industry from operating nuclear power plants over the last forty years, I believe that the NRC and PEF are better prepared to address any challenges that may come up in the licensing, engineering, construction, and operation of new nuclear power plants like Levy Units 1 and 2. Operating nuclear power plants is a core strength of Progress Energy. We plan to bring that core strength to bear on the Levy Units 1 and 2 project.

Q. Are nuclear power plant cost estimates out of control, as Mr. Bradford apparently claims?

A. No, I would not characterize them the way Mr. Bradford does, and I disagree with his characterization of the "recent trends" that he refers to at page 15, lines 6-18 of his testimony. First, all initial cost estimates put out by the industry and financial companies several years ago were "best guesses" because no company in the United States had even begun to negotiate with vendors on specific terms and conditions or pricing. Second, construction cost estimates today are higher than they were five years ago. This is not only due to natural inflation and changes in the value of the dollar to other world currencies but also to an increase in capital construction worldwide, particularly in China, which has increased the demand for nearly all material, equipment, and construction labor for large-scale industrial and utility projects. Third, a number of the cost estimates for nuclear power generation referred to by Mr. Bradford, such as the St. Petersburg Times article and Moody's estimates, reflect generic nuclear power generation estimates. In other words, these estimates were not site specific and therefore they necessarily did not include those costs that can be estimated only upon the selection of a site for the nuclear power plant. The inclusion of site specific costs in any generic estimate means that generic estimate will increase.

To illustrate, as I testified in my direct testimony, the current, non-binding estimate for Levy Units 1 and 2 includes costs for land, COLA preparation and NRC review, the initial core load, site specific structures such as cooling towers,

intake and discharge structures, land clearing and engineering, owner's costs such as training and staffing, permits, fees, insurance and taxes, and AFUDC, among others. Many if not all of these costs are not included in the generic cost estimates that Mr. Bradford refers to in his testimony. It is a mistake, therefore, to compare the current, non-binding cost estimate for Levy Units 1 and 2 to these earlier generic cost estimates for nuclear power plants. Mr. Bradford is comparing "apples to oranges."

III. ADVANCED NUCLEAR REACTOR DESIGNS: THE WESTINGHOUSE AP1000

Q. Mr. Bradford claims the Westinghouse AP1000 "pressurized reactor design" is, however, new with no construction cost or operating experience and, therefore, there is a "high likelihood" of higher costs and schedule delays. Do you agree?

A. No, I do not. The Westinghouse AP1000 reactor design is similar to the design employed and operating successfully in Westinghouse nuclear reactor designs in the United States and around the world. What is advanced or "new" about the Westinghouse AP1000 design is the use of "passive" rather than "active" cooling safety systems that were traditionally used in commercial nuclear power plants in the United States. As I explained in my direct testimony, this "passive" cooling safety system design is a simpler design that uses gravity and the natural recirculation of air and water in the cooling system for the nuclear power plant. This results in less cable, pumps, valves, and pump engines than can be found in existing nuclear power plants, as demonstrated by Exhibit No. ___ (DLR-8) to my

rebuttal testimony. Less material and equipment means lower initial construction costs, lower subsequent maintenance costs, and less equipment that can fail that therefore must be replaced, providing an extremely safe, efficient design.

The Westinghouse AP1000 nuclear power plant design enhances the plant's cooling system. The nuclear reactor in the plant design and the turbine building where steam is turned into electricity reflect traditional, tried and true, engineering technology design, construction, and operation. A useful analogy may be a subsequent model year car where the radiator, cooling hoses, and related parts have been re-designed. The engine, transmission, and other parts of the vehicle remain the same and reflect the combined years of experience in the design, construction, and operating experience of the manufacturing team. The same holds true for the Westinghouse AP1000 advanced passive nuclear power plant design. The cooling system has been re-designed but the nuclear reactor and steam turbines reflect the design, construction, and operational experience of Westinghouse in operating nuclear power plants around the world. Mr. Bradford is simply wrong to conclude that the Westinghouse AP1000 design alone will result in a "high likelihood" of cost increases and schedule delays.

Additionally, there will be both construction cost experience and operating experience with the Westinghouse AP1000 nuclear power plants before construction of Levy Units 1 and 2 will be completed and they assume commercial operation on the current, planned schedule. China has ordered four of the Westinghouse AP1000 nuclear power plants and is proceeding with the engineering and construction work necessary to place the earliest ones on line by 2013.

Q. Is it realistic to expect capacity factors of around 90 percent for Levy Units 1 and 2?

A. Yes, it is. Mr. Bradford refers to "lifetime" capacity factors of United States nuclear plants (at page 20, lines 10-14), which of course includes the infancy period for nuclear power plants that I referred to earlier. In my view, given the knowledge and experience gained by the industry over the last forty years and the similarity of the current designs to existing operational nuclear reactors, a more realistic comparison for future nuclear power plant capacity factors is the capacity factors achieved over the last decade. Exhibit No. ___ (DLR-9) to my testimony includes a chart showing the capacity factors achieved for nuclear power plants in the United States over that period of time. As you can see, the capacity factors achieved are equivalent to the expected capacity factors for Levy Units 1 and 2.

Additionally, Mr. Bradford claims that the most recent nuclear power plants brought on line tend to have "significantly lower" capacity factors in their first few years. (Bradford Test., p. 20, Lines 12-15). Mr. Bradford does not explain what he means by "significantly lower" capacity factors. I have included, however, a chart of the capacity factors of these most recent nuclear power units at Exhibit No. ___ (DLR-10). As you can see, the capacity factors for these newer nuclear power plants started out in the high 80's, right around capacity factors in the range projected for Levy Units 1 and 2.

Finally, Mr. Bradford claims that a 90 percent capacity factor will be difficult to attain because refueling and maintenance outages are unavoidable.

(Bradford Test., p. 20, Lines 15-18). I disagree. While refueling and maintenance outages are essential and will occur, what Mr. Bradford fails to disclose are the achievements obtained by the industry and PEF in managing refueling and maintenance outages to reduce the outage time as much as possible. These reductions are substantial and they are an excellent example of the knowledge and experience that PEF will bring to Levy Units 1 and 2. Therefore, I believe that capacity factors of 90 percent for Levy Units 1 and 2 are attainable.

IV. COST CONDITIONS SHOULD NOT BE IMPOSED

Q. Mr. Bradford refers to a number of conditions that he believes the Commission should consider imposing on the need determination for Levy Units 1 and 2. Do you agree with his recommendations?

A. No, his recommendations are unrealistic and counter-productive to the development of nuclear power plants in Florida (and the United States). We all desire more cost certainty in the process and PEF is taking reasonable steps within its control to obtain as much cost certainty as possible under current market conditions. However, arbitrarily imposing "cost ceilings" or contract terms and conditions ignore the realities of the marketplace and could drive up the project's cost. The reality is that Levy Units 1 and 2 will be constructed and enter commercial operation years from now. Engineering and construction costs will be different then but no one knows for sure what they will be. The best we can do, as I explained in my direct testimony, is to firm up what prices we can by tying them to particular indices, allocate what risks we can to the Consortium, and manage the

project the best we can, all the while carefully watching the costs and making decisions about the project as milestones approach.

At this time, it is unrealistic to expect a "cost ceiling" or "fixed price" contract to work, at least at an acceptable price to our customers. Mr. Bradford refers to the AREVA project in Finland (at page 14, lines 13-21) as an example of recent delays and cost overruns in developing new nuclear power plants and the need for a fixed price contract here similar to what AREVA agreed to there. This is not a comparable project to Levy Units 1 and 2; the legislative and regulatory environment is significantly different and AREVA is a state-supported company that pursued this project to "get a foothold" in the development of new nuclear power projects. Additionally, this example demonstrates that it is unlikely that AREVA or any other nuclear power plant supplier will agree to a fixed price contract in the future. If one is sought or demanded, customers can expect a "fixed price" or "ceiling" that is much higher, not lower, than current estimates, even if suppliers agree to such a "fixed price" or "cost ceiling" which I believe is unlikely under current market conditions. Even Mr. Bradford acknowledges that such arbitrary "fixed" or "ceiling" cost limits are unrealistic because he proposes that any arbitrary ceiling that is set "might be revisited once or twice as the project moves forward." (Bradford Test., p. 24, Line 20).

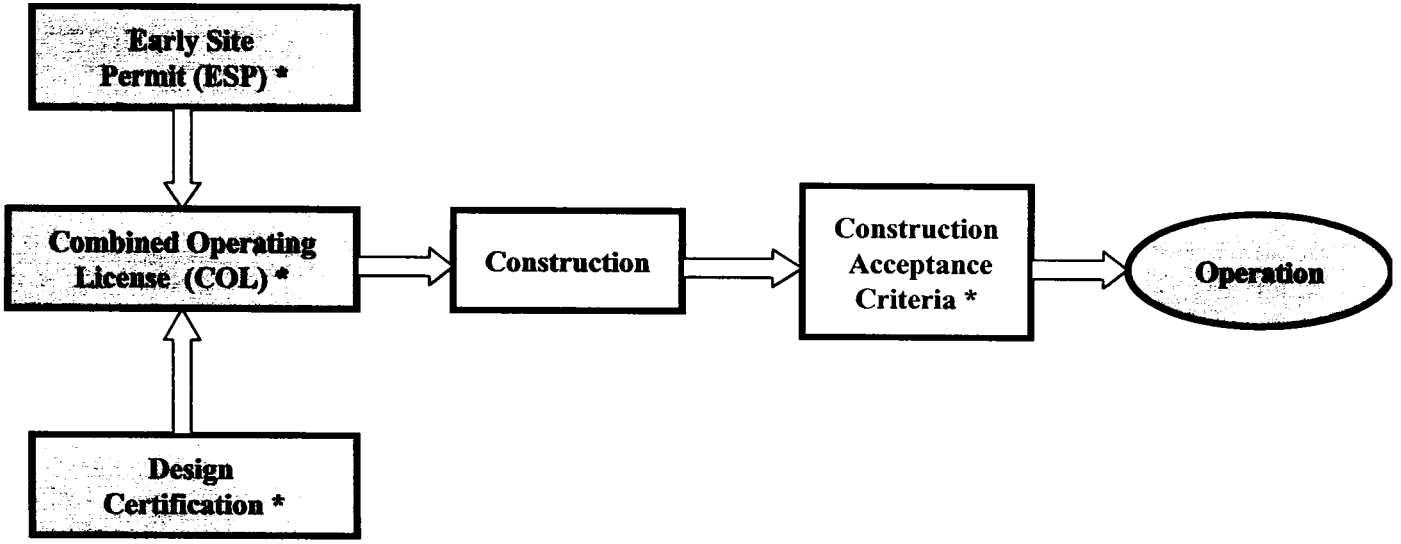
Additionally, Mr. Bradford quotes a periodical that purportedly quotes the Chief Operating Officer of Exelon about contract terms and conditions that he recommends the Commission consider as "requirements" for Levy Units 1 and 2. (Bradford Test., pp. 17-18). Much of this is nothing more than general, hearsay

speculation from the Exelon COO to the periodical and now to Mr. Bradford. In any event, it is difficult to discern from these general statements exactly what "requirements" Mr. Bradford would have the Commission impose here. What is clear, even from the general statements made by the Exelon COO, is that there is no real world support for a successful application of arbitrarily imposed "requirements" on the construction contracting process for new nuclear power plants. Exelon has not done it, and I am aware of no other situation where that has occurred. Indeed, a process that sets arbitrary terms and conditions in advance of contractual negotiations is counterproductive to the development of new nuclear power generation. Such action will discourage, not encourage, the development of nuclear power plants in Florida contrary to the Florida Legislature's direction.

Q. Does this conclude your rebuttal testimony?

A. Yes.

What's Different?...
New NRC Licensing Process (10 CFR Part 52)



*** Public Comment Opportunity**

Licensing Process . . . *What's Different?*

Previous Part 50 Process

- Select an architect engineer and design a unique plant
- Apply for a construction permit
- Parallel design / construction / regulatory review
- Apply for operating license
- Operate plant

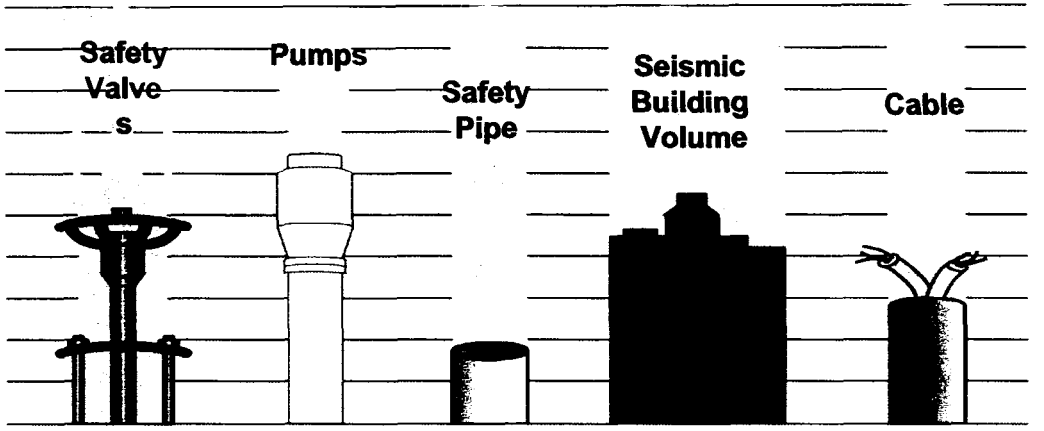
New Part 52 Process

- Select a pre-approved plant design
- Apply for a combined construction and operating license
- Build plant using modular construction techniques
- Operate plant

Nuclear Plant Construction: "Then and Now"

THEN	NOW
Changing regulatory standards and requirements	**More stable process: NRC approves site and design, single license to build and operate, before construction begins and significant capital is placed "at risk"**
Design as you build	**Plant fully designed before construction begins**
No design standardization	**Standard NRC-certified designs**
Inefficient construction practices	**Lessons learned from nuclear construction projects overseas incorporated, and modular construction practices**
Multiple opportunities to intervene, cause delay	**Opportunities to intervene limited to well-defined points in process, must be based on objective evidence that ITAAC have not been, and will not be, met**

AP1000 Simplification Benefits Reliability, Availability, Maintainability

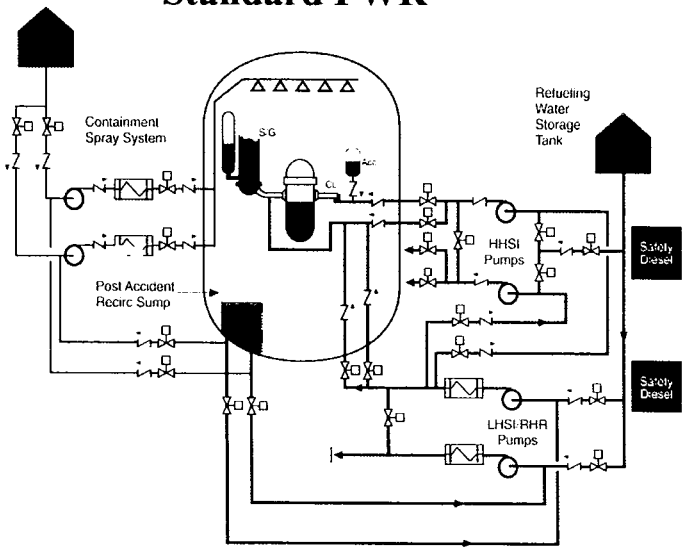


Reduced Number of Components:

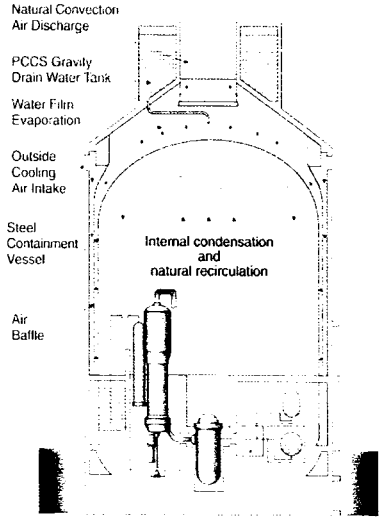
	1000 MW Reference	AP1000	Reduction
- Safety Valves	2844	1400	51%
- Pumps	280	184	34%
- Safety Piping	11.0 x 10^4 feet	1.9 x 10^4 feet	83%
- Cable	9.1 mil. feet	1.2 mil. feet	87%
- Seismic Building Volume	12.7 mil. ft^3	5.6 mil. ft^3	56%

Simplification of Safety Systems

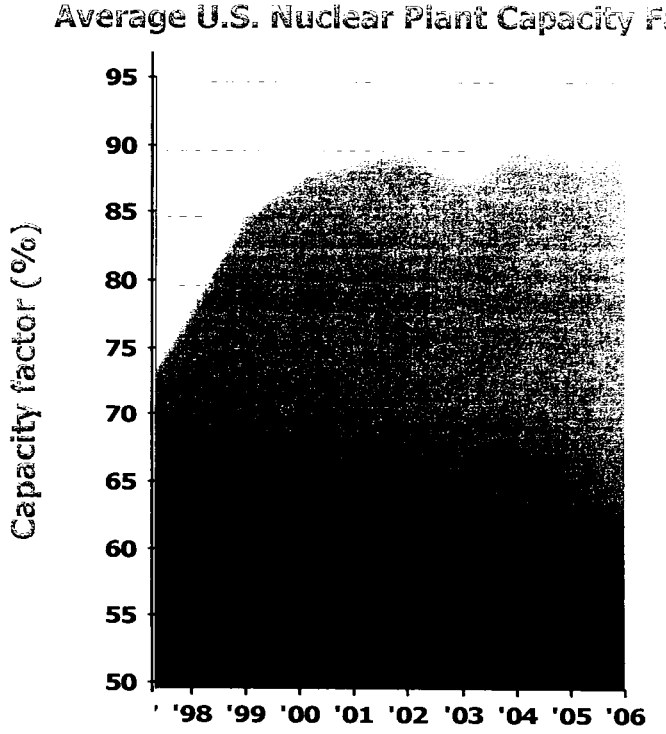
Standard PWR



AP1000



Sustained Reliability and Productivity



88.1% in 2000
89.4% in 2001
90.3% in 2002
87.9% in 2003
90.5% in 2004
89.3% in 2005
89.9% in 2006*

COUNTRY	PLANT NAME	COMMERCIAL OPERATION DATE	OPERATING FACTOR SINCE COD
India	Tarapur	8/18/2006	82.96
Korea	Ulchin	6/1/2005	91.58
Russia	Kalinin	11/8/2005	86.34
Ukraine	Khmelnitski	12/15/2005	86.47
China	Qinshan	5/3/2004	89.64
China	Lingao	8/21/2003	88.17