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Florida Public Service Commission  
2540 Shumard Oak Boulevard  
Tallahassee, FL 32399-0850

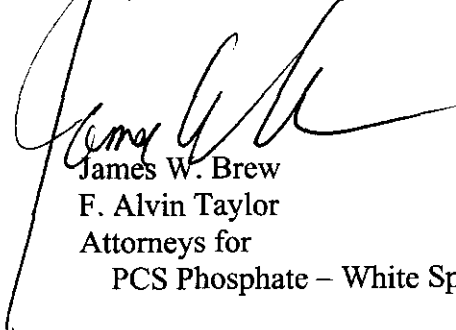
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COMMISSION  
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RE: Docket No. 080148-EI – In Re: Petition for Determination of  
Need for Levy Units 1 and 2 Nuclear Power Plants

Dear Ms. Cole:

Enclosed for filing is an original and fifteen (15) copies of the *Testimony and Exhibit of Peter A. Bradford* on behalf of White Springs Agricultural Chemicals, Inc. d/b/a PCS Phosphate – White Springs in the above-referenced case.

Very truly yours,



James W. Brew  
F. Alvin Taylor  
Attorneys for  
PCS Phosphate – White Springs

- CMP \_\_\_\_\_
- COM \_\_\_\_\_
- CTR \_\_\_\_\_
- ECR 8 \_\_\_\_\_
- GCL 1 \_\_\_\_\_
- OPC \_\_\_\_\_
- RCA \_\_\_\_\_
- SCR \_\_\_\_\_
- SGA \_\_\_\_\_
- SEC \_\_\_\_\_
- OTH Marquette 6

JWB:pdi  
Enclosures: a/s

Cc: All Active Parties (via U.S. mail)

DOCUMENT NUMBER-DATE  
02978 APR 16 08  
FPSC-COMMISSION CLERK

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In Re: Petition for Determination ) Docket No. 080148-EI  
Of Need For Levy Units 1 and 2 )  
Nuclear Power Plants ) Submitted for Filing: April 16, 2008

**TESTIMONY**  
**OF**  
**PETER A. BRADFORD**  
**ON BEHALF OF**  
**PCS PHOSPHATE – WHITE SPRINGS**

DOCUMENT NUMBER - DATE

02978 APR 16 8

FPSC-COMMISSION CLERK

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

**FPSC DOCKET NO. 080148-EI**

**DIRECT TESTIMONY OF  
PETER A. BRADFORD**

**1. INTRODUCTION AND QUALIFICATIONS**

**Q. PLEASE STATE YOUR NAME, ADDRESS AND CURRENT POSITION.**

A. My name is Peter A. Bradford. My business address is PO Box 497, Peru, Vermont, 05152. I am an adjunct professor at Vermont Law School and President of Bradford Brook Associates.

**Q. PLEASE STATE YOUR EXPERIENCE IN THE FIELD OF UTILITY  
REGULATION.**

A. I was a utility regulatory commissioner almost continuously from 1971 until 1995. I chaired the Maine Public Utility Commission (1974-5 and 1982-87) and the New York Public Service Commission (1987-95). During this time, I was involved in several power plant siting proceedings that included determining the need for the proposed facility. I was also a commissioner on the U.S. Nuclear Regulatory Commission (1977-82) during which time the Commission issued more than twenty nuclear power construction permits and operating licenses, which required an assessment of the need for the proposed facility pursuant to the National Environmental Policy Act. I was Maine's Public Advocate in early 1982. Since 1995, I have taught several courses related to energy policy, utility regulation and nuclear power at Yale and at Vermont Law School as well as in seminar programs at the Institute of Public Utilities and elsewhere. I have

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1 also worked with the Regulatory Assistance Project and have testified before  
2 numerous state utility regulatory commissions.

3 I have consulted in several countries – including China, India, Russia and  
4 Indonesia – on issues pertaining to utility regulation and to nuclear power.

5 I was a member of the National Association of Utility Regulatory  
6 Commissioners (NARUC) from 1971 until 1995 and served as its president in  
7 1987. I served on NARUC's Electric, Gas and Communications Committees as  
8 well as on the Subcommittees on Nuclear Waste and Nuclear Economics. I  
9 was also the liaison between the Nuclear Regulatory Commission and NARUC  
10 and have testified before the U.S. Congress at least 50 times on issues relating  
11 to nuclear power.

12 My complete resume is attached as Exhibit PAB-1.

13 **Q. PLEASE DISCUSS YOUR EXPERIENCE IN REGULATING NUCLEAR**  
14 **POWER.**

15 A. My first experience with regulating rate impacts of nuclear power came when  
16 the Maine Yankee nuclear power plant came on line in 1972. Like the  
17 operating Florida plants, Maine Yankee was a relatively inexpensive unit, and  
18 the impacts were not large. The same was true for Maine's investments in  
19 other early New England units. However, early good experiences turned out  
20 not to guarantee that later ones would go as well.

21 In New York and Maine, I chaired commissions deciding cases involving rate  
22 implications and prudence concerning the Seabrook plant in Maine as well as  
23 the Shoreham and Nine Mile Point II plants in New York. I chaired the New

1 York and Maine commissions when those states disengaged from the  
2 Shoreham and Seabrook plants in ways that resulted in adequate power  
3 supplies, improved economic development and produced electric rate impacts  
4 lower than would otherwise have occurred. We also decided several  
5 proceedings allocating the costs of cancelled plants. I also reviewed proposals  
6 to spread the cost of cleaning up the Three Mile Island accident across all  
7 nuclear power plants.

8 More recently, I participated in the 2005 National Research Council of the  
9 National Academy of Sciences panel evaluating the alternatives to continued  
10 operation of the Indian Point nuclear units in New York. I was also a member of  
11 the 2007 Keystone Center Nuclear Power Joint Fact Finding project, which  
12 identified points of agreement among a broad range of constituencies, including  
13 nuclear power plant owners and builders, on issues relating to nuclear power  
14 costs and the role of nuclear power in combating climate change.

15 In other countries, I have participated in evaluating the need for new nuclear  
16 units as an option in Ukraine for the European Bank for Reconstruction and  
17 Development, in evaluating new nuclear power and decommissioning costs in  
18 Armenia and in evaluating the regulatory structure that would oversee the  
19 operating of the Mochovce nuclear plant in Slovakia. I have also given talks on  
20 the U.S. nuclear experience in China.

21 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?**

22 A. I am submitting this testimony on behalf of White Springs Agricultural  
23 Chemicals, Inc. d/b/a PCS Phosphate- White Springs ("PCS Phosphate"). PCS

1 Phosphate is a manufacturer of fertilizer products with plants and operations  
2 located within Progress Energy Florida's ("PEF") electric service territory. PCS  
3 Phosphate receives service under various PEF rate schedules. In the last 12  
4 months, PCS Phosphate paid tens of millions of dollars for electric power  
5 purchased from PEF.

6 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

7 A. My testimony stresses the importance of attaching firm consumer protections to  
8 any determination of need that the Commission makes in this proceeding. While  
9 Progress Energy will still have off-ramps after the need determination has been  
10 made, customers will not. As I explain, the risks to consumers presented by the  
11 Levy County project are significant, but the protections available to customers  
12 under traditional regulation are substantially diminished once the Commission  
13 issues a determination of need.

14 **Q. PLEASE SUMMARIZE THE MAIN POINTS THAT YOU WILL MAKE IN**  
15 **YOUR TESTIMONY.**

16 A. My testimony begins by making clear that a determination of need for power  
17 cannot be separated from the cost of that power to customers or from the risks  
18 that the customers will have to bear as a result of the determination being  
19 made. I also explain that the considerations applicable to a finding of need for a  
20 nuclear unit under the statute (the need for electricity at a reasonable cost, fuel  
21 diversity, reducing Florida's dependence on oil and natural gas, reducing air  
22 emission compliance costs, and contributing to long-term grid reliability) cannot  
23 warrant a finding of need unbounded by cost or consumer rate or bill impacts. I

1 explain why the annual cost and schedule true-ups contemplated by the statute  
2 cannot protect customers from the damage caused by an unconditioned  
3 determination of need.

4 I then note the extraordinary benefit being conferred on Progress Energy in  
5 being able to obtain an early determination of need for the Levy units,  
6 especially without being required to “secure competitive proposals for power  
7 supply” within the framework of Florida law.. I suggest that the proposed  
8 determination in the context of the recently enacted Florida law to encourage  
9 new nuclear construction shifts risk away from Progress Energy’s investors to  
10 consumers. Since the things that can go wrong in actually building and  
11 operating a nuclear unit – as distinguished from the financial risks - are not  
12 changed by the legislation, the statute magnifies the importance of the  
13 Commission’s determination as to need for new nuclear capacity.

14 I point out that cost estimates for new nuclear units have been rising at an  
15 astonishing rate. In its Need Study in this docket, Progress Energy estimates  
16 the unit capital cost of Levy Unit 1 to be more than \$7,600 per kw., more than  
17 tripling many nuclear plant cost estimates of six years ago.

18 I explain also why the changes to the NRC licensing process are not likely to  
19 produce large savings and why they may in some respects be  
20 counterproductive.

21 I discuss the possible impact of nuclear power in the context of climate change.

22 I show that – while nuclear power at a reasonable price and under reasonable  
23 conditions could be helpful – it is not an essential part of the solution. Nuclear

1 power under the conditions presented in the requested need determination is  
2 unlikely to make a positive impact.

3 I conclude with several recommended ways to compensate customers for the  
4 increased risk that they will bear under the new Florida regulatory scheme and  
5 to establish regulatory measures that will encourage Progress Energy to control  
6 the exposure of its customers to potentially massive cost increases if the  
7 substantial construction delays, cost overruns and even cancellations that have  
8 plagued the majority of all U.S. nuclear power projects are encountered.

9 **Q. PLEASE EXPLAIN YOUR OBSERVATION THAT THE DETERMINATION OF**  
10 **NEED CANNOT BE SEPARATED FROM THE COST OF THAT POWER TO**  
11 **RATEPAYERS OR FROM THE RISKS THAT CUSTOMERS WILL HAVE TO**  
12 **BEAR AS A RESULT OF THE NEED DETERMINATION.**

13 A. The statute requires consideration of the need for electricity at a reasonable  
14 cost and a demonstration that the proposed units are the most cost-effective  
15 available resources. While estimates can be made with reasonable confidence  
16 concerning the expected capital costs of most other generation alternatives,  
17 actual construction costs and in-service dates wildly different from initial  
18 estimates have been defining characteristics of commercial U.S. nuclear power.  
19 Indeed, Progress Energy concedes that the Levy County construction cost  
20 estimates may well increase as the EPC contract is settled, equipment and  
21 materials are purchased, and other data becomes more available. The utility  
22 offers sensitivity assessments assuming 5, 15, and 25% increases in  
23 construction costs (with no project delays) compared to the current construction



1 cost estimate. (Need Study, pp. 95-97; Table 11). However, the experience of  
2 the U.S. nuclear industry shows that order of magnitude cost increases have  
3 been commonplace.

4 In this case, Progress Energy proposes to employ a new reactor design that  
5 has no construction (or operating) history. There are known construction  
6 bottlenecks. Japan Steel is the world's only producer of the ultra-large forgings  
7 required for reactor vessels. An NRC-approved chain of materials and  
8 equipment vendors must be re-established.

9 The Levy County experience to date has already seen a tripling of the project  
10 estimate. Given these circumstances, the Commission cannot reasonably rely  
11 upon "Economic Benefits Assessments" that treat construction costs and  
12 schedules as if they were etched in stone in comparing them to speculative  
13 projections of natural gas and CO2 compliance costs in the years 2040 and  
14 beyond.

15 As I discuss, the Florida legislation shifted the risk that today's Levy County  
16 construction cost estimates will be badly wrong to consumers, with little  
17 recourse "down the line" through prudence reviews. To protect customers, and  
18 restore some of Progress Energy's incentive to control project cost and  
19 schedule, the Commission should establish reasoned limits or conditions on its  
20 finding of need for the Levy Units. It also should address separately the need  
21 for Levy Units 1 and 2.

1 **Q. HOW WOULD THE REQUESTED DETERMINATION OF NEED CONFER AN**  
2 **“EXTRAORDINARY BENEFIT” ON PROGRESS ENERGY?**

3 A. The determination of need, in the context of Florida’s recently enacted  
4 “Renewable Technologies and Energy Efficiency Act of 2006” and recently  
5 issued commission regulations, shifts risks historically born by investors onto  
6 customers. For example, the requested finding of need seems likely to preclude  
7 a successful challenge to future cost recovery based on the proposition that the  
8 project is not used and useful. Since more than half of all construction permits  
9 issued by the Nuclear Regulatory Commission ended in cancellations, this is a  
10 significant shift in cost recovery risk that comes into being with the issuance of  
11 the determination of need.

12 In Florida, the Commission cannot review for prudence a decision to proceed  
13 with construction of the units once a certificate has been issued. Furthermore,  
14 as I explain below, upon issuance of the need determination Progress Energy  
15 will be permitted to recover its preconstruction costs and its ongoing  
16 construction costs pursuant to a regulatory process that is quite vulnerable to  
17 inadvertently charging imprudent expenditures to customers.

18 Finally, the new statute also reduces the level of care that a utility building a  
19 nuclear plant may be required to exercise during the resource selection  
20 process. For example, the Commission is forbidden by section 403.519 (4)(c)  
21 F.S. from requiring Progress Energy to test the cost effectiveness of the  
22 proposed Levy units through competitive bidding.

1 Competitive bidding is often used as a way of protecting customers by assuring  
2 efficient procurement of new energy resources. Georgia recently insisted that  
3 the Southern Company use competitive solicitation as part of its decisional  
4 process as to a new nuclear commitment at the Vogtle site. In both Maine and  
5 New York, the use of competitive procurement resulted both in significant  
6 savings and at times in changes in power supply procurement decisions. Use  
7 of "all source" competitive procurement would be a useful precondition to the  
8 requested determination of need, and its absence enhances the need for  
9 *safeguards in the determination itself.*

10 **Q. PLEASE EXPLAIN YOUR ASSERTION THAT THE DECISION REQUESTED**  
11 **IN THIS PROCEEDING DIMINISHES THE HISTORIC PROTECTION OF**  
12 **CUSTOMERS AGAINST HAVING TO PAY FOR INVESTMENT THAT IS NOT**  
13 **"USED AND USEFUL".**

14 A. Once the petition for a determination of need has been granted, the law  
15 provides that cost recovery can be challenged only on the basis of imprudence.  
16 The U.S. utility industry argued sought such a standard from the U.S. Supreme  
17 Court in the 1989 Duquesne Light Company case and was rebuffed. In that  
18 case, which involved recovery of the costs of a cancelled nuclear plant, the  
19 Court sustained the power of states to require also that investment charged to  
20 customers be used and useful.

21 The used and useful standard has been in widespread use across the United  
22 States. It has protected customers from billions of dollars in cancelled plant  
23 costs that were not found to have been imprudent. The traditional interplay of

1 prudence reviews with the used-and-useful principle is spelled out in the 1987  
2 Jersey Central Power and Light case: In a concurring opinion, Judge Starr  
3 warned that the prudent investment rule must be balanced with the used-and -  
4 useful rule in order to avoid infringing on the constitutional rights of customers:

5 Requiring an investment to be prudent when made is one  
6 safeguard imposed by regulatory authorities upon the regulated  
7 business for benefit of ratepayers. As I see it, the "used and  
8 useful" rule is but another such safeguard. The prudence rule  
9 looks to the time of investment, whereas the "used and useful"  
10 rule looks toward a later time. The two principles are designed  
11 to assure that the ratepayers, whose property might otherwise  
12 of course be "taken" by regulatory authorities, will not  
13 necessarily be saddled with the results of management's  
14 defalcations or mistakes, or as a matter of simple justice, be  
15 required to pay for that which provides the ratepayers with no  
16 discernible benefit.....

17 For me, the prudent investment rule is, taken alone, too  
18 weighted for constitutional analysis in favor of the utility. It lacks  
19 balance. But so too, the "used and useful" rule, taken alone, is  
20 skewed heavily in favor of ratepayers. [footnote omitted] It also  
21 lacks balance....<sup>1</sup>

22 Florida has chosen to do what the courts have not – to remove the used and  
23 useful standard from its ratemaking process for allocating the costs and risks of  
24 future nuclear units. The Legislature had every right to do this, but the regulatory  
25 process needs to recognize that the traditional balancing of risk will change in  
26 fundamental ways upon the issuance of the determination of need requested in  
27 this proceeding. The Commission should proceed with a caution proportionate to  
28 the new risks that customers will assume under the new statutory framework.

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<sup>1</sup> Jersey Central Power & Light Co. v. Fed. Energy Regulatory Comm'n, 810 F. 2d  
1168, at 1190 (1987).

1 **Q. HOW ELSE WILL THE REQUESTED DETERMINATION OF NEED OPEN**  
2 **THE DOOR TO A REGULATORY PROCESS MORE ADVANTAGEOUS TO**  
3 **PROGRESS ENERGY INVESTORS THAN TO ITS CUSTOMERS?**

4 A. Throughout the twentieth century regulatory framework, the framework  
5 incidentally that oversaw the successful building of Florida's existing nuclear  
6 units, a prudence review was almost always triggered by the occurrence of one  
7 or more events with substantial adverse impacts on rates. The review then  
8 focused in great detail on the decisions and actions giving rise to the adverse  
9 impacts in order to determine their prudence. Investigators with the necessary  
10 specific expertise were employed, and focused proceedings lasting as long as  
11 necessary were conducted.

12 Once the determination of need is issued, the costs of the Levy station become  
13 largely insulated from such reviews. Under contemporaneous reviews through  
14 the Nuclear Capacity Cost Recovery clause, regulators probably will have no  
15 idea which subset of the vast materials relevant to construction costs requires  
16 close attention. The new process requires that the decision to construct the  
17 *proposed nuclear units and the costs of construction be deemed prudent based*  
18 *on series of reviews conducted long before events bring to regulators' attention*  
19 *the causes of anything that has actually gone wrong.*

20 On the basis of these necessarily incomplete reviews, Progress Energy will be  
21 well on the road to recovering a very substantial portion of its costs before the  
22 plant ever operates. No other type of large industrial facility enjoys this  
23 capability. A nuclear power plant built in restructured markets (where cost

1 recovery depends on participation in a power market) cannot recover costs until  
2 it produces kilowatt hours at a competitive price. A paper mill or an oil refinery  
3 must produce products at a competitive price to recover their costs.

4 **Q. CAN YOU GIVE EXAMPLES OF IMPRUDENT EXPENDITURES THAT**  
5 **WOULD BE LIKELY TO GO UNDETECTED UNDER THE PROCESS**  
6 **TRIGGERED BY THE REQUESTED DETERMINATION UNLESS THE**  
7 **COMMISSION BUILDS THE NECESSARY SAFEGUARDS INTO ITS INITIAL**  
8 **DETERMINATION OF NEED?**

9 A. Nuclear construction history is replete with imprudent decisions and actions that  
10 could not have been detected by regulators until they produced real  
11 consequences. The decision by Maine utilities to increase their share in the  
12 Seabrook units in the late 1970s was one such decision with which I had first  
13 hand experience. The process by which a design error led to the waste, years  
14 later, of hundreds of millions of dollars at the Diablo Canyon Station in  
15 California was another. The failures in the quality assurance program at the  
16 Zimmer plant in Ohio that eventually led to the cancellation of a plant that had  
17 been considered (wrongly as it turned out) to be 99% complete was yet another  
18 case in which the source of the waste could not have been discovered by a  
19 state PUC for several years after it had occurred. Many of the quality  
20 assurance problems that led to cancellation of the Midland nuclear plant, on  
21 which more than \$3 billion had been spent, came to light when the diesel  
22 generator building began to sink into inadequately compacted soil years after  
23 the costs had been incurred.

1 A prudence review uninformed by the occurrence of substantial rate impacts is  
2 an impossible task. Imagine that the Pennsylvania PUC had been asked to  
3 assess prudence at Three Mile Island Unit 2 in the months before the accident.  
4 No before-the-fact reviews would have discovered the many acts of  
5 imprudence that caused the accident. Yet once the Florida Commission  
6 determines need and starts the process of annual prudence samplings it may  
7 be foreclosed from revisiting the prudence of costs incurred even if later events  
8 reveal a likelihood of past imprudence not addressed in prior cost recovery  
9 filings.

10 By increasing the likelihood that customers will be required to bear the costs of  
11 undiscovered imprudence, the Florida process shifts risk from investors to  
12 customers. To the extent that the Commission makes the need determination  
13 requested in this proceeding, it will expose customers to some risk of bearing  
14 imprudent and unreasonable costs, a risk that they did not bear under the  
15 former statutory framework. Again, this points to caution in Commission review  
16 of the application, and the imposition of triggers or caps to protect consumers  
17 from runaway costs.

18 **Q. BUT SURELY A PROJECT AS EXPENSIVE AND COMPLEX AS A**  
19 **NUCLEAR UNIT COULD NOT BE FINANCED WITHOUT AN UNQUALIFIED**  
20 **FINDING OF NEED AND ASSURANCE THAT IT WILL RECOVER ITS**  
21 **COST?**

22 A. Size and complexity are not what makes a project unfinanceable. To take just  
23 one example, the Trans-Alaska Pipeline, costing some \$7 billion in the dollars

1 of the 1970s (more like \$30 billion today) and involving unprecedented  
2 construction challenges, was built without conscripting capital from its  
3 customers before it went into operation. Financing of large and complex  
4 projects is a regular occurrence. What makes nuclear projects so hard to  
5 finance conventionally is not expense and complexity but risk – risk of cost  
6 overruns, risk that the owners will not be able to meet schedules, risk that the  
7 plant will operate poorly, risk that demand will be overestimated, risk that other  
8 technologies will be available at lower costs. Of course, all of these things  
9 happened in this industry in the last three decades, so they are not abstract  
10 concerns, and most apply to the Levy Units.

11 For example, the Westinghouse AP1000 pressurized reactor design that  
12 Progress Energy has selected is a new design with no actual construction cost  
13 history or operating experience. The high likelihood of cost and schedule delays  
14 for such projects is confirmed by recent developments in Finland, where the  
15 first of the advanced reactor designs to be built in the West (Areva's EPR) has  
16 been under construction since May, 2005. The plant has fallen two years  
17 behind schedule and is at least \$1 billion over budget. Because Areva has  
18 agreed to a fixed price contract, Finnish customers – including the consortium  
19 of industrial customers who negotiated the terms for Finland's commitment to  
20 buy the plant - will be protected from much of the cost overrun, although Areva  
21 has recently said that it may sue to avoid having to absorb the full overrun.

22 Unless the Commission takes actions comparable to Finland's in this  
23 proceeding, the risk of very high cost overruns will be largely on the customers,



1 to the unnecessary detriment of Florida's overall economy and business  
2 climate. Customers after all have no control over any aspect of the project.  
3 Progress Energy will be managing the project and making daily decisions that  
4 affect project cost and the risk of overruns, and the Company will lack many of  
5 the historic regulatory incentives for cost control.

6 **Q. WHAT ARE THE RECENT TRENDS IN COST ESTIMATES FOR NEW**  
7 **NUCLEAR UNITS, AND HOW DO THEY AFFECT THIS PROCEEDING?**

8 A. Nuclear cost estimates have been increasing at a breathtaking pace. As  
9 recently as five years ago, vendors and studies were estimating costs between  
10 \$1500 and \$2000 per kW. Last June, an impartial Keystone Center fact finding  
11 effort found costs in the \$3600-\$4000 per kW range. Four months later,  
12 Moody's estimated \$5,000-6,000 per kW as a likely cost.

13 And, of course, in recent weeks, Florida Power and Light and Progress Energy  
14 have provided estimates in regulatory proceedings that are higher even than  
15 that of Moody's. The Progress Energy estimate of \$17 billion, including  
16 transmission upgrades, for two 1,100 MW plants represents a tripling of its  
17 estimate of just two years ago, according to the St. Petersburg Times of March  
18 11, 2008.

1 **Q. DO THESE COST TRENDS CAUSE CONCERN WITH REGARD TO**  
2 **PROGRESS ENERGY’S REQUEST FOR A DETERMINATION OF NEED**  
3 **WITH RESPECT TO A DECISION TO INCUR OBLIGATIONS FOR “LONG**  
4 **LEAD PROCUREMENT ITEMS”?**

5 A. Absolutely. The Commission is being asked to commit the customers to paying  
6 very large sums for items as to which great uncertainty exists as to price,  
7 schedule and procurement. As to these items, Progress Energy has not  
8 explained the contracting approach that it will use.

9 As to some of these items there may well be only one supplier in the world, so  
10 the price of securing a “place in line” will not be constrained by competitive  
11 forces, and will certainly run to eight figures, perhaps even nine. Progress  
12 Energy has made no showing that the contracts that it proposes to sign will  
13 contain price ceilings or penalty provisions on the supplier, elementary  
14 precautions to protect against exploitation of monopoly power or delay or price  
15 increases for other reasons

16 On this record, Progress Energy is asking the Commission to put the full risk of  
17 such occurrences on the customers, an allocation of risk the Company would  
18 never accept on behalf of its shareholders. The need determination in this  
19 docket is the sole forum for addressing those risks and limiting ratepayer  
20 exposure.

1 **Q. CAN YOU DESCRIBE UTILITY INDUSTRY BEST PRACTICES TO MANAGE**  
2 **NUCLEAR PLANT CONSTRUCTION COSTS?**

3 A. Industry best practice is still evolving in light of the absence of recent  
4 experience. However, Exelon, which is proposing a nuclear plant in the  
5 restructured market in Texas, where it cannot assure cost recovery by  
6 persuading regulators to put the risks on the customers, seems to be taking  
7 quite a different approach. Here is a description of their approach to prudent  
8 contracting as described by Chief Operating Officer Christopher Crane in the  
9 March 6, 2008 of Nucleonics Week:

10 Engineers and construction contractors for new nuclear  
11 plant builds must be prepared to share risks by guaranteeing  
12 timely, on-budget performance in their contracts,  
13 Christopher Crane, chief operating officer of Exelon  
14 Generation, said in a February 27 interview.  
15 When the current US power reactor fleet was built, "the  
16 risk was always on the owner," but all companies involved  
17 in "engineering, procurement, construction or any subset of  
18 one of those items" must be "responsible to execute to  
19 expectations" if new nuclear projects are to succeed, Crane  
20 said. In the 1970s and 1980s, some utilities faced bankruptcy  
21 and ratepayers were forced to bear the costs of "mismanagement,  
22 project overruns, productivity issues and just bad  
23 design," but "there was not a contractor that I ever remember  
24 that did anything other than profit wildly. So the model  
25 has got to change," he said.

26 In practice, parties to new nuclear contracts must "figure  
27 out in advance what [costs] in the contract would be fixed  
28 and what would be variable," and "bounds" must be set on  
29 the "allowable percentage of error or rework," Crane said.  
30 Construction contractors must be "accountable" for meeting  
31 a certain level of productivity and delivering "quality of  
32 work within a reasonable band of acceptance." Hedging and  
33 other long-term procurement strategies must account for  
34 inflation in future prices for copper, steel, concrete and  
35 other key commodities. Such an approach has never before  
36 been used for a power reactor construction project in the  
37 US, Crane said.

1 Vendors are now “working diligently at finalizing their  
2 designs so they can finalize their commodity count and  
3 constructability evaluations,” and until that process is complete,  
4 “there’s no way to put the strategies in place to come up  
5 with the correct [engineering, procurement and construction]  
6 model,” he said.

7 Much that Mr. Crane says is important and sensible. Aggressive contracting  
8 practices to contain costs and maintain schedule is vital to the Levy County  
9 project and should be reflected in the Commission’s actions. The Commission  
10 should consider conditioning any finding of need that it makes on a requirement  
11 that Progress Energy employ the types of contracting procedures indicated by  
12 Mr. Crane.

13 **Q. PLEASE DISCUSS YOUR OWN EXPERIENCE WITH PLACING CAPS ON**  
14 **THE COST OF A NUCLEAR FACILITY, INCLUDING WHETHER THOSE**  
15 **CAPS SERVED TO PROTECT CUSTOMERS.**

16 A. In essence a cap is a determination that need for the power exists only as long  
17 as the cost of completing the plant does not exceed a certain amount, usually  
18 determined by comparison to alternative ways of meeting the projected  
19 customer needs.

20 The Seabrook station in New Hampshire ran far over budget and behind  
21 schedule. Ultimately, the second unit was cancelled after hundreds of millions  
22 of dollars had been spent on it. In the mid-1980s, the Maine commission –  
23 unconvinced by the estimates of costs to complete the remaining plant –  
24 required Maine utilities to seek offers for their share of that plant. The offers  
25 were far below the estimates of the cost to complete the unit. Rather than  
26 accept a cap somewhere between the market value and the estimated

1 completion cost, the Maine utilities negotiated the sale of their Seabrook shares  
2 to a southern New England company which went bankrupt because the  
3 expenditures required by its new obligation exceeded the value of the power  
4 that the plant would generate.

5 In New York during that era, the owners of Nile Mile Point 2 entered into a  
6 settlement capping the amount that they would be permitted to recover from  
7 customers at about \$4 billion. Ultimately, the plant cost several hundred million  
8 more than that, and those costs were absorbed by the owners and their  
9 shareholders. The cap protected the customers, just as Areva's turnkey  
10 contract protects the customers in Finland.

11 **Q. BUT THE EXPERIENCES YOU'VE DESCRIBED ARE IN OTHER PARTS OF**  
12 **THE COUNTRY, WHERE NUCLEAR POWER HAS BEEN MORE**  
13 **CONTROVERSIAL. WHY DOES THIS HISTORY HAVE ANY RELEVANCE**  
14 **TO PROGRESS ENERGY OR TO FLORIDA?**

15 A. It's true that Florida avoided some of the problems that plagued nuclear power  
16 and state regulators in the 1970s and 1980s. However, those problems were  
17 not confined to parts of the U.S. where nuclear power was relatively  
18 controversial. Georgia, Mississippi, Louisiana and Texas all experienced cost  
19 overruns in the billions of dollars.

20 Furthermore, both New York and New England had successful experiences  
21 with nuclear construction. But those successful experiences turned out to be  
22 no guarantee against later projects that would cause repeat double digit rate

1 increases, power supply uncertainty and adverse economic development  
2 effects.

3 It's important also to keep in mind that even the best nuclear operators are at  
4 the mercy of events beyond their control. Locally, the Crystal River unit  
5 encountered this difficulty in 1979, when the NRC shut down all Babcock and  
6 Wilcox nuclear power plants for a period following the accident in the B&W  
7 facility at Three Mile Island.

8 **Q. IS THE PROJECTED 90% ANNUAL CAPACITY FACTOR FOR THE LEVY**  
9 **UNITS DESCRIBED IN THE NEED STUDY REALISTIC?**

10 A. It's extremely optimistic. Nuclear plants in the U.S. today don't have lifetime  
11 capacity factors of 90% even with the commendable improvements of the last  
12 decade. Indeed, most new units completed in recent years in other countries  
13 tend to have significantly lower capacity factors in their first few years of  
14 operation, when they are being broken in. Prudence requires assuming  
15 something similar with respect to any new design. If the capacity factor of the  
16 first few years is significantly below 90%, it will be hard to attain a 90% lifetime  
17 average because downtime for refueling and maintenance remains unavoidable  
18 even for the best units.

1 **Q. DOES THE REVISED NRC LICENSING PROCESS PROVIDE ASSURANCE**  
2 **THAT THE EXPERIENCES THAT YOU HAVE DISCUSSED WON'T BE**  
3 **REPEATED AND MITIGATE THE RISK SHIFTS THAT WILL ACCOMPANY**  
4 **THE NEED CERTIFICATION?**

5 A. No. The prior NRC licensing process was not a significant cause of the delays  
6 and cost overruns of the previous generation of nuclear plants. Although the  
7 hearings were sometimes contentious and protracted, they took place while the  
8 plants were being built and invariably ended with the issuance of the requested  
9 license.

10 The real cause of most of the cost overruns was in the pace at which nuclear  
11 power grew in the U.S., a pace so rapid that the lessons of operating surprises  
12 repeatedly had to be applied to plants that were already partially built, an  
13 expensive and wasteful process. To cite but one among many examples, a  
14 1975 fire in the cable tray insulation at the Brown's Ferry station in Alabama  
15 nearly caused a serious accident. This event demonstrated the need to  
16 physically separate the backup safety systems from the primary systems so  
17 that no one event could disable the ability to shut down the plant. Because the  
18 changes involved tearing out cable trays and rerouting the cables, as well as  
19 reconfiguring entire backup systems in many plants that were already partially  
20 built, the changes were extremely expensive and time consuming.

21 Whether this type of problem will be repeated in future plants remains to be  
22 seen. However, it cannot be fixed by "streamlining" the licensing process.  
23 Indeed, if the changes to the licensing process have the effect of diminishing its

1 thoroughness or increasing public mistrust of the Nuclear Regulatory  
2 Commission, some the changes may even be counterproductive.

3 **Q. IS NUCLEAR POWER SO ESSENTIAL TO COMBATING CLIMATE CHANGE**  
4 **THAT THE COMMISSION SHOULD GRANT PROGRESS ENERGY'S**  
5 **REQUEST FOR A FINDING OF NEED REGARDLESS OF LIKELY**  
6 **INCREASES IN THE PROJECT'S COST ESTIMATES?**

7 A. No. The Keystone Fact Finding Report that I alluded to earlier demonstrated  
8 that new nuclear plants can contribute only a relatively small part of the overall  
9 solution to reducing climate change, even if the world builds three times its  
10 existing nuclear capacity over the next 50 years, an immense achievement that  
11 would require increases in the rate of construction far beyond anything that now  
12 seems likely. If nuclear power can be built cost effectively, this contribution  
13 would make the climate change task easier. Averting the potentially serious  
14 consequences of climate change will require an immense effort encompassing  
15 many technologies, but no one measure is essential. Implementing measures  
16 for choosing wisely among the possibilities is perhaps the greatest challenge of  
17 all. If new nuclear units are not cost effective (as seems likely if they are built  
18 under the potential blank check framework in the requested determination of  
19 need), they will take revenue and attention from other measures that can  
20 prevent far more green house gas reductions far more quickly.



1 **Q. CAN THE LEVY UNITS BE CONSIDERED THE MOST COST-EFFECTIVE**  
2 **ALTERNATIVE TAKING INTO ACCOUNT FUEL DIVERSITY, REDUCING**  
3 **FLORIDA'S RELIANCE ON OIL AND NATURAL GAS, REDUCING AIR**  
4 **EMISSION COMPLIANCE COSTS AND CONTRIBUTING TO GRID**  
5 **RELIABILITY LONG TERM?**

6 A. Those factors are important, and they have always been attributes of  
7 commercial nuclear power, although large nuclear units like the Levy units  
8 actually may create reliability concerns by establishing larger system  
9 contingency resource needs, which Progress witness Oliver discusses in his  
10 testimony. However, the core reason why Florida has not seen a new  
11 nuclear unit enter commercial service since 1983, is that the risks of  
12 building new units were perceived by investors, regulators and consumers  
13 alike to be too high. Absent measures to address that basic concern from a  
14 consumer perspective, shifting risks from investors to customers cannot  
15 make the Levy units a cost-effective resource alternative.

16 **Q. BUT DON'T THE REDUCTIONS IN THE COST OF CAPITAL THAT**  
17 **ACCOMPANY REDUCED INVESTOR RISK MAKE THE LEVY UNITS**  
18 **MORE COST EFFECTIVE?**

19 A. Definitely not. In fact, there is likely to be a net economic loss in Progress  
20 Energy territory in shifting economic risk from investors and lenders – many of  
21 whom don't live in Progress Energy territory – onto Progress Energy  
22 customers. Reduced capital costs resulting from such a risk transfer are not  
23 true savings at all. They are not, for example, like the savings produced by a

1 reduction in the price of steel or concrete. Instead they represent a  
2 concentration of the risk of things going wrong that had been dispersed among  
3 investors and lenders nationwide onto the shoulders of Progress Energy  
4 customers.

5 **Q. GIVEN THE MANY UNCERTAINTIES SURROUNDING THIS PROJECT'S**  
6 **ULTIMATE COST, SHOULD THE COMMISSION INCLUDE A COST CEILING**  
7 **OR A RATE IMPACT CEILING IN ANY DETERMINATION OF NEED THAT IT**  
8 **MAKES?**

9 A. Absolutely. The issue of need is inseparable from the issue of cost. Florida  
10 may have an immense need for generation costing one cent per kilowatt hour.  
11 However, it has a very limited need for power costing twenty-five or thirty cents  
12 per kilowatt hour. A determination of need cannot be a blank check as to cost  
13 and price. Both the customers and the utility would benefit from a clear  
14 statement as to the highest acceptable price for the power from the Levy units.  
15 In the present environment of rapidly escalating costs, it is particularly urgent to  
16 protect customers from open-ended commitments with potentially ruinous  
17 economic impacts. To this end, the Commission should limit the total cost of  
18 the project that it would consider to be a prudent commitment at this time.  
19 Costs above that ceiling would not be recoverable from the customers. Such a  
20 ceiling might be revisited once or twice as the project moves forward, but the  
21 Commission should be clear that it is not subject to infinite upward revision.  
22 Both the Nine Mile Point 2 and the Limerick 2 nuclear power plants were  
23 subject to cost caps by their regulatory commissions in the 1980s. As I have

1 discussed, the cost cap obtained by the Finnish purchasers of the output of the  
2 Olkiluoto 3 nuclear power plant curtails the exposure of Finnish customers to  
3 the substantial cost overruns that have occurred.

4 **Q. WHAT OTHER LESSONS FROM YOUR EXPERIENCE MIGHT FLORIDA**  
5 **REGULATORS CONSIDER WITH REGARD TO NEW NUCLEAR**  
6 **CONSTRUCTION TODAY?**

7 A. I'd suggest several lessons applicable to this proceeding:

- 8 • First, the Commission should confine the scope of any need determination  
9 that it makes as narrowly as possible under the statute. In particular, the  
10 Commission should not accept the proposition that payments to secure the  
11 long lead time items are "project development costs." Such payments are  
12 very much part of the construction process. Their prudence requires detailed  
13 separate review of evidence not presented in this proceeding.
- 14 • Because of the strong likelihood that energy efficiency is available at lower  
15 cost than the proposed nuclear station, the Commission should require a  
16 showing that programs are in place to capture all cost-effective energy  
17 efficiency before it accepts as prudent any decision to build a nuclear unit.
- 18 • The Commission should separately assess the need for Levy Units 1 and 2.
- 19 • The Commission should indicate in any decision under the new Florida  
20 statute that it recognizes the reduced risk that will flow from the decision and  
21 intends to adjust the allowed return on equity accordingly.
- 22 • Perhaps the most important overall lesson that I can offer is the need to avoid  
23 commitments to costs that are open-ended and unlimited. Investors have

1 proven unwilling to shoulder such exposure. This is the reason that no  
2 nuclear plants have been ordered since the 1970s, and it is the reason that  
3 the nuclear industry has sought state regulatory changes laying the unlimited  
4 exposure off on the customers (as well as federal loan guarantees assigning  
5 similar exposure to the taxpayers). Regulators should be clear as to the limits  
6 on the amounts that can be charged to the customers, and those limits should  
7 not exceed the costs of the next best alternatives. By setting and enforcing  
8 such limits, the Commission will be benefiting both customers and utility  
9 investors as well as the Florida economy.

10 **Q. DOES THAT CONCLUDE YOUR TESTIMONY?**

11 **A. Yes.**

## CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing has been furnished by U.S. mail this 16<sup>th</sup> day of April, 2008 to the following:

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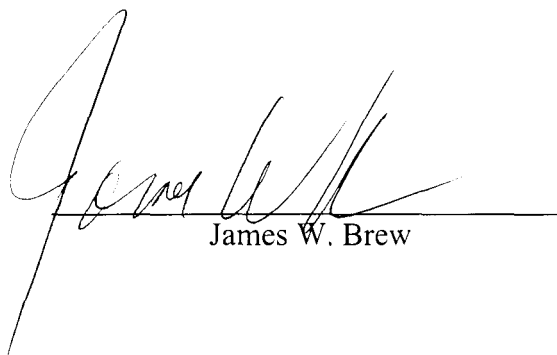
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March 1996- present - consultant on Energy and Utility Regulatory Policy;

*Advising and teaching utility regulation, restructuring, nuclear power and energy policy in the U.S. and abroad. Has been a visiting lecturer in energy policy and environmental protection at Yale University and has taught courses entitled “Nuclear Power and Public Policy” and “The Law of Electric Utility Restructuring” at the Vermont Law School. Recently served on a Keystone Center fact finding collaboration on nuclear power and a National Academy of Sciences panel evaluating the alternatives to continued operation of the Indian Point Nuclear Power Plants in New York. Also affiliated with the Regulatory Assistance Project, which provides assistance to state and federal energy regulatory commissions regarding economic regulatory policy and environmental protection.*

*Has advised on restructuring issues and has testified on aspects of electricity and telecommunications restructuring in many U.S. states. As to nuclear power, he advised the Internal Revenue Service in a successful proceeding related to taxation of Maine Yankee fuel expenditures, testified on behalf of Wiscasset, Maine in a 2004-05 property tax proceeding on the value of spent fuel storage and advised the Vermont Legislature on issues pertaining to the taxation of Maine Yankee. He testified before the U.S. Congress on the renewal of the Price-Anderson Act.*

*International - Taught and/or advised abroad on energy (including nuclear power) and water issues and electric restructuring in China, Armenia, Russia, India, Indonesia, Mongolia, Canada, St. Lucia, Kosovo, South Africa, Georgia, Trinidad and Tobago. Member, Policy Advisory Committee of the Packard Foundation's*

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February 1995 - March 1996 Fellow, **Regulatory Assistance Project**

*Project funded by the U.S. Dept. of Energy, the Environmental Protection Agency and foundations to provide assistance to state and federal regulatory commissions on energy and environmental matters.*

June 1987- January 1995 **Chairman, New York State Public Service Commission,** Albany, New York

*CEO of state agency charged with overseeing \$29 billion annual revenues of New York utilities. Responsible for developing and implementing consumer and environmental protection policies, transitions from monopoly to competition in energy and telecommunications industries. 700 employees, \$65 million budget.*

July 1982- June 1987 Chairman, **Maine Public Utilities Commission,** Augusta, Maine

*CEO of state agency charged with overseeing \$2 billion annual revenues of Maine utilities. Responsible for developing and implementing consumer and environmental protection policies, including competitive bidding for independent power production and energy conservation services as well as adjusting to the break-up of AT&T. 60 employees, \$4 million budget.*

March 1982-June 1982 **State of Maine Public Advocate**

*First full-time Maine public advocate; intervened on consumers' behalf in telephone and electric cases; oversaw staff of 6; prepared briefs; cross-examined witnesses.*

Aug. 1977-March 1982 **Commissioner, United States Nuclear Regulatory Commission, Washington, D.C.**

*One of five commissioners of the federal agency whose responsibilities include safety of nuclear power plants and other nuclear facilities; preparing licensing criteria for a nuclear waste repository; licensing exports of nuclear fuel and reactors pursuant to Nuclear Nonproliferation Act; assisted in major upgrades of regulatory and enforcement processes in wake of Three Mile Island accident. 3000 employees, \$250 million budget.*

Dec. 1971-Aug. 1977 **Commissioner, Maine Public Utilities Commission, Chairman** (9/74-7/75).

Sept. 1968- Dec. 1971 **Federal-State Coordinator, State of Maine**

*Responsible for many oil, power, environmental and housing matters. Assisted in preparation of landmark Maine laws relating to oil pollution and industrial site selection. Staff Director, Governor's Task Force on Energy, Heavy Industry and the Coast of Maine.*

Aug. 1964-June 1965 **Athens College, Greece, Teaching Fellowship**

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1975-1977, 1982-1986. Advisory Council, Electric Power Research Institute

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Honorary Degree, Unity College, 1981.

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## **PUBLICATIONS of Peter A. Bradford**

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