STATE OF SOUTH CAROLINA

(Caption of Case)

In the Matter of

Application of Duke Energy Carolinas, LLC for Approval of Decision to Incur Nuclear Generation Pre-Construction Costs

BEFORE THE
PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA

COVER SHEET

DOCKET NUMBER: 2007 - 440 - E

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DOCKETING INFORMATION (Check all that apply)

☐ Emergency Relief demanded in petition  ☐ Request for item to be placed on Commission's Agenda expeditiously

☐ Other:

INDUSTRY (Check one)

☒ Electric  ☐ Electric/Gas  ☐ Electric/Telecommunications
☐ Electric/Water  ☐ Electric/Water/Telecom.  ☐ Electric/Water/Sewer
☐ Gas  ☐ Railroad  ☐ Sewer
☐ Telecommunications  ☐ Transportation  ☐ Water
☐ Water/Sewer  ☐ Administrative Matter  ☐ Other:

NATURE OF ACTION (Check all that apply)

☐ Affidavit  ☐ Agreement  ☐ Letter  ☐ Request
☐ Answer  ☐ Memorandum  ☐ Motion  ☐ Request for Certification
☐ Appellate Review  ☐ Application  ☐ Objection  ☐ Request for Investigation
☐ Brief  ☐ Certificate  ☐ Objection
☐ Complaint  ☐ Consent Order  ☐ Petition
☐ Consent Order  ☐ Discovery  ☐ Petition for Reconsideration
☒ Exhibit  ☐ Expedited Consideration  ☐ Petition for Rulemaking
☐ Interconnection Agreement  ☐ Interconnection Amendment  ☐ Petition for Rule to Show Cause
☐ Interconnection Amendment  ☐ Late-Filed Exhibit  ☐ Petition to Intervene
☐ Late-Filed Exhibit  ☐ Memorandum  ☐ Petition to Intervene Out of Time
☐ Memorandum  ☐ Memorandum
☐ Motion  ☐ Motion
☐ Objection  ☐ Objection
☐ Petition  ☐ Petition for Reconsideration
☐ Petition for Rulemaking  ☐ Petition for Rule to Show Cause
☐ Petition to Intervene  ☐ Petition to Intervene Out of Time
☐ Petition to Intervene Out of Time  ☑ Prefiled Testimony
☐ Request
☐ Request
☐ Request
☐ Request
☐ Resale Agreement
☐ Resale Agreement
☐ Resale Amendment
☐ Resale Amendment
☐ Reservation Letter
☐ Reservation Letter
☐ Response
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☐ Response
☐ Response to Discovery
☐ Response to Discovery
☐ Return to Petition
☐ Return to Petition
☐ Stipulation
☐ Stipulation
☐ Subpoena
☐ Subpoena
☐ Tariff
☐ Tariff
☐ Other:

RETURN DATE: 3/20/08
SERVICE: ok
March 20, 2008

Mr. Charles Terreni
Chief Clerk
Public Service Commission of South Carolina
Synergy business Park, Saluda Building
101 Executive Center Drive
Columbia, SC 29210

Re: Application of Duke Energy Carolinas, LLC for Approval of Decision to Incur Nuclear Generation Pre-Construction Costs
Docket No. 2007-440-E

Dear Mr. Terreni:

Enclosed please find for filing and consideration 25 copies of the Direct Testimony and Exhibit of Peter A. Bradford for Friends of the Earth, together with Certificate of Service reflecting service upon all parties of record.

With kind regards I am

Sincerely,

Robert Guild

Encl.s
In the Matter of

Application of Duke Energy Carolinas, LLC for Approval of Decision to Incur Nuclear Generation Pre-Construction Costs

DIRECT TESTIMONY OF PETER A. BRADFORD FOR FRIENDS OF THE EARTH
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 have chaired the public utility regulatory commissions in Maine (1974-5 and 1982-87) and New York (1987-95). I was also a commissioner on the U.S. Nuclear Regulatory Commission (1977-82). 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 also worked with the Regulatory Assistance Project and have testified before numerous state utility regulatory commissions.

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

I was a member of the National Association of Utility Regulatory Commissioners (NARUC) from 1971 until 1995 and served as its president in 1987. I served on the Electric, Gas and Communications Committees as well as on the Subcommittees on Nuclear Waste and Nuclear Economics. I was also the liaison between the Nuclear Regulatory Commission and NARUC and have testified before the U.S. Congress at least 50 times on issues relating to nuclear power.
Q. PLEASE DISCUSS YOUR EXPERIENCE IN REGULATING NUCLEAR POWER AT THE STATE LEVEL.

A. As a regulator in New York and Maine, I chaired commissions deciding cases involving rate implications and prudence concerning the Seabrook I plant in Maine as well as the Shoreham and Nine Mile Point II plants in New York. I chaired the New York and Maine commissions when those states disengaged from the Shoreham and Seabrook plants in ways that resulted in adequate power supplies, improved economic development and electric rate impacts lower than would otherwise have occurred. We also decided several proceedings allocating the costs of cancelled plants. I also reviewed proposals to spread the cost of cleaning up the Three Mile Island accident across all nuclear power plants.

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

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

Q. PLEASE STATE THE MAIN POINTS THAT YOU WILL MAKE IN YOUR TESTIMONY.

A. My testimony begins by noting that the extraordinary benefit being conferred on Duke Energy Carolinas in being able to obtain both an early determination of prudence and preoperational rate increases in connection with the William States Lee III Station. I then explain why Duke cannot establish the prudence of its decision to incur preconstruction costs of $230 million between now and the end of 2009 without providing reliable evidence of the likely cost of the unit and the impact of that cost on the rates to be paid by South Carolina electric customers. I then discuss the ways in which seeking to assess prudence on a segmented basis as contemplated by this proceeding works to the advantage of Duke’s investors and to the disadvantage of its customers. I point out that the statute requiring this approach results in a shifting of risk away from Duke’s investors that should result in a lower cost of capital for rate setting purposes.

In explaining the impossibility of assessing the prudence of the decision to incur preconstruction costs, I point out that cost estimates for new nuclear units have been rising at an astonishing rate and have reached some $6,000 per kW and above, more than doubling the estimates of five years...
ago. I also describe my own experience in dealing with the ratemaking consequences of some of the problem plants of the 1970s and 1980s. In discussing this history, I explain also why the changes to the NRC licensing process are not likely to produce large savings and why they may in some respects be counterproductive.

Finally, I discuss the possible impact of nuclear power in the context of climate change. I show that – while nuclear power at a reasonable price and under reasonable conditions could be helpful - nuclear power under the conditions presented in this proceeding is unlikely to make a positive impact.

Q. WHY DOES SOUTH CAROLINA'S STATUTORY FRAMEWORK CONFER AN “EXTRAORDINARY BENEFIT” ON DUKE?

A. Because it allows the decision to construct the proposed nuclear unit to be deemed prudent based on a review conducted long before events point to anything that has actually gone wrong. On the basis of this necessarily incomplete review, Duke will be well on the road to being able to recover a very substantial portion of its costs before the plant ever operates. No other type of large industrial facility enjoys this capability. A paper mill or an oil refinery must produce products at a competitive price to recover their costs. Indeed, even a nuclear power plant built in restructured markets (where cost recovery depends on participation in a power market) cannot recover costs until it produces kilowatt hours at a competitive price.
Q. WHY DOES THE SEGMENTED NATURE OF THE SOUTH CAROLINA PRUDENCE REVIEW PROCESS WORK TO THE ADVANTAGE OF DUKE INVESTORS AT THE EXPENSE OF ITS CUSTOMERS?

A. Because no regulatory commission will have the information or the resources to establish the prudence of the thousands of decisions and calculations that the Company must make in deciding to construct a nuclear plant. Only after some subset of those decisions has produced meaningful cost consequences can regulators know where to focus their very limited resources to assess prudence.

Throughout twentieth century utility regulation, a prudence review was almost always triggered by the occurrence of one or more events with substantial adverse impacts on rates. The review then focused in great detail on the decisions and actions giving rise to the adverse impacts in order to determine their prudence. Consultants with the necessary specific expertise were employed, and focused proceedings lasting as long as necessary were conducted. Such a review cannot take place in this proceeding because regulators can have no idea which subset of the vast relevant materials requires close attention.

Imprudent actions without substantial adverse impacts have in the past not been investigated by regulators. To implement South Carolina's new law, however, the Commission is going to have to detach prudence inquiries from financial consequences and to review the prudence of decisions that have had no adverse consequences.
A prudence review without a cost overrun is to a real prudence review as a
doctor’s physical exam is to an autopsy. Just as a person may pass a
physical one month and die the next, so a transaction may pass a review
based on the level of information provided in this proceeding only to be
revealed as imprudent by later rate impacts indicative of significant
infirmities. Nuclear construction history is replete with imprudent decisions
and actions that could not have been detected by regulators until they
produced real consequences. The decision by Maine utilities to increase
their share in the Seabrook units in the late 1970s was one such decision
with which I had first hand experience. The process by which a design error
led to the waste of hundreds of millions of dollars at the Diablo Canyon
Station in California was another. The failures in the quality assurance
program at the Zimmer plant in Ohio that eventually led to the cancellation
of a plant that had been considered (wrongly as it turned out) to be 99%
complete was another case in which the source of the waste could not have
been discovered by a state PUC for several years after it had occurred.
A prudence review uninformed by the occurrence of substantial rate impacts
is an impossible task. Thousands of decisions would have to be reviewed
and predictions of consequences would have to be made. Consider that
Enron or Global Crossing or Bear Stearns were believed to be sound
investments a few months before their collapse proved to the contrary, or
imagine that the Pennsylvania PUC had been asked to assess prudence at
Three Mile Island Unit 2 in early March, 1979, just before the accident. No
before-the-fact reviews would have discovered the many acts of imprudence
that caused the accident a few weeks later. Yet once the South Carolina
Commission determines prudence in this proceeding it may be foreclosed
from revisiting that determination even if later events reveal that it was
questionable.

By increasing the likelihood that customers will be required to bear the costs
of undiscovered imprudence, the South Carolina statute shifts risk from
investors to customers. The scale of this shift is not small. In the energy
sector alone, a 1985 survey [The Prudent Investment Test in the 1980s] by
the National Regulatory Research Institute chronicled more than 50 state
decisions that made “significant” use of the prudence standard through
1983. Of course, many significant prudence decisions were made after
1983. Prudence reviews between 1984 and 1988 are estimated in one
study to have saved customers $11.6 billion (Richard Pierce, Should the
Judiciary Attempt to Police the Political Institutions?, 77 Georgetown Law
Journal 2031, August, 1989). To the extent that the South Carolina
Commission makes the requested prudence determination in this
proceeding, it will expose customers to some risk of bearing imprudent
costs, a risk that they did not bear under the former statutory framework.

Q. AREN'T YOU URGING A PRUDENCE REVIEW BASED ON HINDSIGHT,
RATHER THAN ONE BASED ON THE INFORMATION AVAILABLE AT
THE TIME THAT THE DECISION IN QUESTION IS BEING MADE?
A. Not at all. Hindsight in the form of damaging rate impacts should be used to identify the decisions and practices that need to be reviewed, not to assess their prudence. Once these decisions and practices have been identified, they should indeed be reviewed in light of whether the company undertook them with the level of care appropriate to decisions of that magnitude in light of the information reasonably available at the time.

Q. BUT SURELY A PROJECT AS EXPENSIVE AND COMPLEX AS A NUCLEAR UNIT COULD NOT BE FINANCED WITHOUT ASSURANCE THAT IT WILL RECOVER ITS COST?

A. Size and complexity are not what makes a project unfinanceable. The Trans-Alaska Pipeline, costing some $7 billion in the dollars of the 1970s and involving unprecedented construction challenges, was built without conscripting capital from its customers before it went into operation. Financing of large and complex projects is a regular occurrence. What makes nuclear projects so hard to finance conventionally is not expense and complexity but risk – risk of cost overruns, risk that the owners will not be able to meet schedules, risk that the plant will operate poorly, risk that demand forecasts will be overstated, risk that other technologies will be available at lower costs. Of course, all of these things happened in this industry in the last three decades, so they are not abstract concerns.

Q. WHY DO YOU SAY THAT DUKE CANNOT DEMONSTRATE THE PRUDENCE OF ITS DECISION WITHOUT PROVIDING RELIABLE EVIDENCE OF THE COST OF THE UNIT?
A. One of the statutory requirements for a prudence determination is that the power be needed. But need is a function of cost. Every state has a very large need for power costing one cent per kilowatt hour and little or no need for power costing twenty-five cents per kWh. The commission needs to know the price per kWh to know where on this scale the William States Lee Station's output will fall and what its impact on South Carolina rates will be. Recent cost figures for new nuclear plants provided in Florida show the potential for nuclear construction to raise rates by 50 percent or more in that state. To find that such projects are needed, any commission needs to be able to say that cheaper or otherwise preferable resources are unlikely to be available.

Q. WHAT IS THE RELATIONSHIP BETWEEN THE POINTS THAT YOU HAVE MADE AND DUKE'S RETURN ON EQUITY?

A. Shifting risk from investors to customers does not produce real savings. It lowers the cost of capital used in building the plant by increasing customer exposure to costly events that might otherwise have been borne by investors. If any of these events occur, the customers will pay for them, and this risk offsets any savings from the reduced cost of capital. The Commission should at least lower Duke's return on equity in order prevent the injustice of having customers pay investors as if they were bearing the risks that have in fact been shifted to the customers.

Q. WHAT ARE THE RECENT TRENDS IN COST ESTIMATES FOR NEW NUCLEAR UNITS, AND HOW DO THEY AFFECT THIS PROCEEDING?
A. Nuclear cost estimates have been increasing at a breathtaking pace. As recently as five years ago, vendors and studies were estimating costs between $1500 and $2000 per kW. Last June the impartial Keystone Center fact finding found costs in the $3600-$4000 range. Four months later, Moody’s estimated $5,000-6,000.

In recent weeks, Florida Power and Light and Progress Energy have provided estimates in regulatory proceedings that are higher even than that of Moody’s. The Progress Energy estimate of $17 billion for two 1100MW plants like the ones proposed by Duke represents a tripling of its estimate of just two years ago, according to the St. Petersburg Times of March 11, 2008.

The nuclear industry has been particularly surprised by developments in Finland, where the first of the advanced reactor designs to be built in the West has been under construction since May, 2005. The plant has fallen two years behind schedule and is at least $1 billion over budget. Because the French company Areva, which is building the plant, has agreed to a fixed price contract, Finnish customers may be protected from the cost overruns, although Areva has recently said that it may sue to avoid having to absorb the full cost overrun.

Given runaway cost trends attested to by utilities in nearby states, the absence of any Duke cost estimate at all in this proceeding is a source for regulatory concern.
Q. **DO THESE COST TRENDS CAUSE CONCERN WITH REGARD TO**
DUKE'S REQUEST FOR A FINDING OF PRUDENCE WITH RESPECT TO
A DECISION TO INCUR OBLIGATIONS FOR “LONG LEAD
PROCUREMENT ITEMS”? 

A. Absolutely. The Commission is being asked to commit the customers to
paying very large sums for items as to which great uncertainty exists as to
price, schedule and procurement, none of which are addressed in Duke's
testimony. Indeed, as to these items, Duke has furnished no cost estimates
at all. Neither has it explained the contracting approach that it will use.

As to some of these items there may well be only one supplier in the world,
so the price of securing a “place in line” will not be constrained by
competitive forces, and will certainly run to eight figures, perhaps even nine.

Duke has made no showing that the contracts that it proposes to sign will
contain price ceilings or penalty provisions, elementary precautions to
protect against exploitation of monopoly power or delay or price increases
for other reasons.

On this record, Duke is asking the Commission to put the full risk of such
occurrences on the customers, an allocation of risk the Company would
never accept on behalf of its shareholders. Such an arrangement cannot be
prudent.

Q. **Is Duke’s proposal prudent in light of industry best practice?**

A. No, it isn’t. Industry best practice is still evolving in light of the absence of
recent experience. However, Exelon, which is proposing a nuclear plant in
the restructured market in Texas, where it cannot assure cost recovery by
persuading regulators to put all the risks on the customers, seems to be
taking quite a different approach. Here is a description of their approach to
prudent contracting as described by Chief Operating Officer Christopher
Crane in the March 6, 2008 of Nucleonics Week:

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

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

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

Much that Mr. Crane says is important and sensible. For purposes of this
proceeding the last sentence is especially important. There is at present no
way to come up with the correct model for the contracts whose conceptual
prudence the Commission is being asked to approve. Without establishing
that contracts containing the costs to reasonable levels can be negotiated,
Duke cannot sustain its burden of proving that a decision to enter into such
contracts is prudent.

Q. PLEASE DISCUSS YOUR OWN EXPERIENCE WITH SETTING RATES
TO COVER THE COST OF NUCLEAR CONSTRUCTION IN THE 1970s
AND 1980s.

A. My first experience with regulating rate impacts of nuclear power came
when the Maine Yankee nuclear power plant came on line in 1972. Like the
operating Duke plants, Maine Yankee was a relatively inexpensive unit, and
the impacts were not large. The same was true for Maine’s investments in
other early New England units. However, early good experiences turned out not to guarantee that later
ones would go as well. The Seabrook station in New Hampshire ran far
over budget and behind schedule. Ultimately, the second unit was
cancelled after hundreds of millions of dollars had been spent on it. In the
mid-1980s, the Maine commission – unconvinced by the estimates of costs
to complete the remaining plant – required Maine utilities to seek offers for
their share of that plant. The offers were far below the estimates of the cost
to complete the unit. Ultimately the Maine utilities negotiated the sale of
their Seabrook shares to a southern New England company which went
bankrupt as a result of the expenditures required by its new obligation. The
replacement power and efficiency of the alternatives procured by the Maine utilities were cheaper than the completion costs and – because much of the power was fueled by Maine resources – also did more for the state economy.

The Shoreham situation was more difficult because the unit was closer to completion by the time I became chair of the New York Commission and because there were no potential buyers. Ultimately, the plant was abandoned without being run commercially. Astonishingly, there is little doubt that the customers have been better off as a result of the decision not to run the plant. The plant would – if operating – be a plus today, but there is little chance that the benefits over the rest of its life would ever offset the present value of its negative impact on New York electric rates in its first fifteen years.

The other nuclear plant built in New York during that era was the second unit at Nile Mile Point. The owners of that plant entered into a settlement capping the amount that they would be permitted to recover from customers at about $4 billion. Ultimately, the plant cost several hundred million more than that, and those costs were absorbed by the owners and their shareholders. The cap protected the customers, just as Areva’s turnkey contract protects the customers in Finland. There is no indication that Duke proposes any similar protection for the customers of South Carolina.

Q. BUT THE EXPERIENCES YOU’VE DESCRIBED ARE IN OTHER PARTS OF THE COUNTRY, WHERE NUCLEAR POWER HAS BEEN MORE
CONTROVERSIAL AND SOME NUCLEAR UTILITIES HAVE BEEN PENALIZED FOR IMPRUDENCE ON A LARGE SCALE. WHY DOES THIS HISTORY HAVE ANY RELEVANCE TO DUKE OR TO SOUTH CAROLINA?

A. It's true that Duke and South Carolina avoided some of the problems that plagued nuclear power and state regulators in the 1970s and 1980s. However, those problems were not confined to parts of the U.S. where nuclear power was relatively controversial. Georgia, Mississippi, Louisiana and Texas all experienced cost overruns in the billions of dollars. Even Duke cancelled a number of plants at a cost of several hundred million dollars to its customers in North and South Carolina. Furthermore, both New York and New England had successful experiences with nuclear construction. But those successful experiences turned out to be no guarantee against later projects that would cause repeat double digit rate increases, power supply uncertainty and adverse economic development effects.

It's important also to keep in mind that even the best nuclear operators are at the mercy of events beyond their control. Duke had this experience with its Oconee units in 1979, when the NRC shut down all Babcock and Wilcox nuclear power plants for a period following the accident at Three Mile Island.

Q. IS MR. JAMIL’S TESTIMONY THAT THE PROJECTED ANNUAL CAPACITY FACTOR OF THE LEE STATION REALISTIC?
A. It's extremely optimistic. Nuclear plants in the U.S. today don't have lifetime capacity factors of 90% even with the commendable improvements of the last decade. Indeed, most new units in other countries tend to have significantly lower capacity factors in their first few years of operation, when they are being broken in. Prudence requires assuming something similar with respect to any new design. If the capacity factor of the first few years is significantly below 90%, it will be hard to attain a 90% lifetime average because downtime for refueling and maintenance remains unavoidable even for the best units.

Q. DOESN'T THE REVISED NRC LICENSING PROCESS PROVIDE ASSURANCE THAT THE EXPERIENCES THAT YOU HAVE DISCUSSED WON'T BE REPEATED?

A. No. The NRC licensing process was not a significant cause of the delays and cost overruns of the previous generation of nuclear plants. Although the hearings were sometimes contentious and protracted, they took place while the plants were being built and were invariably ended with the issuance of the requested license. The U.S. issued 230 construction permits in 20 years between 1958 and 1978, more than the next five countries combined. Half of the plants were cancelled. The real causes of the cost overruns were in the pace at which nuclear power grew in the U.S., a pace so rapid that the lessons of operating experience surprises had repeatedly to be applied to plants that were already partially built, an expensive and wasteful process.
Whether this problem will be repeated in future plants remains to be seen. However, it cannot be fixed by “streamlining” the licensing process. Indeed, if the changes to the licensing process have the effect of diminishing its thoroughness or increasing public mistrust of the Nuclear Regulatory Commission, some of the changes may even be counterproductive.

Q. ISN'T NUCLEAR POWER SO ESSENTIAL TO COMBATTING CLIMATE CHANGE THAT THE COMMISSION SHOULD GRANT DUKE'S REQUESTS EVEN WITHOUT KNOWING THEIR COST ESTIMATES?

A. No. The Keystone Fact Finding Report that I alluded to earlier concluded that nuclear can contribute only modestly to reducing climate change even if the world builds three times its existing nuclear capacity over the next 50 years, an immense achievement that would require increases in the rate of construction far beyond anything that now seems likely. If nuclear power can be built cost effectively, this contribution would make the climate change task easier. However, if nuclear is not cost effective, it will take revenue and attention from other measures that can prevent far more greenhouse gas reductions far more quickly.

Q. WHAT ARE THE IMPLICATIONS OF THE UNCERTAINTY THAT YUCCA MOUNTAIN WILL BE AVAILABLE FOR THE PRUDENCE OF PROCEEDING WITH THIS PLANT?

A. Unless the law is changed to expand Yucca Mountain, that proposed repository will not be able to store all of the waste from the existing plants, to say nothing of new ones. Furthermore, the Department of Energy does
not have the same obligation to take the waste from new plants, such as the unit proposed by Duke in this proceeding, that it has under the contracts with the existing plants. Therefore, the waste from this plant is not assured of a place in any repository. Indeed, there is no assurance that it can be moved off site at all.

The only prudent assumption is that the waste from this plant may have to be stored on site for a long time. Dry cask storage makes this technically feasible, but Duke and its customers may be responsible for the costs of that indefinite storage because, unlike the existing spent fuel, it is not covered by a contract that subjects the U.S. government to an obligation to take it.

Q. IN THE EVENT THAT YUCCA MOUNTAIN IS NOT LICENSED, WON’T REPROCESSING PROVIDE AN ALTERNATIVE WAY – INDEED, A PREFERABLE WAY – TO DEAL WITH SPENT NUCLEAR FUEL?

A. Reprocessing will add substantially to the cost of nuclear power – at least 1.5 cents per kWh according to the 2003 MIT report - and it will do almost nothing to solve the waste problem. In some ways it makes it worse. This is because the primary driver of repository size is the heat load, and reprocessing doesn’t diminish the heat load. Reprocessing removes only the plutonium and the uranium from the waste. These are not significant heat contributors. All of the rest of the spent fuel remains to be disposed of. In addition, reprocessing creates significant new volumes of radioactive waste.
The British are close to giving up on reprocessing because of its high costs. The French have thus far kept some of the costs of reprocessing in the government budget rather than in electric rates, but they are making only limited use of the recycled plutonium and – as European markets become more transparent and competitive - the future even of the French program is not certain.

The only U.S. spent fuel reprocessing plant that ever operated closed in 1972, saddling the state of New York and the federal government with a multibillion dollar clean up task that is not yet complete. Two other plants – including one at Barnwell in South Carolina - that were completed never operated due to President Ford's 1976 decision that reprocessing should not go forward in the U.S. President Carter expanded that decision. President Reagan reversed it, but no private sector firm was interested, a condition that persists today.

Q. WHAT LESSONS FROM THIS EXPERIENCE MIGHT SOUTH CAROLINA REGULATORS CONSIDER WITH REGARD TO NEW NUCLEAR CONSTRUCTION TODAY?

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

• First, the Commission should not find any decisions prudent until it is presented with a credible cost estimate and an estimate of rate impacts as well as a clear comparison among the alternatives.

• Second, the Commission should confine the scope of its prudence determination as narrowly as possible under the statute. In particular, the
Commission should not accept the proposition that payments to secure
the long lead time items are “preconstruction” costs. Such payments are
very much part of the construction process. Their prudence requires
detailed separate review of evidence not presented in this proceeding in
the event that they give rise to excessive costs.

- The Commission should require that Duke use a competitive power
procurement process to screen possible power supply resources. Such
competitive power procurement was the source of the resources that
successfully replaced the Seabrook power in Maine. Indeed, when utilities
in Maine sought a determination of the prudence of a major transmission
project to buy power from Hydro-Quebec, the Maine Commission required
that they test the purchase decision against the results of competitive
solicitation for equivalent power. The solicitation produced ample power
at lower prices, and the transmission line was never built.

- In the present environment of rapidly escalating costs, it is particularly
urgent to protect customers from open-ended commitments with
potentially ruinous economic impacts. To this end, the Commission
should limit the total cost of the project that it would consider to be a
prudent commitment at this time. Costs above that ceiling would not be
recoverable from the customers. Such a ceiling might be revisited once or
twice as the project moves forward, but the Commission should be clear
that it is not subject to infinite upward revision.
• Because of the strong likelihood that energy efficiency is available at lower
cost than the proposed nuclear station, the Commission should require a
showing that programs are in place to capture all cost-effective energy
efficiency before it accepts as prudent any decision to build a nuclear unit.

• The Commission should indicate in any decision on prudence under the
new South Carolina statute that it recognizes the reduced risk that will flow
from the decision and intends to adjust the allowed return on equity
accordingly.

Q. DO YOU HAVE AN OPINION, BASED ON YOUR QUALIFICATIONS AND
EXPERIENCE, AS TO WHETHER DUKE ENERGY'S DECISION TO
INCUR NUCLEAR GENERATION PRECONSTRUCTION COSTS
SHOULD BE APPROVED BY THIS COMMISSION AS "PRUDENT
CONSIDERING THE INFORMATION KNOWN TO THE UTILITY AT THE
TIME AND CONSIDERING THE OTHER ALTERNATIVES AVAILABLE TO
THE UTILITY FOR SUPPLYING ITS GENERATION NEEDS"?

A. Duke has not set forth basic elements necessary to a finding that incurring
preconstruction costs would be prudent. I urge the Commission not to
expose South Carolina customers to the very large rate impacts implicit in
such a finding.
EXHIBIT A

PETER A. BRADFORD
P.O. BOX 497
PERU, VERMONT 05152
(802) 824-4296

PROFESSIONAL EXPERIENCE:

March 1996- present Energy and Regulatory Advisor;

Peter Bradford advises and teaches on utility regulation, restructuring, nuclear power and energy policy in the U.S. and abroad. He 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, where he is an adjunct professor. He has 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. He is also affiliated with the Regulatory Assistance Project, which provides assistance to state and federal energy regulatory commissions regarding economic regulatory policy and environmental protection. He is vice-chair of the Board of the Union of Concerned Scientists.

He 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 China Sustainable Energy Project. Served as one of two U.S. representatives on international panel advising European Bank for Reconstruction & Development on least cost alternatives in Ukraine to continued operation of the Chernobyl Nuclear Station (1996-97) and on an international expert panel assessing the safety of the Mochovce Nuclear Power Station in Slovakia (1998);
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.


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

PROFESSIONAL AFFILIATIONS:

1999-present - Member, Policy Advisory Committee, China Sustainable Energy Project (funded by the David and Lucille Packard Foundation and the Energy Foundation).


Nov. 1986-Nov. 1987 President, National Association of Regulatory Utility Commissioners

1977-1995 NARUC positions, Member, Executive Committee; Member, Electricity Committee (1977-1989); Member, Gas Committee (1989-1993); Member, Communications Committee (1975-1977); Board of Directors, National Regulatory Research Institute (1985-1987).


1987-1995, Member of New York State Energy Planning Board

1987-1995, Member, Board of Directors, New York State Energy Research and Development Administration

1987-1995, Member, New York State Environmental Board;

1987-1995, Chair, New York State Energy Facilities Siting Board

1992-1994, State co-chair, New York State Task Force on Telecommunications Policy

Vice-chair, Board of Directors, Union of Concerned Scientists

Board of Directors, Nuclear Control Institute

EDUCATION:

1964 B.A. History, Yale University, New Haven, CT
1968 L.L.B., Yale University School of Law, New Haven, CT
AWARDS:

Honorary Degree, Unity College, 1981.
Environmental Award, Natural Resources Council of Maine, 1979.

PERSONAL:

Married (Susan Symmers Bradford)
Three children (Arthur, Laura, Emily)

PUBLICATIONS of Peter A. Bradford

Books


Law Review


Articles

The Economics of Nuclear Power (with Steven Thomas, Antony Froggatt, and David Millbrow) for Greenpeace International, May, 2007;
Nuclear Power's Prospects in the Power Markets of the 21st Century, for the Nonproliferation Education Center, February, 2005;
Some Environmental Lessons from Electric Restructuring, IUCN Colloquium on Energy Law for Sustainable Development, Shanghai, Winter 2004;
Where Have All the Safeguards Gone? Foreword to “Financial Insecurity: The Increasing Use of Limited Liability Companies and Multi-Tiered Holding Companies to Own Nuclear Power Plants” The Star Foundation August 7, 2002
The Unfulfilled Promises of Electric Restructuring, Nor'easter, summer 2001.
Ships at a Distance: Energy Choice and Economic Challenge, The National Regulatory Research Institute Quarterly Bulletin, Volume 18, Number 3, Fall, 1997, p. 287
(Originally the 1997 George Aiken Lecture at the University of Vermont).
In Search of an Energy Strategy, Public Utilities Fortnightly, 1/15/92.
Parables of Modern Regulation, The Electricity Journal, November 1992, p.73.
The Shoreham War Has Got to End Now, Newsday, 5/9/89;
Parallel to the Nuclear Age, Yale University 25th Reunion book, 1989;
Wall Street's Flawed Evaluation of State Utility Regulation, Bangor Daily News, September 3, 1984;
*Keeping Faith with the Public, Nuclear Safety*, March-April, 1981;
*Regulation or Reassurance, Washington Post*, August 16, 1979;

**Other Presentations Concerning Nuclear Energy**

*Of Risks, Resources, Renaissances and Reality*, Institute of Public Utilities, Charleston, South Carolina, December 4, 2007;
*Nuclear Power and Climate Change*, Chicago Humanities Festival; November 10, 2007


*The Future of Nuclear Energy*, Bulletin of the Atomic Scientists Conference; University of Chicago, November 1, 2006

*Nuclear Power and Climate Change*, Society of Environmental Journalists, Burlington, Vermont, October 27, 2006

*Nuclear Power, Climate Change and Public Policy*, National Conference of State Legislatures, April, 2006.

*Electric Restructuring after Ten Years: Surprises, Shocks and Lessons*, State Legislative Leaders' Foundation, November, 2005;

*Nuclear Power's American Prospects*, Presentation to the California Energy Commission Nuclear Issues Workshop, August, 2005;


*The Value of Sites Capable of Extended Storage of High Level Nuclear Waste*, Report for the Town of Wiscasset, Maine, December 2004 (supplemental report, January, 2005);

*Did the Butler Really Do It? The Role of Nuclear Regulation in Raising the Cost of Nuclear Power*, Cato Institute, Washington D.C. March 2004;

*China’s Energy Regulatory Framework* China Development Forum, Beijing, November 17, 2003;
Repeating History: Nuclear Power's Prospects in a Carbon-Conscious World  
Yale School of Forestry and Environmental Studies, Leadership Council Meeting, October 24, 2003;  
What Nuclear Power Can Learn from Electric Restructuring, and Vice Versa, Aspen Institute, July 5, 2003;  
Renewal of the Price Anderson Act Testimony before the United States Senate Committee on Environment and Public Works Subcommittee on Transportation, Infrastructure and Nuclear Safety, January 23, 2002;  
Call Me Ishmael: Reflections on the Role of Obsession in Nuclear Energy Policy, NARUC annual meeting, November 13, 1989;  
Nuclear Power and Climate Change; Harvard Energy and Environmental Policy Center, January 13, 1989;  
Somewhere between Ecstasy, Euphoria and the Shredder: Reflections on the Term Pro-Nuclear Symposium on Nuclear Radiation and Public Health Practices and Policies in the Post-Chernobyl World, Georgetown University, September 18, 1987;  
Searching the Foreseeable Past: Nuclear Power, Investor Confidence and Reality Public Utilities Institute, East Lansing Michigan, July 30, 1987;  
Why Do We Have a Nuclear Waste Problem Conference on Nuclear Waste, Naples, Maine, March 22, 1986;  
With Friends Like These: Reflections on the Implications of Nuclear Regulation, Institute of Public Utilities, Williamsburg, Virginia, December 13, 1982;  
The Man/Machine Interface Public Citizen Forum, March 8, 1982;  
A Perspective on Nuclear Power, The Groton School, January 15, 1982;  
Reasonable Assurance, Regulation and Reality ALI-ABA Course of Study on Atomic Energy Licensing and Regulation, September 24, 1980;  
Misdefining the National Security in Energy Policy from Machiesport to Three Mile Island, Environmental Law Institute, University of Maine, May 1, 1980  
Condemned to Repeat It? Haste, Distraction, Rasmussen and Rogovin, Risks of Generating Electricity, Seventh Annual National Engineers’ Week Energy Conference, February 21, 1980;  
Lightening the Nuclear Sled; Some Uses and Misuses of the Accident at Three Mile Island Seminar on the Problems of Energy Policy, New York University, November 21, 1979;  
The Nuclear Option: Did It Jump or Was It Pushed? NARUC Regulatory Studies Program, August 2, 1979;
How a Regulatory View of Nuclear Waste Management is Like a Horse’s Eye View of the Cart 90th NARUC Annual Convention, November 15, 1978;
Sentence First: Verdict Later: Some Thoughts on the Level of Acclaim Thus Far Afforded the Nuclear Siting and Licensing Act of 1978 ALI-ABA Course of Study, September 28, 1978;
Some Observations on Recent and Proposed Changes in Nuclear Regulatory Commission Jurisdiction Atomic Industrial Forum Workshop on Reactor Licensing and Safety, April 5, 1978;

Other Papers
The Nexus between Energy Sector Reform and Democracy & Governance (co-lead author), for USAID, February, 2005;
Public Interaction in the Georgian Energy Regulatory Process: Case Study for the USAID Project on the Nexus between Democratic Governance and Energy Sector Reform, April, 2004;
Economic Regulatory Issues in the Armenian Water Supply and Wastewater Treatment Sectors, for USAID, January 2003;
Some Potential Approaches to the Enforcement of License Conditions and Regulatory Orders in Armenia, for USAID, June 2002
The Process of Auditing Utilities: A Primer for the Energy Regulatory Commission of Armenia, for USAID, June 2002
Performance-Based Regulation in a Restructured Electric Industry, (with Bruce Biewald, Paul Chernick, Susan Geller, Jerrold Oppenheim and Tim Woolf) for the National Association of Regulatory Utility Commissioners, November 1997.
BEFORE
THE PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA
DOCKET NO. 2007-440-E

In the Matter of
Application of Duke Energy Carolinas, LLC for Approval of Decision to Incur Nuclear Generation Pre-Construction Costs

Certificate of Service

I hereby certify that on this date I served the above Direct Testimony and Exhibit of Peter A. Bradford by placing copies of same in the United States Mail, first-class postage prepaid, addressed to:

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