070650

STATE OF FLORIDA

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Public Service Commission

November 13, 2009

FPSC, CLK - CORRESPONDENCE
X Administrative Parties Consumer
DOCUMENT NO. 09541-07
DISTRIBUTION:

Natalie F. Smith, Esquire
John T. Butler, Esquire
Florida Power & Light Company
215 South Monroe Street, Suite 810
Tallahassee, Florida 32301-1859

Re: Return of Confidential Document to the Source, Docket No. 070650-EI

Dear Ms. Smith and Mr. Butler:

Commission staff has advised that confidential Document No. 09469-07, filed on behalf of Florida Power & Light Company, can be returned to the source. The document is enclosed.

Please do not hesitate to contact me if you have any questions concerning return of this material.

Sincerely,

Ann Cole
Commission Clerk

AC:kmp
Enclosure

cc: Shevie Brown, Division of Economic Regulation
Katherine Fleming, Office of General Counsel

RECEIVED Nanci Nelson DATE 11/16/09

Marguerite McLean

070650-EI

From: Marguerite McLean
Sent: Thursday, October 09, 2008 10:20 AM
To: Patsy White
Cc: Karla Barnes
Subject: Quarterly Confidential Reports - Division/Office

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Patsy,
on the ECR inventory of confidential documents by Responsible Division/Office as of 10/06/2008, Karla noted that the following confidential documents are SGA and not ECR. Please hand-write them on your report. I will change the responsible Division to SGA for these documents.
thanks,
Marguerite.

Dkt No. 060811-EI
DN 07744-08

Dkt No. 070650-EI
DN 09469-07

Dkt No. 080148-EI
DN 01806-08
04148-08
04667-08

Dkt No. 080152-GU
DN 01856-08

Dkt No. 080203-EI
DN 04849-08
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05859-08

Dkt No. 080245-EI
DN 05624-08

Dkt No. 080246-EI
DN 05624-08

STATE OF FLORIDA

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Public Service Commission

June 13, 2008

Jessica Cano, Esquire
Florida Power & Light Company
215 South Monroe Street, Suite 810
Tallahassee, Florida 32301

Re: Return of Confidential Document to the Source, Docket No. 070650-EI

Dear Ms. Cano:

Commission staff have advised that confidential Document No. 10888-07, filed on behalf of Florida Power & Light Company, can be returned to the source. The document is enclosed.

Please do not hesitate to contact me if you have any questions concerning return of this material.

Sincerely,

ac

Ann Cole
Commission Clerk

AC:mhl
Enclosure

cc: Shevie Brown, Division of Economic Regulation
Katherine Fleming, Office of the General Counsel

RECEIVED Regina Alden **DATE** 6/19/08

STATE OF FLORIDA

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ANN COLE
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Public Service Commission

May 6, 2008

(CERTIFIED MAIL NO. 7006-2760-0003-8797-6310)

Jessica A. Cano, Esquire
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, Florida 33408-0420

Re: Return of Confidential Documents to the Source, Docket No. 070650-EI

Dear Ms. Cano:

Commission staff have advised that confidential Document Nos. 10890-07, 11142-07, 00847-08, and 01008-08, filed on behalf of Florida Power & Light Company, can be returned to the source. The documents are enclosed.

Please do not hesitate to contact me if you have any questions concerning return of this material.

Sincerely,

Ann Cole
Commission Clerk

AC:mhl
Enclosure

cc: Shevie Brown, Division of Economic Regulation
Katherine Fleming, Office of the General Counsel

070650-EI

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits. 070650-EI

1. Article Addressed to: 10890-07

JESSICA A CANO ESQUIRE
FLORIDA POWER & LIGHT CO
700 UNIVERSE BLVD
JUNO BEACH FL 33408-0420

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery
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D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

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☒ Certified Mail ☐ Express Mail
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☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7006 2760 0003 8797 6310

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

Marguerite McLean PSC-08-0237-FOF-EI

From: Theresa Walsh
Sent: Friday, April 11, 2008 11:48 AM
To: CLK - Orders / Notices; Katherine Fleming; Jennifer Brubaker; Caroline Klancke
Subject: Order / Notice Submitted

Date and Time: 4/11/2008 11:45:00 AM
Docket Number: 070650
Filename / Path: 070650.or.031808.kef.doc

33 pgs

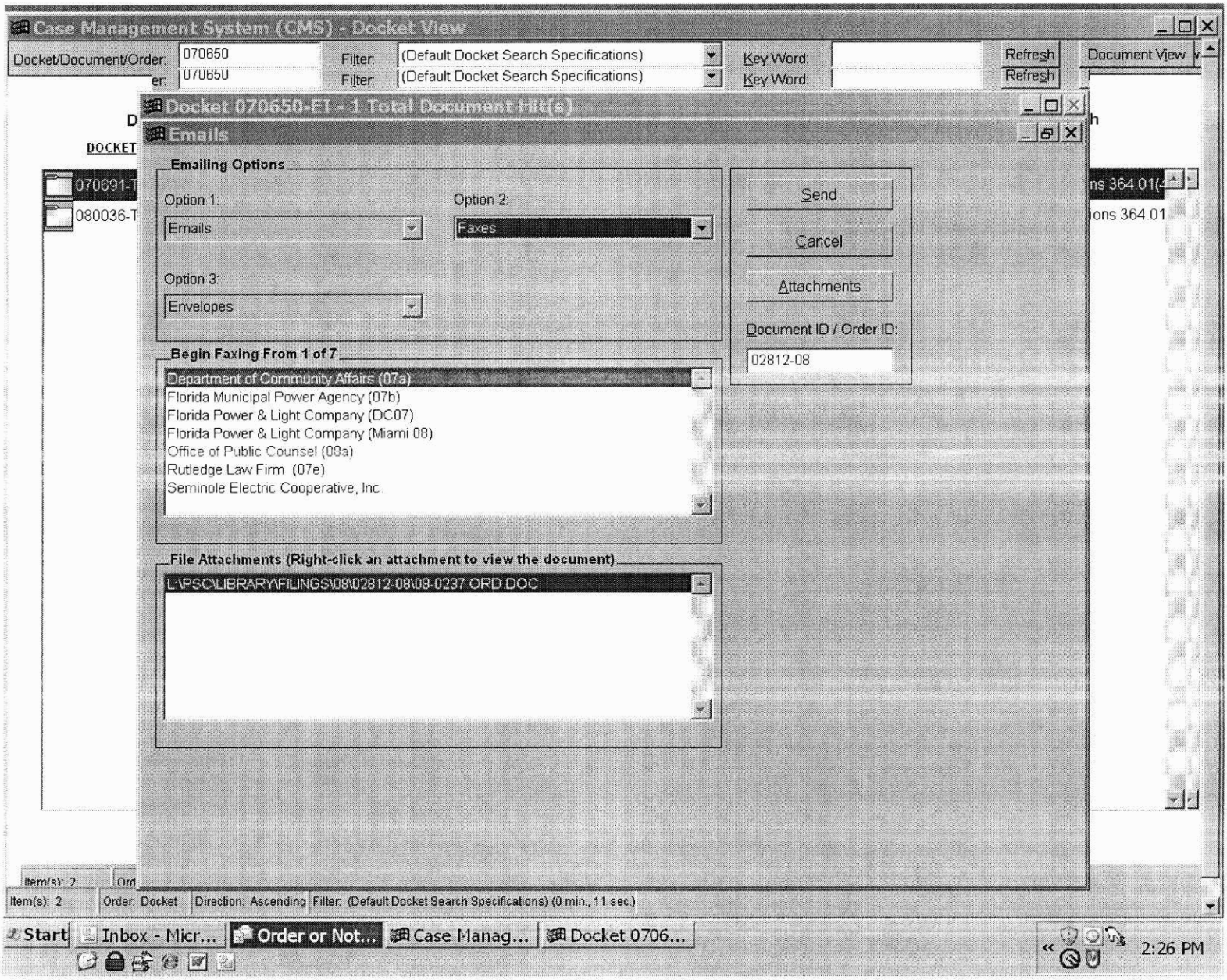
FPSC, CLK - CORRESPONDENCE
☒ Administrative ☐ Parties ☐ Consumer
DOCUMENT NO. 09541-07
DISTRIBUTION: _____

Please issue the above-referenced Final Order in Docket No. 070650-EI today.

5 faxed
2 mailed
19 emailed

FLORIDA PUBLIC SERVICE COMMISSION
CASE MANAGEMENT SYSTEM
PARTICIPATING EMAIL ADDRESSES FOR DOCKET 070650

PARTY NAME	COMPANY CODE	EMAIL ADDRESS	ADDRESS IN MASTER COMMISSION DIRECTORY
Anchors Law Firm (07)		vkaufman@asglegal.com	No
Bob and Jan M. Krasowski		Minimushomines@aol.com	No
City of Jacksonville		Bpage@coj.net	No
Clean Water Action/Clean Water Fund		dshirreffs@cleanwater.org	No
CRA International		ekee@crai.com	No
Department of Environmental Protection (07a)		Mike.Halpin@dep.state.fl.us	No
Florida Municipal Electric Association (07)		bmoline@publicpower.com	No
Florida Municipal Power Agency (07a)		roger@fmpa.com	No
Florida Power & Light Company	EI802	wade_litchfield@fpl.com	No
Florida Power & Light Company (Juno07g)		Wade_litchfield@fpl.com	No
International Brotherhood of Electrical Workers		Garyscu4@aol.com	No
JEA (08)		DickJA@jea.com	No
Miller, Balis & O'Neil, P.C. (07)		wmiller@mbolaw.com	No
Orlando Utilities Commission (07)		kksionek@ouc.com	No
Sierra Club, Miami Group		oncavage@bellsouth.net	No
Sugarman Law Firm		nwarman@sugarmansusskind.com	No
Suzanne Brownless, P.A. (08)		sbrownless@comcast.net	No
The Florida Alliance for a Clean Environment		Alliance4Cleanfl@aol.com	No
Young Law Firm (07c)		ryoung@yvlaw.net	No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Florida Municipal Power Agency (07b)
Florida Power & Light Company (DC07)
Florida Power & Light Company (Miami 08)
Office of Public Counsel (08a)
Rutledge Law Firm (07e)
Seminole Electric Cooperative, Inc.
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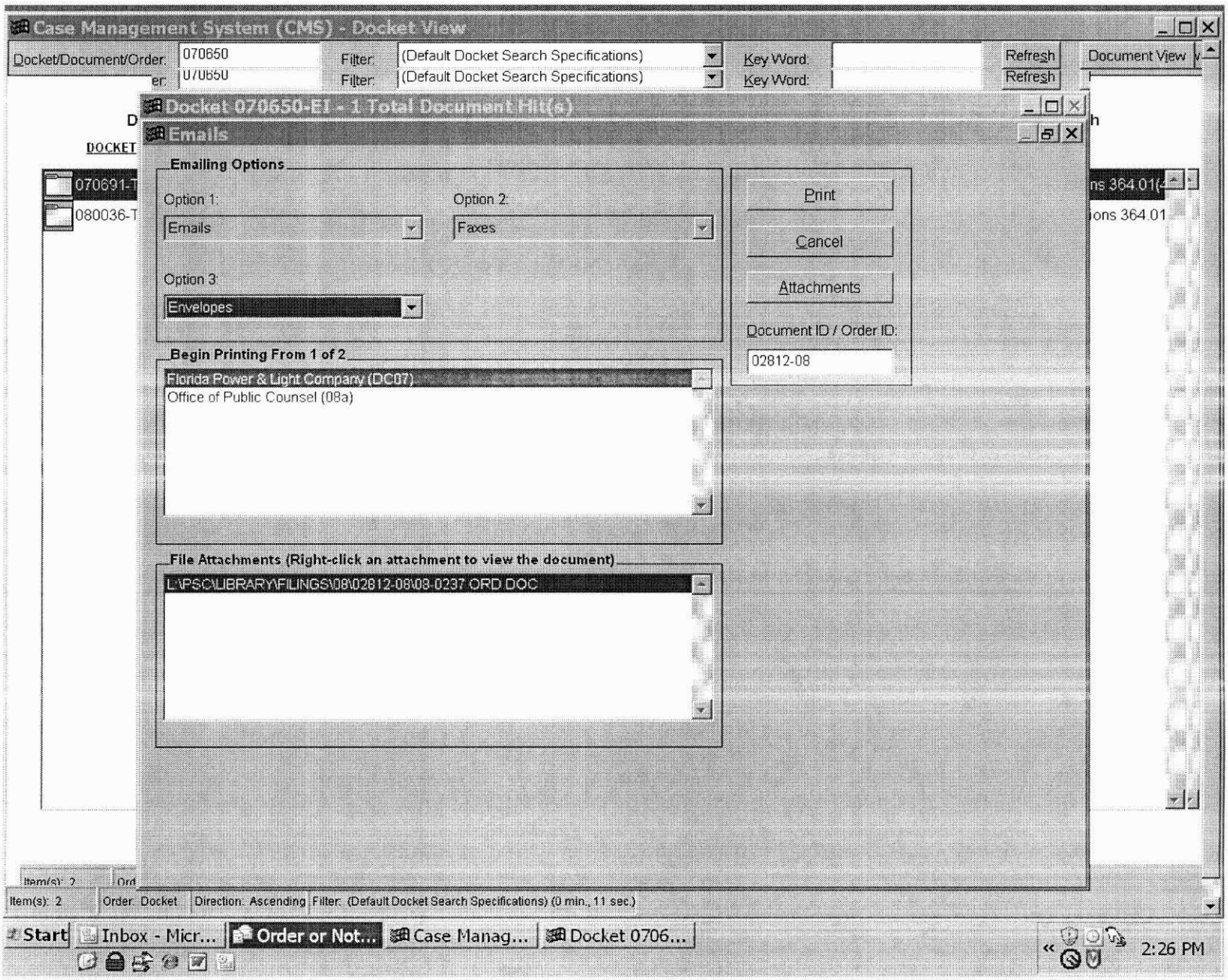
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Office of Public Counsel (08a)
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State of Florida

Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: March 5, 2008

TO: Ann Cole, Commission Clerk - PSC, Office of Commission Clerk

FROM: Bridget M. Groom, Assistant to Commissioner Skop BG

RE: Communication Received in Docket No: 070650-EI – FPL Turkey Ponit 6 and 7.

Commissioner Skop's Office has received the following correspondence from Barry Parsons, Consumer.

The correspondence has not been viewed or considered in any way by Commissioner Nathan A. Skop. Under the terms of the advisory opinion from the Commission on Ethics (issued July 24, 1991 as CEO 91-31-July 19, 1991), the following correspondence does not constitute an ex parte communication by virtue of the fact that it was not shown to the Commissioner. Because it is not deemed to be an ex parte communication, it does not require dissemination to parties pursuant to the provisions of section 350.042, Florida Statutes. However, in such cases Commissioner Skop has requested that a copy of the correspondence and this memo be, as a matter of routine, placed in the correspondence side of the file in this docket.

Attachment

Cc: William Garner
Roberts Bass
Lorena Holley
Larry Harris

Hand delivered.

Barry G. Parsons

1011 NW **Bobwhite Terrance . Madison, Florida 32340 PHONE: (850) 973 - 3351**

re. Docket No. 070650-EI FPL Turkey Point 6 and 7

Dear Commissioner :

To make amends for my not having enough copies of the booklet, "Why a Future for the Nuclear Industry is Risky" booklet (Exhibit #92, I believe), I am enclosing your own personal copy of it.

I have written a summary of footnoted items and a few comments that I suspect may be more salient items for your purposes. But I strongly urge you to read the whole booklet, if you haven't yet had a chance. It is well written and an easy read.

Let me reiterate that most of the information in this booklet was taken from a series of speeches by Peter Bradford (noted on the front cover) with whom the publisher, the Southern Alliance for Clean Energy, toured a few years ago. All of the information, as you can see, is extensively documented.

Mr. Bradford, as you'll recall --and can see on the front cover-- is not only the former chair of two state PSCs but also a former commissioner with the U.S. Nuclear Regulatory Commission. You might find it informative to compare his take on many of the nuclear power issues with that of another ex-NRC commissioner, FPL witness, Dr. Diaz.

Ahead of this one-page summary and booklet, please find my OPEN LETTER to you, to the Florida PSC. I wanted to share with you and with others a few of my impressions of the recent hearing.

Thank you for your hard (and incredibly tedious !),hard work for the people of Florida.

Enc. Open Letter to PSC
booklet & one page summary

bonus: January, 2008 publication of Science for Democratic Action, by Arjun Makhijani, Ph.D.

Sincerely,

barry parsons

PLEASE RECYCLE

PRESS CONTACT:
Steve Simon
S&S Public Relations, Inc.
847/955-0700 ext. 9347
steve@sspr.com

STEMTech Debuts StemEnhance™, The Natural Adult Stem Cell Breakthrough

Botanical Extract Shown Clinically to Promote Natural Release of Adult Stem Cells From Bone Marrow, Optimizing Tissue and Organ Function Throughout the Body

SAN CLEMENTE, CA – June 9, 2006 – For nearly twenty years, medical science has recognized the role of antioxidant nutrition in prolonging human life and increasing vibrant health. Now, new research has uncovered a dietary strategy that may even eclipse antioxidants for maintaining proper organ and tissue function throughout the body: adult stem cell enhancement.

STEMTech HealthSciences, Inc., a pioneer in nutraceutical development and marketing, today announced the availability of StemEnhance™, the first natural dietary supplement proven to support adult stem cell circulation. A breakthrough in its field, StemEnhance has been shown to support and increase naturally-occurring adult stem cell release from bone marrow, within normal ranges.

Adult stem cells are without a doubt one of the most exciting fronts in health sciences today. While human embryos were once thought to be the only source of these "super cells" that could regenerate a wide range of human tissue, research in recent years has generated a growing body of evidence that adult stem cells have the same remarkable ability to develop and replicate in a wide variety of forms, a property known to health science as pluripotence.

The *New England Journal of Medicine*, in one recent example, published a study suggesting that the number of circulating stem cells has a direct correlation to overall heart health (September 8, 2005, 353(10): 999-1007). There is clear and convincing evidence that adult stem cells are involved in maintaining homeostasis (natural physiological equilibrium) and normal body function.

In human beings, stem cells are most abundantly found in bone marrow from birth onward. However, over a lifetime, there is evidence that in some people, the number and quality of these cells circulating through the body gradually decreases. STEMTech's groundbreaking discovery is that a patented blend of extracts from the widely consumed aquatic botanical *Aphanizomenon flos-aquae* can actually support the release of these cells, improving the body's ability to maintain optimal health. With StemEnhance, individuals can help to slow the age-related decline of normal processes like stem cell release and cell repair.

-more-

Open Letter to the Florida Public Service Commission and the People of Florida, from Barry G. Parsons, Madison

This is a personal opinion from this member of the public regarding the recent PSC hearing on the application (Docket No. 070650-EI) of Florida Power and Light Co. for needs determination for two new nuclear power plants (Turkey Point 6 & 7) in Dade County, held January 30 – February 1, the first two days of which I attended.

I. Thin Assumptions.

Here are just a few of the more troubling examples of assumptions and speculation, copiously and prejudicially number-crunched by FPL and only minimally challenged.

1. That this most expensive of all energy choices ($12 to 24 billion) is somehow "cost effective."
2. That the increased use of lower quality uranium due to the disappearing stocks of high-grade uranium ore won't be a problem because it can be enriched – only not in the USA (fear of public reaction?). Rather, it will be shipped to Britain or France for enrichment, across the Atlantic Ocean and back. And that somehow this won't raise costs significantly. Or increase the probability of being hit by natural disasters or a terrorist attack.
3. That the intractable and ominous problem of handling and containment of long-term hazardous nuclear waste --which may, again, be shipped across the Atlantic, this time for reprocessing in France—will somehow by solved (it hasn't for the last half century). And that this somehow won't eventually drive the cost of nuclear power even higher.
4. That the problem-plagued history of nuclear energy, including "permissible" low level radiation emissions, isn't anything to worry about. This ignores the heightened rates of leukemia associated with such routine emissions right now, as recorded in France and Germany. We are to presume that this won't happen here, driving up medical costs from the resulting excess cancer morbidity.
5. That the failure of the first nuclear era in America was mostly political. I lived through that period. I observed that the politics came mostly from the powerful combination of government and industry, in favor of nuclear power. In fact, that's the main reason the early build-out moved too fast, compromising safety such that events like Three Mile Island were more likely.
6. And specific to Florida, that the dramatic slowdown of growth (87% in the last two years) is just part of an economic cycle. How do they know that those with other explanations, like climate change and the long-running environmental destruction in this state, are wrong?
7. That the deepening back-to-back droughts in Florida are also "cyclical" and will soon reverse. This assumption is as much a hope, a prayer, on the part of FPL as it is fact. Because if global warming renders drought permanent and progressive, it would constrict the crucial ability to use water to cool dangerously radioactive material. This implication goes beyond cost to the sheer existence of the nuclear industry.

These concerns contribute to the disinclination of investors to go nuclear. Latest examples: the state of Utah's recent canceling of a new nuclear plant proposal; and Germany's decision to decommission two (and possibly more) of their functioning nuclear plants and not plan any new ones. Italy, too, is ceasing construction of new nuclear plants.

As I have said before and will say again at every opportunity: How does it make sense to subsidize and promote the one energy choice that is the MOST polluting, the MOST hazardous and the MOST expensive? Especially when other countries are proving that solar and wind can and do provide reliable electric power without all these negatives?

II. The Arrogance of the "in advance" mentality.

The proof of the frailty behind the techno-bravado of FPL and its associated promoters of nuclear power lies in the unusual list of special favors that this industry, so well represented by FPL, want in advance of the completion of the permitting process.

This industry is not only unapologetically holding out its hand for taxpayer supported subsides, loan and insurance guarantees, tax breaks and the limiting of liability in cases of catastrophic radioactivity releases. It is also, in the case of FPL, making the following incredible demands of the state of Florida.

1. That FPL be allowed to bill ratepayers in advance for the costs of nuclear power plant construction. Have we forgotten the still fresh lessons of the TECO and OUC coal gasification plant projects?

2. That they get from the PSC, in advance, a statement of "explicit and unwavering support" over the next ten years (!), in the words of FPL head, Armando Olivera.

3. That they get from the PSC ("Issue# 9") an acknowledgement, a judgement, of the "prudence" of FPL shelling out $16 million of ratepayer money to buy a place in line with the Japanese steel works that builds the huge nuclear plant vessels. In advance, of course.

4. That they want all of the above before even settling on the final design, which may not come until as late as the end of this year.

Taken together, these actions would constitute a premature PSC approval that FPL will surely use to its political advantage in approaching other regulatory entities and the court of public opinion. These machinations are striking in their hubris, and amount to a set-up, a gaming of the needs determination process. My impression is that FPL is attempting to back the PSC into a corner from which it will be uncomfortable in the future, given the investment that will have been made, in denying FPL any subsequent favors it requests, as cost overruns mount. And if successful, surely others, like Progress Energy, may follow suit.

The checks and balances, therefore, of the proposed PSC "annual reviews" of FPL's nuclear construction progress --or lack thereof-- would become markedly compromised if not moot.

III. A Summary Perspective.

I believe PSC Commissioner Edgar was justified in her lengthy expression of frustration (January 30) with these demands, specifically "Issue # 9" (item II. 3., above) regarding advance approval for FPL expenditures related to this as yet unpermitted project. I shared her frustration with all of that, including the confusing legalese so pathetically put forth by FPL in response.

Similarly, I believe that Commissioner Argenziano's concerns held traction on the issues of:

1. The large water use by nuclear power plants, so critical for cooling, in this era of declining water body depths and minimum flow levels across the state.

2. The fact of Germany decommissioning two of their existing nuclear plants, and maybe more. The explanation given by the FPL witness, Dr. Diaz, that the original decision by the German government to shut down all 16 of its nuclear plants (1/4 of the nation's electrical power) was made merely for purposes of political accommodation, is preposterous on the face of it.

Regarding the conduct of the PSC hearing, I admit to concern, as a member of the public, about the unlevel playing field wherein an intervenor unable to afford an attorney was pummeled by a veritable football team of lawyers for FPL. It seems to me that the process should provide for a sort of "public defender" for such intervenors, arranging for the services of counsel for the public rather than lawyers that, in this case, represented other utility companies and the legislature and appeared to be just along for the ride.

That said ---and despite other moments that appeared to be biased in favor of FPL and my own confusion over possibly non-uniform guaranteed rates of return for coal and nuclear energy compared to solar and other clean renewables-- it is my overall sense that the Public Service Commission process, via this hearing, still demonstrated its value to the people of Florida. For in my opinion, it revealed to those with some knowledge of the subject and who paid attention that nuclear power is not only NOT ready for a "renaissance" but is inappropriate by its very nature to continue to be taken seriously as a rational energy choice for Florida.

The bottom line is that no matter how hard the nuclear industry strains to explain away their history and convince us that this time things will be different, and even given the improvements in nuclear technology, things really haven't changed much. As a Florida citizen and taxpayer, I know that we will have to pony up some serious tax and ratepayer dollars to implement whatever energy options the state decides on. I am one citizen who is ready to pay those taxes and fees IF the safest and cleanest renewable energies are chosen.

Barry G. Parsons,

1011 NW Bobwhite Terrace, Madison, FL 32340 850 973-3351 barryandjudy@hotmail.com

cc. Governor's office

various environmental groups

abstracts to select media outlets

Footnote summary, **Exhibit# 92: "Why a Future for the Nuclear Industry is Risky"**

First, the following series of references to STANDARD & POORS studies, and my comments.

Page 2, footnote 3; p.3, f. 9; p. 3, f. 15; and p. 4, f. 16.

The upshot from S&P is that federal assistance programs for the nuclear industry (the 2005 EPACT legislation is the example) do not really help nuclear's credit worthiness (new construction or expansion); that any given nuclear power plant may never actually begin operation; that as recently as 01/06, S&P believes "cost overruns are highly probable;" and that S&P apparently finds disturbing that "a regulatory process cannot provide recovery for underfunding."

Unless, of course, the nuclear industry can convince regulators to find ways to cover that, too, along with all the other special treatment requested.

Other major reports or studies.

Page 2, footnote 2. The UNIVERSITY OF CHICAGO's study for the DOE, 08/ 04, finding that the cost of recent new nuclear plants in Japan – a nation for which FPL witnesses expressed admiration for their nuclear programs—were much higher than anticipated.

p. 3, f. 8. A RAND CORP study that billion dollar "mega-projects" go way over first cost estimates and that "only one in three meets its profit goals." Florida's mega-examples: the TECO and OUC IGCC coal plants.

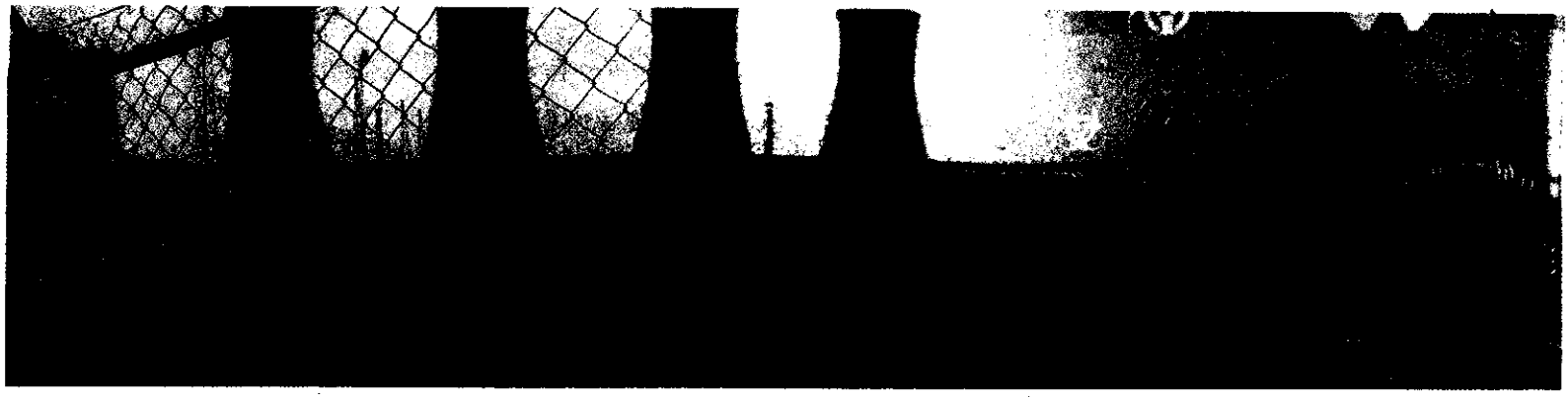
p. 3, f. 10. The DOE's annual Energy Outlook for 2005, stating their skepticism about new nuclear plants being economical.

p. 3, f. 11. The MIT study that finds the real levelized cost of electricity from nuclear reactors would be "more expensive than from pulverized coal or natural gas." Wasn't cost involved with the Glades decision?

Finally, p. 8, f. 41. MIT's report on the 2002 sale of a majority interest in the Seabrook nuclear power plant. It led MIT to say that "the market value of a fully licensed and operational nuclear power plant with a good performance record is *less than half* of the most optimistic cost estimates for .. a new nuclear..plant." And accordingly, that "the market value of nuclear plants is far below their replacement costs.."

This booklet concludes that the last 50 years of subsidies to the nuclear industry ($145 billion) amounted to more than all other energy sectors combined. What does this say about FPL's contention that their huge investments in nuclear energy will not drain funding from their truly renewable energy projects? Maybe it's because their solar projects in Florida are so small, relative to the MW need, that it wouldn't make much difference.

The conclusion also notes on page 8 that the growth in wind, solar and micropower in 2006 outperformed existing nuclear power, and was "mostly financed by private risk capitol." No bribing with loan guarantees or liability protection there.



INTRODUCTION

Talk of a "nuclear renaissance" abounds. The accidents at Chernobyl and Three Mile Island are receding in public memory. Promises of improved safety and performance are coupled with billions of dollars of subsidies. However, the claims that nuclear power is a necessary energy source for displacing greenhouse gases hasn't convinced investors that new nuclear power plants will be safe and profitable investments.

New nuclear power plants will not be cost competitive with other electricity generating alternatives. Wind power and other renewable technologies, combined with energy efficiency, conservation and cogeneration can be much more cost effective and can be deployed much sooner than new nuclear power plants. Building expensive new nuclear plants will divert private and public investment from the cheaper and readily available renewable and energy efficiency options needed to protect our climate.

In competitive markets, new nuclear power plants will be bad investments. At the same time, worldwide private equity and venture capital investments in clean energy continue to grow. Worldwide investment in renewable energy capacity was almost $40 billion in 2005 and the renewable energy markets continue to grow robustly.[1]

DESPITE THE SIGNIFICANT SUBSIDIES PROVIDED IN THE ENERGY POLICY ACT OF 2005 (EPACT 2005), INVESTMENTS IN NEW NUCLEAR PLANTS REMAIN VERY RISKY

- The estimated cost of $1,500-$2,000 per KW for new nuclear plants is unlikely to be achieved and has recently been revised upward for some companies.
- The prices of recently built nuclear power plants in Japan were much higher, ranging between $1,796 and $2,827 per KW, in 2003 dollars.[2]
- The subsidies provided in EPACT 2005 are limited to a few plants and some require Congressional appropriations which are not guaranteed. Moreover, Standard & Poor's analysis of EPACT 2005 has concluded that the bill has few implications for the credit quality of nuclear developers and that the regulatory risk for new nuclear construction remains high, given the possibility that a plant for which construction has started may never actually commence operations.[3]
- None of the new nuclear power plant designs under consideration in the U.S. have actually been built. The industry's optimistic construction time and cost estimates are unproven and theoretical.
- Despite massive subsidies and R&D investments, there has not been an order for a new nuclear power plant in the U.S. for almost three decades.[4]
- Even with the subsidies in EPACT 2005, the U.S. Department of Energy has moved its target for bringing a new nuclear unit online from 2010 to 2014.[5]

1 "Renewables Global Status Report: 2006 Update," Renewable Energy Policy Network for the 21st Century, 2006, at pages 2-5, available at http://www.ren21.net/globalstatusreport/download/RE_GSR_2006_Update.pdf.

2 "Economic Future of Nuclear Power," The University of Chicago for the U.S. DOE, August 2004, at pages 2-14.

3 "Energy Policy Act 2005 has Limited Credit Implications: S&P," Nuclear Engineering International News, August 18, 2005, available at http://www.neimagazine.com/story.asp?sc=2030540&ac=7969460 and "Long-Awaited Energy Act Has Marginal Credit Implications for U.S. Utility And Oil And Gas Companies," Standard & Poor's, August 1, 2005.

4 "Nuclear Power: Economics and Climate Protection Potential," Amory Lovins, Rocky Mountain Institute, September 11, 2005, at page 9, available at http://www.rmi.org/images/other/Energy/E05-08_NukePwrEcon.pdf.

5 Statement of Samuel W. Bodman, Secretary of Energy, Before the Committee on Science, U.S. House of Representatives, Concerning the Department of Energy's FY 2007 Budget, February 15, 2006. available at http://resourcescommittee.house.gov/science/hearings/full06/Feb15/bodman.pdf.

- A recent article in The Energy Journal, published by the International Association for Energy Economics, concluded that in current liberalized markets, investors have no incentives to back the construction of new nuclear power plants because of their capital intensity, "engineering difficulties" and "regulatory creep."[6]

- Nuclear construction cost estimates in the U.S. have been notoriously inaccurate. In fact, the estimated costs of some existing nuclear units were wrong by factors of two or more. The total estimated cost of 75 of today's nuclear units was $45 billion (in 1990 dollars).[7] The actual cost turned out to be $145 billion (also in 1990 dollars). This $100 billion cost overrun was more than 200 percent above initial cost estimates.

  - New billion dollar mega-projects traditionally cost much more than their original estimates. As a result, a 1988 RAND Corporation study concluded that "the data on cost growth, schedule slippage and performance shortfalls of mega-projects are certainly sobering, but the most chilling statistic is that only about one in three of these projects is meeting its profit goals."[8]

  - Standard & Poor's stated that "given that construction [of new nuclear plants] would entail using new designs and technology, cost overruns are highly probable."[9]

  - The DOE's Energy Information Administration has clearly and concisely stated that "new [nuclear] plants are not expected to be economical."[10]

  - A 2003 study by the Massachusetts Institute of Technology forecasted that the base case real levelized cost (present value of building and running a plant for its lifespan) of electricity from new nuclear reactors with an estimated 85 percent capacity would be $.067 per kilowatt hour over a projected forty year operating life more expensive than from pulverized coal or natural gas.[11]

  - A 2005 assessment by Synapse Energy Economics, Inc. showed that the levelized cost of electricity from a new nuclear power plant would be $.068 per kilowatt hour, which was significantly higher than obtaining the same amount of energy from a combination of wind and gas-fired capacity and energy efficiency measures.[12] Additional studies have also concluded that overnight capital costs, lead construction times and interest rate premiums are likely to place the cost of electricity from any future nuclear power plants within the range of $.06 to $.07 per kilowatt hour.[13]

- Nuclear utilities have acknowledged that there are significant economic risks associated with the operation of nuclear power plants.

  - Plant O&M and capital expenditures could increase or the nuclear plant(s) could experience outages as a result of events at other operating nuclear power plants, new rules or regulations issued by the U.S. Nuclear Regulatory Commission (NRC), or as the result of deficiencies identified by the NRC.[14]

- Restructuring of the electric utility industry brings additional uncertainty to the ownership of new nuclear power plants. Without captive customers from whom increased costs can be recovered, plant owners are exposed to the risks of higher O&M expenses, higher decommissioning costs, and the lost revenues and higher costs of extended unit outages.

  - For example, Standard & Poor's stated that "Decommissioning risk remains an important factor in determining credit quality of U.S. firms and weighs more in the analysis of competitive nuclear generators. This is the case because, again, a regulatory process cannot provide recovery for underfunding."[15]

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6 "Nuclear Power: A Hedge against Uncertain Gas and Carbon," Fabien A. Roques, William J. Nuttall, David M. Newbery, Richard de Neufville, Stephen Connor, The Energy Journal, Vol. 27, n. 4., 2006.

7 Study prepared by the Energy Information Administration of the U.S. DOE, "An Analysis of Nuclear Power Plant Construction Costs," 1986.

8 "Understanding the Outcomes of Megaprojects: A Quantitative Analysis of Very Large Civilian Projects," Edward W. Merrow, RAND Corporation, March 1988.

9 "Credit Aspects of North American and European Nuclear Power," Standard & Poor's, January 9, 2006.

10 Annual Energy Outlook 2005, Energy Information Administration, available at http://www.eia.doe.gov/emeu/plugs/plfeb05.html.

11 "The Future of Nuclear Power – Summary Report," MIT, 2003, available at http://web.mit.edu/nuclearpower/pdf/nuclearpower-summary.pdf.

12 Affidavit of Bruce Biewald, Synapse Energy Economics, in U.S. NRC Docket No. 52-007-ESP, at page 23.

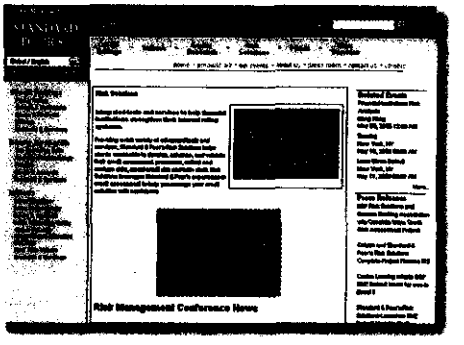
13 "Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Crisis – Summary," Brice Smith, Institute for Energy and Environmental Research, 2006, at page 6, available at http://www.ieer.org/reports/insurmountablerisks/summary.pdf.

14 For example, see the Testimony of Thomas Aller, in Iowa Utility Board Docket No. SPU-05-15, at page 15.

15 "Credit Aspects of North American and European Nuclear Power," Standard & Poor's, January 9, 2006.

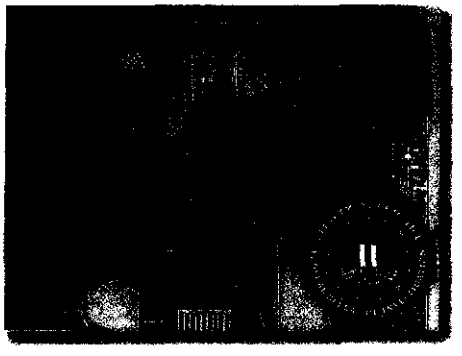
WALL STREET HAS EXPRESSED SERIOUS CONCERNS ABOUT THE CREDITWORTHINESS OF COMPANIES THAT PURSUE NEW NUCLEAR PLANTS

- Standard & Poor's Ratings Services found that "an electric utility with a nuclear exposure has weaker credit than one without and can expect to pay more on the margin for credit. Federal support of construction costs will do little to change that reality. Therefore, were a utility to embark on a new or expanded nuclear endeavor, Standard & Poor's would likely revisit its rating on the utility."[16]
- Standard & Poor's has also expressed concern that "from a credit perspective, [2005 Energy Policy Act] provisions may not be substantial enough to sustain credit quality and make [nuclear generation] a practical strategy."[17]
- The credit rating service Fitch reminds potential investors that "the overarching concern [regarding nuclear power generation] is the financial effect of an extended outage, forcing the generating company to buy potentially more expensive replacement power on the spot market to honor any existing supply commitments."[18]



NUCLEAR POWER PLANTS ARE STATED TERRORIST TARGETS: A SUCCESSFUL ATTACK COULD HALT NEW CONSTRUCTION EVEN AFTER SIGNIFICANT EXPENDITURE

In testimony before the Select Committee on Intelligence in the U.S. Senate in February 2005, FBI director Robert S. Mueller stated that, "Another area we consider vulnerable and target rich is the energy sector, particularly nuclear power plants. Al-Qa'ida planner Khalid Sheikh Mohammed had nuclear power plants as part of his target set and we have no reason to believe that Al-Qa'ida has reconsidered."[19]



- In October 2001, the Federal Aviation Administration temporarily restricted all private aircraft from flying over 86 nuclear facilities due to threats of terrorist attacks.[20]
- Over 53,000 metric tons of highly radioactive spent nuclear fuel is stored at commercial reactors in the U.S. Nearly 90% of this fuel is stored in cooling pools without adequate protection.[21] According to a recent study by the National Academy of Sciences, a terrorist attack on a spent fuel pool could lead to the release of large quantities of radioactive materials to the environment.[22] Such an event could result in thousands of cancer deaths and economic damages in the range of hundreds of billions of dollars.
- In the event of a major radioactive release from a nuclear power plant, public opinion would likely react strongly against nuclear power (as occurred after the Chernobyl and Three Mile Island accidents), resulting in the halting of construction of any new planned reactors.

16 Ibid.
17 Ibid.
18 "Fitch's Approach to Rating U.S. Wholesale Energy Companies," October 2004.
19 "Testimony of Robert S. Mueller, III, Director, Federal Bureau of Investigation Before the Senate Committee on Intelligence of the United States Senate," February 16, 2005, available at http://www.fbi.gov/congress/congress05/mueller021605.htm.
20 "FAA Restricts All Private Aircraft Flying Over Nuclear Facilities," October 30, 2001, available at http://www.faa.gov/news/press_releases/news_story.cfm?newsId=5446.
21 "Spent Nuclear Fuel Storage Locations and Inventory," Anthony Andrews, Congressional Research Service, updated 2004.
22 "Safety and Security of Commercial Spent Fuel Storage: Public Report," Committee on the Safety and Security of Commercial Spent Fuel Storage, National Research Council, 2006, available at https://newton.nap.edu/catalog/11263.html#toc.

WEAKNESSES IN NUCLEAR REGULATORY COMMISSION (NRC) OVERSIGHT OFFER TROUBLESOME INDICATIONS THAT THE NRC IS PUTTING THE NUCLEAR INDUSTRY AHEAD OF SAFETY AND PUBLIC CONFIDENCE

- In recent years, the NRC appears to have retreated into a similar pro-industry mindset that was described in the assessment of the March 1979 accident at the Three Mile Island nuclear power plant that was prepared by a Presidential Commission: "We find that the NRC is so preoccupied with the licensing of plants that it has not given primary consideration to overall safety issues. [...] With its present organization, staff and attitudes, the NRC is unable to fulfill its responsibility for providing an acceptable level of safety for nuclear power plants."[23]
- For example, shortcomings in the U.S. nuclear regulatory process were clearly implicated in the 2001 near-accident at the Davis-Besse plant in Ohio. The NRC Inspector General's report on that incident found that there was a clear connection between cost considerations and NRC laxity in the fact that the licensee sought and the NRC staff allowed the Davis-Besse plant to operate without performing important inspections, and that this situation was driven in large part by a desire to lessen the financial impact that would result from an early shutdown.[24] A loss of coolant accident at Davis-Besse might well have eliminated all discussion of a nuclear revival in the U.S.
- NRC surveys have showed that almost half of all NRC employees thought that their careers would suffer if they raised safety concerns and nearly one-third of those who had raised safety concerns felt they had suffered harassment and/or intimidation as a result. [25]
- Streamlined licensing processes for construction and operating permits eviscerate public involvement as a check on laxity in the licensing process.

NUCLEAR POWER WILL NOT REDUCE U.S. DEPENDENCE ON ENERGY SUPPLIES FROM ABROAD

- The U.S. is importing more oil each year – most of it from the world's most unstable regions – increasing our country's economical and political vulnerability and making oil dependency among the largest threats to our economy and national security.
- Increasing reliance on nuclear power will not reduce our nation's dependency on foreign sources of oil – only about 3% of the electricity produced in the U.S. is from petroleum and almost none of that petroleum comes from the Middle East.[26]
- Nuclear power's only substantial contribution to oil displacement in the U.S. comes in regions in which natural gas displaced by nuclear power can penetrate further into oil's share of the markets, such as space heating in New England. [27]
- Indeed, transportation is the sector that accounts for most of U.S. oil consumption – about two-thirds of the country's oil consumption is used by vehicles, which corresponds to roughly 13 millions barrels a day.[28] Thus, possible nuclear power development would not have any influence over these statistics.

23 "Report of the President's Commission on the Accident at Three Mile Island: The Need for Change," October 1979, pages 51, 56.

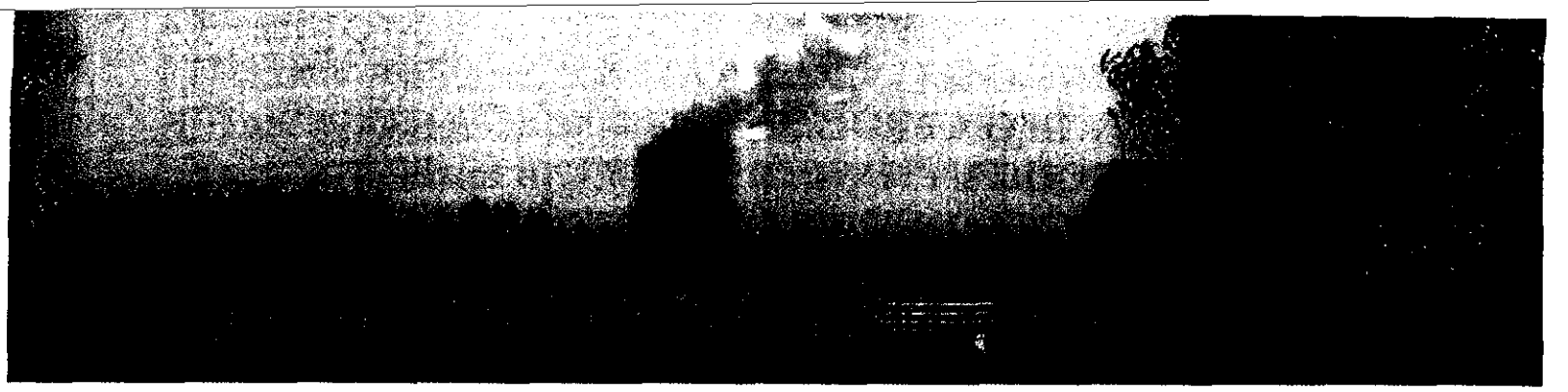
24 "NRC's Regulation of Davis Besse Regarding Damage to the Reactor Vessel Head," NRC Inspector General, Case No. 02-03S, December 30, 2002, at page 23.

25 "Special Evaluation: *OIG 2002 Survey of NRC's Safety Culture and Climate*," Office of the Inspector General, U.S. Nuclear Regulatory Commission, December 11, 2002, OIG-03-A-03; "Audit Report: Review of NRC's Differing Professional View/Differing Professional Opinion Program," Office of the Inspector General, U.S. Nuclear Regulatory Commission, September 26, 2000, OIG-00-A-07.

26 U.S. Energy Information Administration, Electric Power Generation by Fuel Type (2004), available at http://www.eia.doe.gov/fuelelectric.html.

27 "Nuclear Power's Prospects in the Power Markets of the 21st Century," Peter A. Bradford, Nonproliferation Education Center, February 2005, available at: http://www.npec-web.org/Essays/Essay050131%20NPT%20Bradford%20Nuclear%20Powers%20Prospects.pdf.

28 "Peaking of World Oil: Impacts, Mitigation and Risk Management," Hirsch et al, Science Applications International Corporation, Department of Energy, February 2005, available at http://www.netl.doe.gov/publications/others/pdf/Oil_Peaking_NETL.pdf.



PERMANENT STORAGE OF SPENT NUCLEAR FUEL REMAINS UNRESOLVED

One of the riskiest elements of building new nuclear plants is that the long-term disposition of the waste is far from being resolved. The planned Yucca Mountain repository in Nevada is almost 20 years behind schedule and may never open. The projected opening date for this permanent spent fuel repository has been delayed countless times and, according to the Department of Energy, the current target date of 2017 is a "best-achievable schedule."[29]

A plan proposed by the Bush Administration, the Global Nuclear Energy Partnership (GNEP), that would allow the reprocessing of spent nuclear fuel, will face significant technical, legal, and political challenges and cannot be counted on as a realistic solution. Reprocessing results in large amounts of waste still needing disposal, and much of the technology essential to GNEP is unproven and undeveloped. Indeed, similar attempts to reprocess spent fuel in the past have been unsuccessful and the DOE does not have a lifecycle cost analysis for the program.

Interim storage of waste at Idaho National Engineering & Environmental Laboratory

- Reprocessing would be a dangerous shift in U.S. global nonproliferation policy and would increase the likelihood that a terrorist could obtain fissile material to build a nuclear bomb. Moreover, DOE is trying to build momentum for the program before deliberations have been conducted by Congress to determine whether this path is in the best interests of U.S. national and energy security, as well as fiscally sound, even if it should eventually prove technically feasible.
- Reprocessing would increase the number of nuclear waste streams to be managed and secured and is the most polluting part of the nuclear fuel cycle. It would not alleviate the problem of used (spent) fuel storage on reactor sites or the need for a permanent waste repository.[30]
- U.S. taxpayers are still paying several billion dollars each year to clean up contamination from reprocessing programs in the 1960s and 1970s for nuclear weapons at the Hanford Site (WA) and the Savannah River Site (SC), as well as the reprocessing of naval irradiated fuel at the Idaho National Laboratory (ID) and commercial reprocessing at West Valley (NY), which all make this new reprocessing push unlikely and illogical.

29 Statement of Edward F. Sproat, III, Director for the Office of Civilian Radioactive Waste Management, U.S. Department of Energy, Before the Subcommittee on Energy and Air Quality, Committee on Energy and Commerce, U.S. House of Representatives. September 13, 2006, available at http://www.ocrwm.doe.gov/info_library/program_docs/testimonies/SPROAT9-13Testimony_FINAL.pdf.

30 Spent fuel rods must remain in on-site cooling pools for at least five years until they have cooled sufficiently to be transported. Reprocessing waste does not eliminate long-lived radioactive elements that necessitate secure storage for hundreds of thousands of years. GNEP proposes to transmute much of the nuclear waste, but this technology as yet to be proven.

WHAT ABOUT GLOBAL GLOBAL WARMING? BETTER SOLUTIONS EXIST

- Climate change is one of the most pressing threats of our time and it is imperative that we take swift and decisive action to avert its most severe impacts. However, building more nuclear power plants is not the answer.
- The claim that "we need all energy options" to face growing energy needs is disingenuous. On the contrary, we cannot afford all energy options. Further investment in nuclear power would squander the limited financial resources that are available to implement meaningful climate change mitigation policies.
- Nuclear power's role in mitigating climate change (and in reducing oil dependence) is constrained because its impact is limited to the electric sector.

Wind power and other renewables, such as solar and bioenergy, coupled with energy efficiency, conservation and cogeneration are much more cost effective and can be deployed much faster. Building new nuclear power plants will divert private and public investment from the cheaper, readily available options needed to protect our climate. Each dollar invested in electric efficiency in the U.S. displaces nearly seven times as much carbon dioxide as a dollar invested in nuclear power, and nuclear power saves as little as half as much carbon per dollar as wind power and cogeneration.[31]

- Recent studies analyzing the potential of nuclear power to combat global warming have concluded that between 1,000 and 2,000 new nuclear reactors would have to be built around the globe in the next decades to achieve a meaningful impact on CO_2 emissions.[32] These projections point to a clearly infeasible schedule, as new reactors would have to come online every few weeks.
- A 2005 study by Synapse Energy Economics, Inc. showed that the U.S. can substantially reduce global warming pollution through efficiency improvements in power generation. In fact, the report concludes that modest investments in efficiency and renewable energy would reduce global warming pollutants from the electricity sector by 47% by 2025.[33]

IMPACTS OF GLOBAL WARMING INCREASE RISKS OF OPERATING NUCLEAR POWER PLANTS

- Heat waves in the summer of 2006 forced U.S. and European utilities to shut down some reactors and reduce operations at others. Some companies in Europe also had to secure exemptions from regulations in order to discharge overheated water into the environment and others were forced to buy electricity on the spot market.[34]
- Rise in frequency and intensity of catastrophic weather events pose additional risks to nuclear plants' safety because reactors are particularly vulnerable to the effects of flooding, hurricanes, and tornados, as severe storms can disable the on and off-site power systems necessary to operate the plants' safety mechanisms.

31 *"Return of the Nuclear Salesmen: Global Warming* Gives Them a New Sales Pitch," Dave Reed, Rocky Mountain Institute Newsletter, Vol. XVI, #1, Spring 2000, pages 25 and 15, available at http://www.rmi.org/images/other/Newsletter/NLRMIspring20.pdf.

32 "The Future of Nuclear Power - Summary Report," MIT, 2003 and "Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Crisis - Summary," Brice Smith, Institute for Energy and Environmental Research, 2006, at page 6, available at http://www.ieer.org/reports/insurmountablerisks/summary.pdf.

33 "A Responsible Electricity Future: An Efficient, Cleaner and Balanced Scenario for the US Electricity System," Bruce Biewald et al. Synapse Energy Economics, Inc. and National Association of State PIRGS, May 2005, available at http://www.uspirg.org/uploads/w7/0S/w70S27rKo2G0k0LMyQqBNg/AResponsibleElectricityFuture.pdf.

34 *"Nuclear Power's Green Promise Dulled by Rising Temps,"* Susan Sachs, The Christian Science Monitor, August 10, 2006, available at http://www.csmonitor.com/2006/0810/p04s01-woeu.html; and "U.S. Heat Wave Heads to Northeast, May Break Records," update to Bloomberg News, July 31 2006, available at http://www.bloomberg.com/apps/news?pid=20601087&sid=aNtzVaLCaNc8&refer=home.

RENEWABLE ENERGY INVESTMENTS ARE BOOMING WHILE PRICES FOR CONSUMERS KEEP DROPPING

- Worldwide investment in renewable energy capacity was almost $40 billion in 2005. In the U.S., renewable power capacity expanded to 23 GW.[35]
- In 2005, wind energy in the U.S. grew by almost 2,500 MW of installed capacity – a 35% increase in just one year.[36] Total wind-generating capacity in the United States now stands at over 9,000 MW, enough to power more than 2.3 million average American homes.[37]
- Venture capital investment in U.S. based solar companies totaled more than $150 million in 2005 – double the investment from the previous year.[38]
- The International Energy Agency predicts a cost reduction up to 25% for wind power and 50% for solar photovoltaics from 2001 to 2020.[40]
- In the global marketplace, nuclear power is already losing to its faster, cheaper, less financially risky competitors that are NOT centralized power stations.
  - In 2005, micropower (low-carbon fossil-fueled cogeneration, 2/3 of it gas-fired, plus decentralized renewables) added 4 times as much output and 8 times as much capacity as nuclear power.
  - These alternatives have eclipsed nuclear power in both capacity (in 2002) and output (in 2006) .
  - In 2005, micropower provided 32% of the additional global electrical output and was mostly financed by private risk capitol. Thus, investors focusing on actual market behavior must conclude that nuclear power is not preferred.[39]

HOW THE EVOLUTION OF POWER SUPPLY MARKETS AFFECTS NUCLEAR POWER

Assessing the future of nuclear power begins by understanding the past. Nuclear power is a technology force fed into an unsophisticated power supply selection process at a pace too fast for the nuclear industry to assimilate the lessons of operating experience. Moreover, the evolution occurred in ways that concealed or understated the real costs and problems, assuring a series of unpleasant surprises, deepening public mistrust, and, ultimately, reform of the power supply selection processes under which nuclear power had momentarily thrived.

- A real nuclear revival will not exist until private capital is available to build plants, which will require market prices that assure competitive success and profitability. However, even with their ability to compete on the basis of operating costs, the most recent sales of nuclear units have not been at prices that would support the building of a new plant.(41)
- In short, nuclear power's asserted comeback rests not on a newfound competitiveness in power plant construction, but on an old formula: massive government subsidies and licensing shortcuts, and perhaps, guaranteed purchases with risks borne by customers. Climate change has replaced oil dependence as the bogeyman from which supposedly only nuclear power can save us.

35 "Renewables Global Status Report: 2006 Update," Renewable Energy Policy Network for the 21st Century, 2006, at pages 2-5, available at http://www.ren21.net/globalstatusreport/download/RE_GSR_2006_Update.pdf.

36 "U.S. Wind Industry Ends Most Productive Year, Sustained Growth Expected for At Least Next Two Years," American Wind Energy Association, January 24, 2006, available at http://www.awea.org/news/US_Wind_Industry_Ends_Most_Productive_Year_012406.html.

37 "Global Wind 2005 Report," Global Wind Energy Council, 2005, available at http://www.gwec.net/fileadmin/documents/Publications/Global_WindPower_05_Report.pdf.

38 Ibid, page 4.

39 "The Rise of Micropower" Amory Lovins, Rocky Mountain Institute, Updated July 2006, available at www.rmi.org/sitepages/pid171.php#E05-04.

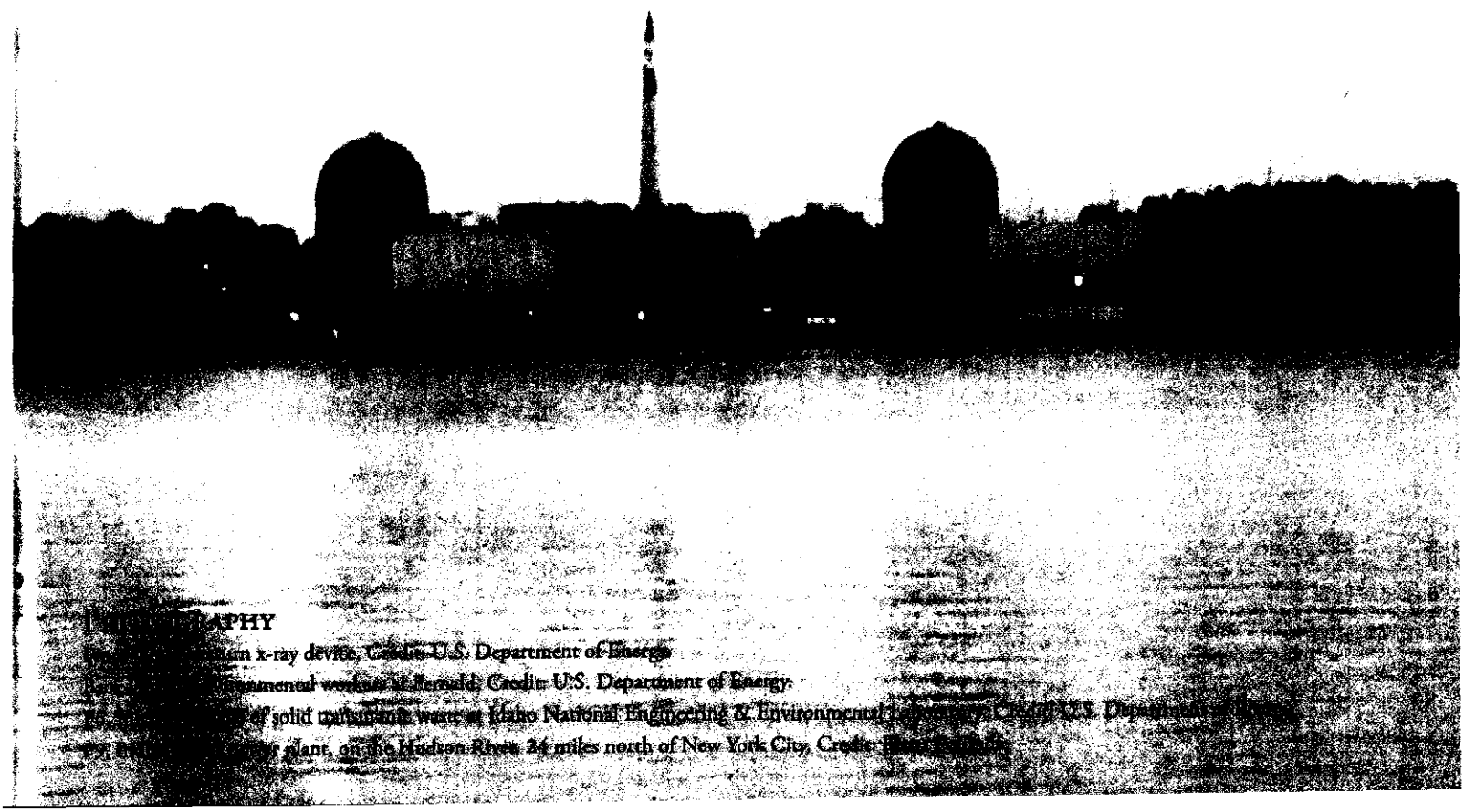
40 "Renewable Energy," International Energy Agency, available at http://www.iea.org/textbase/papers/2002/renewable.pdf.

41 The MIT study, in discussing the 2002 sale of 88% of the Seabrook station, notes that the price "implies that the market value of a fully licensed and operational nuclear power plant with a good performance record is less than half of the most optimistic cost estimates for building a new nuclear power plant....Comparable analyses of other nuclear power plant sales come to very similar conclusions. The market value of nuclear plants is far below their replacement cost, a result that is inconsistent with merchant investment in new nuclear plants." ("The Future of Nuclear Power," Appendix 5, p. 140.)

CONCLUSION

The genesis of nuclear power was the "Atoms for Peace Program" which was intended to make the public more comfortable with the horrifying destruction of the nuclear bomb. Originally, the promise was that the technology would provide energy that would be "too cheap to meter." However, in the last 50 years, nuclear energy subsidies have totaled close to $145 billion and amount to more taxpayer dollars for R&D than for all other energy sectors combined. In fact, nuclear power became the energy that is "too expensive to matter."

A nuclear revival is financially risky. The likelihood of large numbers of new nuclear units being built on the basis of favorable economics is very unlikely. Nuclear power is not competitive today and for nuclear power to succeed it must achieve major cost cuts, avoid even one serious accident, resolve the nuclear waste storage and disposal issue in an enduring way, sever its links to proliferation of nuclear weapons, and get the benefit of its status as a lower carbon-emitting power source. However, even if all of these things occur over the next decade, success will not be guaranteed. Nuclear power may still be more expensive and offset much fewer greenhouse gas emissions than a portfolio of renewable and energy efficiency options.



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[illegible] x-ray device, Credit: U.S. Department of Energy

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[illegible] plant, on the Hudson River, 24 miles north of New York City, Credit: [illegible]

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Nuclear Power Costs: *High and Higher*

BY ARJUN MAKHIJANI, Ph.D.

After the spectacular crash of the 1950s propaganda of nuclear power that would be "too cheap to meter," evidenced in dozens of cancelled nuclear power plants because they were too costly to build or complete, there is a new push for nuclear power in the United States. Some advocates of a nuclear power "renaissance" are basing their appeals on the notion that nuclear power will be an inexpensive way to get new baseload capacity and to combat global warming. Others believe that it may become economical if there is a high enough price on carbon dioxide emissions.

Cost estimates of nuclear power

The principal cost associated with commercial nuclear power is the capital cost of the plant. Operating costs consist of fuel, which is generally low enriched uranium; other operating and maintenance costs constitute a relatively small fraction of the total cost of nuclear power. The costs of spent fuel management and disposal as well as decommissioning costs would be in addition to these two items.

Capital costs of nuclear power consist mainly of two components:

- The "overnight cost" of the power plant – this is the cost that would be incurred if the plant could be built at once.
- Additional costs incurred during construction, notably interest costs.

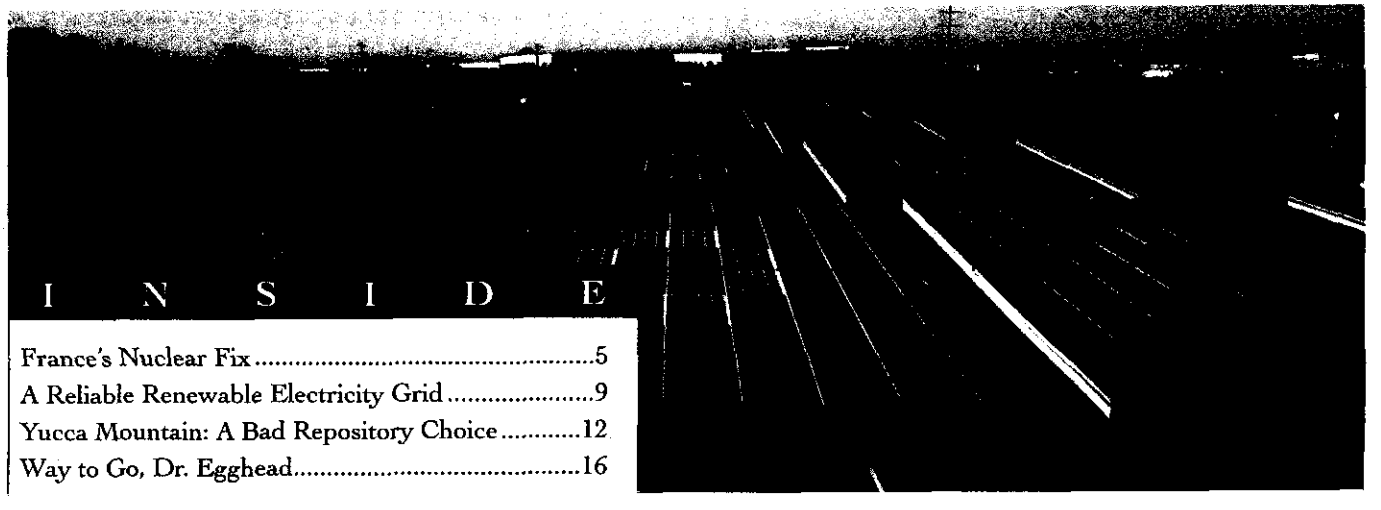
The overnight cost of nuclear power is a matter of some debate. A 2003 MIT report, which advocates building nuclear power plants, estimated it at $2,000 per kilowatt (kW), while a 2004 University of Chicago study estimated it at $1,500 per kW.[1] Current U.S. estimates and actual experience in Western Europe with the European Pressurized Water Reactor are much higher.

For instance, the CEO of Duke Energy, which wants to build nuclear power plants, gave his estimate of the capital cost of $2,500 to $2,600 per kW.[2] Using $2,500 per kW as the starting point, the overnight capital cost contribution to electricity cost alone is over 4 cents per kilowatt-hour (kWh). Interest during construction would add 1 to 2 cents per kWh (depending on borrowing rates, risk premium, and construction time). Fuel costs and other operating and maintenance costs are 1.5 to 2 cents.[3] Adding 0.1 cent per kWh for spent fuel disposal (the current federal charge) and a small charge for decommissioning[4] gives a total cost of about 7 cents to over 8 cents per kWh.

These are costs based on industry figures and the assumptions of those who favor nuclear power. [redacted] as well as those more skeptical of a renewed role for nuclear power. [redacted] Its cost investigation co[redacted] that completed nuclear power pl[redacted] interest during construction, v[redacted] to $4,000 per kilowatt. The resultant cost estimates are shown in Table 1, on the following page, reproduced from Table 6 of the Keystone Center's report.

SEE **NUCLEAR POWER COSTS** ON PAGE 2, ENDNOTES PAGE 4

Solar Grove, San Diego, California. The parking lot of Kyocera's North American headquarters is a 25-panel, 235-kilowatt solar electric generating system that also provides shade for 186 vehicles.



I N S I D E

Table 1: Estimated nuclear electricity costs from new power plants in the United States

Cost Category	Low Case	High Case
Capital Costs	4.6	6.2
Fuel	1.3	1.7
Fixed O&M	1.9	2.7
Variable O&M	0.5	0.5
Total (Levelized Cents/kWH)	**8.3**	**11.1**

Source: Keystone Center

Real world experience is proving to be even more problematic. The only nuclear power plant being constructed in the West that is well along in its construction is a European Pressurized Water Reactor (EPR) being built in Finland by AREVA, the French reactor vendor and reprocessing company. The cost of the reactor, which is rated at 1,600 megawatts, was originally estimated at 3 billion euros, but it has now escalated to 4.5 billion euros. At the present rate of exchange, this amounts to about $4,000 per kW, which is at the high end of the capital cost estimate made by the Keystone Center report. Moreover, the reactor is not yet complete. So far, there has been a two year delay.[5]

Wall Street casts a skeptical eye on nuclear power plants and no company is ready to order one without federal loan guarantees.

Notably, AREVA made a turnkey contract with Finland, agreeing to absorb all costs more than 3.2 billion euros.[6] Since the company is about 85 percent owned by the French government, French taxpayers will pick up most of the cost overrun. Evidently, the hidden hand of the nuclear power industry is to be found in the pocketbooks of taxpayers' or ratepayers, or both.

Wall Street and nukes

No new nuclear power plants have been ordered in the United States since 1978. The last one that was actually completed and put into operation was ordered in October 1973.

The risks of nuclear power are such that Wall Street casts a skeptical eye on nuclear power plants and no company is ready to order one without federal loan guarantees. That is why despite all the talk of a "nuclear renaissance," no company in the United States has as yet ordered a nuclear power plant, though some have applied for various kinds of licenses that will be necessary to build one. The nuclear industry is waiting with a large hat in hand for 100 percent loan guarantees from the federal government, which would lower interest costs.

The Wall Street firm Moody's estimated in October 2007 that the "all-in" capital nuclear costs of new nuclear plants (including interest during construction and upgrades to existing sites with nuclear power plants needed for construction) were being underestimated and that they would likely be in the range of $5,000 to $6,000 per kW. Using the latter figure would increase the Keystone Center report's upper end estimate of nuclear

SEE **NUCLEAR POWER COSTS** ON PAGE 3, ENDNOTES PAGE 4

Science for Democratic Action

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electricity from new plants to about 14 cents per kWh (since the capital cost would increase from 6.2 cents per kWh to about nine cents per kWh).

Views from the industry

Many in the industry, such as the Duke Energy CEO, understand that nuclear power is risky, which is why they are pressing for government loan guarantees. However, some would-be nuclear entrepreneurs are still promoting a retro-1950s fantasy of cheap nuclear power.

For instance, the 2007 Integrated Resource Plan of the western U.S. electricity producer PacifiCorp estimates that a new nuclear power plant can be built for $2,635 per kW, including interest during construction. Using a low effective rate for interest and return on equity, the annual capital charges are estimated at only $210.97 per kW.[7] At an 85 percent capacity factor, this means that the capital cost of nuclear power would amount to only 2.8 cents per kWh in 2006 dollars. This is lower than the MIT study, which was done in 2003 — and costs have escalated for nuclear as well as coal-fired and wind power plants since that time.

PacifiCorp further estimates operating and maintenance costs of about 2.3 cents per kWh, for a total cost of electricity of about 5.1 cents per kWh. Given the trends in costs, this is far lower than any realistic estimate of nuclear electricity, such as that in the Keystone Center study or the actual costs being incurred in the Finnish EPR project. It would be interesting to know if PacifiCorp would stand behind its estimate and provide a turnkey project to, for instance, the State of Utah along the same lines that AREVA provided to Finland — that is, a fixed total installed cost, including all construction and interest costs.[8]

As a more extreme example, Alternate Energy Holdings, Inc., proposes to build the European Pressurized Water Reactor in Owyhee County in southwestern Idaho. In a radio interview on July 30, 2007,[9] the following interchange took place between the host and the company's CEO, Don Gillispie:

> Interviewer: And it's a 3.5 billion dollar plant.
> Mr. Gillispie: Yeah. They're not cheap. New plants produce electricity power very cheaply but they have high capital cost. Normally the capital cost, as you may know, in any investment is not borne by the, it's really borne by the investors pretty much and the lenders, but essentially we can produce electricity between 1 and 2 cents a kilowatt-hour. There is nothing in the United States that can do that. The only thing that comes close to that is hydro. Of course, we're dying on hydro. Hydro's down to six percent of our power source in the U.S.

While part of Mr. Gillispie's statement is realistic — that expanding hydropower significantly is not a viable option — the rest of the exchange is misleading. First, fuel and non-fuel operating costs are very unlikely to be as low as one cent per kWh. The higher estimate of 2 cents would be more typical of current costs, into which the recent run-up in uranium prices has not been factored

uranium prices and shortages of skilled labor, the operating and maintenance costs could well be higher. The Keystone Center report estimated them to be in the range of 3.7 to 4.9 cents per kWh. Even PacifiCorp estimated them at about 2.3 cents per kWh.

Second, while investors and lenders normally provide the capital, they do not do this as a public service or charity. They do it to get a return on investment. Given the risk of nuclear projects, investors would normally demand a premium for investing in them. These costs are included in the electricity rates and must be paid by consumers – that is, the people and businesses in Idaho who would purchase the power and those outside the state who may choose to buy it. These costs, including interest during construction, would be on the order of 4 to 6 cents per kWh, and possibly more.

Alternatives to nuclear

Besides all this, there is the real risk that nuclear power plants will be economically obsolete before they are built. Wind energy is already more economical than nuclear energy. Expansion of wind capacity is taking place rather rapidly, especially in some parts of the United States.

A review of solar photovoltaic (PV) costs in my book *Carbon-Free and Nuclear-Free*, indicates that

costs are likely to be $2,000 per peak kilowatt or less

[10] The U.S. Department of Energy's (DOE)

It has stated that solar energy is "on track to reduce the cost of electricity produced by PV from current levels of $0.18-$0.23 per kWh to $0.05-$0.10 per kWh by 201

— a

Given this prognosis, so

which is the earliest possible date at which a new nuclear power plant could come on line in the United States. Further,

(see photo on page 1),

If such installations supply entire neighborhoods, some distribution costs will be incurred, since investments to upgrade distribution systems will likely be needed. Typically, that cost might be 1 to 2 cents per kWh.

If the delivered cost of solar electricity to the commercial sector is in the 5 to 10 cents per kWh range and if that to the residential sector from intermediate station installations is in the 7 to 12 cents range,

become economically obsolete rather soon, possibly before the first example of the "nuclear renaissance" comes on line.

Nuclear electricity is at least as risky today as it was in the 1970s when a wave of plants was ordered, resulting in dozens of cancelled plants and tens of billions of dollars in

consumers and taxpayers have to bail

nuclear industry again, incurring tens of billions of dollars in additional costs? They already have once in the

SEE **NUCLEAR POWER COSTS** ON PAGE 4, ENDNOTES PAGE 4

form of "stranded costs" in the 1990s when nuclear utilities were deregulated.

This time the stakes are much higher than just money. We have precious little time to waste on pursuing false economic trails, particularly ones that create more nuclear waste and proliferation headaches than we already have. Those who say that nuclear power should "remain on the table" as an option should have the burden of proof, since IEER has already shown that a reliable electricity system can be built without it and without fossil fuels (see accompanying article on page 9).[12]

Endnotes

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8. Peter Bradford, former Nuclear Regulatory Commission member, suggested this as a strategy to officials in Utah during a visit there on November 2, 2007. PacifiCorp's IRP states that it is investigating nuclear power as a "viable option" for the future.
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12. Makhijani 2007, op cit.

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France's Nuclear Fix?

BY ARJUN MAKHIJANI, Ph.D.[1]

The nuclear establishment regularly points to France as the model nuclear energy state. Almost eighty percent of its electricity comes from nuclear power plants. It reprocesses its spent nuclear fuel to recover the plutonium, which it makes into mixed oxide fuel – a mixture of plutonium dioxide and depleted uranium dioxide called MOX fuel. This supplies 30 percent of the fuel for 20 of its 58 reactors.

This "recycling" is held up as the solution to nuclear waste problems — with the implication that France has solved them. All this is supposed to help solve the problem of reducing carbon dioxide emissions (and there is near general agreement that this is a global imperative of considerable urgency). Finally, the French public is said to be more sensible in that they support clean nuclear energy as distinct from the skepticism of the U.S. public.

Let us disentangle the fairy tales from the facts. First the facts from the side of the ledger that the nuclear establishment loves:

1. France does get nearly 80 percent of its electricity from nuclear power.
2. It does reprocess most of its uranium spent fuel at the largest commercial reprocessing facility in the world, located on the Normandy Peninsula at La Hague. France has two reprocessing units there, one for reprocessing domestic spent fuel and the other for foreign spent fuel. The site also stores highly radioactive liquid waste arising from reprocessing and highly radioactive glass logs that result from mixing the high-level liquid waste with molten glass. The volume of these radioactive glass logs is about a third of the volume of the spent fuel that is reprocessed.
3. France imports all of its uranium requirements.
4. MOX fuel generates less than ten percent of France's nuclear electricity.

Now for some of the inconvenient realities.

Pollution from reprocessing

Like every other country that has nuclear power plants, France has a large and complex nuclear waste problem that it is nowhere close to solving. Reprocessing and vitrification do reduce the volume of high-level radioactive waste, but they create other problematic waste streams.

For instance, the La Hague plant uses a pipeline to discharge hundreds of millions of liters of liquid radioactive waste into the English Channel each year, polluting the oceans all the way to the Arctic. This egregious pollution continues on the basis of a disingenuous renaming of liquid waste as "discharges." If the same waste were put into 55-gallon drums and dumped overboard from a ship, it would be illegal under the 1970 London Dumping Convention. But somehow the "discharges" are permitted. Twelve of the fifteen governmental parties to the Oslo-Paris agreement have asked France and Britain, which has two reprocessing plants in Northwestern England, to stop these discharges, to no avail. It is a weak treaty – the abstaining parties, Britain and France, are not required to comply.

Further, [redacted] n, called long-lived intermediate-level waste in France, [redacted]. This is designated for disposal in a deep geologic repository, along with the highly radioactive vitrified waste. French waste data do not allow easy comparison of reprocessing and non-reprocessing waste volumes for repository waste. But it should be noted that [redacted] Table 1 shows the approximate composition of fresh and spent fuel from a pressurized water reactor (the type used in France and also the most common one in the United States).

Table 1: Approximate composition of pressurized water reactor fuel (rounded)

Material	Fresh Fuel (weight percent)	Spent Fuel (weight percent)	Comments
Uranium-235	4	1	Each kilogram of enriched fuel creates about seven kilograms of depleted uranium in the course of enrichment
Uranium-238	96	94	
Plutonium (plus smaller amounts of other transuranic radionuclides)	0	1	Mixture of various isotopes from Pu-238 to Pu-242. Can be used to make nuclear weapons. Predetonation is more likely for bombs made with reactor-grade plutonium than with weapon-grade plutonium.
Fission products	0	4	Fission products contain the vast majority of the radioactivity in the spent fuel.

Note: Trace quantities of U-234 and activation products are not shown. Reproduced from Arjun Makhijani, Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy *(Takoma Park, MD: IEER Press; Muskegon, MI: RDR Books), 2007. On the web at www.ieer.org/carbonfree/.*

SEE **FRANCE'S NUCLEAR FIX?** ON PAGE 6. ENDNOTES PAGE 8

Only about one percent of mass of spent fuel is plutonium. This is the part that is "recycled." This recycled part creates MOX spent fuel which has a degraded isotopic composition of plutonium that is more complex to reprocess and more difficult to use in light water reactors. Eventually MOX spent fuel will likely be disposed of in a deep geological repository along with the vitrified waste and transuranic waste.

[redacted] and depleted uranium waste

Ninety-five percent of the mass of spent fuel is uranium, almost all of it uranium-238, which is not a fissile material. This uranium is contaminated with traces of fission products, plutonium, and other radioactive materials. In theory it can be re-enriched and used as a fuel, but since it is contaminated it [redacted] enrichment of uranium more complex and costly.

For starters, the equipment for uranium processing and enrichment gets contaminated with these materials, which are [redacted] more radioactive per unit mass than natural or low-enriched uranium. France conveniently sends this contaminated uranium to Russia,[3] which apparently does not mind contaminating its enrichment plants. It should be noted that the U.S. compensation program for nuclear weapons workers exposed to radiation was triggered in large measure by the revelations that the Paducah enrichment plant in Kentucky had been contaminated with plutonium[4] and other transuranic radionuclides and that these materials may have contributed significantly to worker radiation exposure.[5]

Even if the contamination of the enrichment plants is accepted, the vast majority of the uranium, which is non-fissile uranium-238, would have to be disposed of as a waste. Proponents of nuclear power since the 1950s have dreamed that uranium-238 would be converted to fuel in "breeder reactors" which would use plutonium as a fuel, but make even more from uranium-238 – an energy system that was described as a "magical" energy source for that reason by Alvin Weinberg, the first director of Oak Ridge National Laboratory.

But despite $100 billion of expenditures (1996 dollars) worldwide, the combination of reprocessing and breeder reactors has never been commercialized.[6] In fact breeder reactors have operated so erratically – some well, some poorly – that there is no realistic prospect of significant use of commercial breeders for decades. So far as reprocessing is concerned, France, which operates the most efficient of the world's commercial reprocessing plants, spends about two cents more for every kilowatt-hour generated from MOX fuel, compared to uranium fuel.

Reprocessed uranium would add to the vast amounts of depleted uranium that has been generated as a result of enriching uranium for reactor fuel [redacted] France has not solved either problem. In recent years, there have been calls for disposing of depleted uranium as a Class A low-level radioactive waste in shallow land burial, even though such disposal would create long-term radiation doses greatly in excess of present-day radiation protection standards.[7] Disposal of reprocessing-derived uranium would be even worse, because it has a greater radioactivity per unit mass.

When radioactivity and biological impacts are taken into account, [redacted] would have to be disposed of in a deep geologic repository, as transuranic waste. This would add to the burdens of waste disposal that have not yet been solved by any country.

Deep geologic repository

Finally, F[redacted] need a deep geologic repository for [redacted] transuranic waste. [redacted] repository program has faced public opposition [redacted] For instance, France, like the United States, had planned to characterize two different repository rocks, including one in granite. When the names of the possible granite sites were announced, [redacted] in 2000.[8] [redacted] granite sites were abandoned [redacted] An earlier attempt to characterize a repository had to be abandoned in the face of militant opposition from farmers who raised gourmet chickens ("poulets de Bresse") in the region.[9]

Like the United States, France is characterizing just one repository, which continues to face significant technical and political issues.

Accident and security risks

France is rightly proud of its culinary and viticultural traditions. As noted above, a part of the militant opposition to a nuclear waste repository was motivated by farmers who supply gourmet chickens designed to please particular Parisian palates. Yet, little attention has been given as to what would happen if there were to be a severe accident releasing large amounts of radioactivity, of the same order of magnitude as Chernobyl. Such an accident is less probable in France. Its reactors are of a different design, for one thing. Yet, while the mechanisms would be different and the probability is likely lower, the occurrence of such an accident would irreparably harm the finest traditions of the country. When I debated a French proponent of nuclear power in Paris in the 1990s and pointed this out, much of the audience was shocked at this realization.

Despite a larger use of plutonium fuel than any other country, [redacted] a huge stock of surplus plutonium. As of 2005, 81 metric tons of plutonium were stockpiled at La Hague, of which about 51 metric tons belonged to France.[10] [redacted] does not have much scope to expand its plutonium fuel [redacted], since only eight more reactors (for a total of 28) are suitable for using MOX fuel up to 30 percent in the reactor core. The plutonium is stored in the form of thousands of [redacted]. There is a risk of terrorist attacks either on the plutonium stocks or on the liquid high level waste tanks.

There are also proliferation risks, the most notable of which relates to Japan. France reprocesses Japanese spent fuel and has helped Japan to build and commission a large commercial reprocessing plant, Rokkasho-mura.[11] [redacted]

SEE **FRANCE'S NUCLEAR FIX?** ON PAGE 7, ENDNOTES PAGE 8

has had ambitions to use MOX fuel in its reactors for many years, but to date has not yet used any due to a host of problems. Its breeder reactor program has also been plagued with difficulties, including a sodium fire at its Monju demonstration plant in 1995.

The temptation to weaponize stocks of surplus plutonium separated in commercial reprocessing plants was most dramatically expressed when Ichiro Ozawa, the leader of Japan's Labor Party, opined in 2002 that Japan could use its commercial nuclear assets to make thousands of nuclear weapons if China got too powerful and "inflated."[12]

Overall, the security problem of surplus plutonium continues to mount. There were about 250 metric tons of surplus commercial separated plutonium around the world in 2005, with the British stock being even larger than the French – at 107 metric tons. [redacted] continues to reprocess though it does not have even a single reactor that is using MOX fuel. One of its two reprocessing plants suffered a large [redacted] and has been closed for two years.

The [redacted] Fact-Finding (NJFF), which included nuclear industry representatives, had some rather stark cautions about reprocessing risks and about the promotion of [redacted] Global Nuclear Energy Partnership (GNEP):

While the NJFF agrees with several premises of the GNEP, the program is not a [redacted] problem of the weapons proliferation problem. The NJFF group agrees with the following proliferation concerns that GNEP attempts to address:

- [redacted] regardless of the source, [redacted] used in nuclear explosives and must be controlled.
- [redacted] Widespread use of mixed-oxide fuel by both weapons states and non-weapons states is similarly troublesome.
- Even in the weapons states, plutonium must be protected [redacted] stocks of plutonium in separated [redacted]

The NJFF participants believe that critical elements of the GNEP are unlikely to succeed because:

- GNEP requires the deployment of commercial scale reprocessing plants, and a [redacted] commercial reactor fleets would have to be fast reactors.
- [redacted]
- [redacted] light-water reactors.

Although it is not its aim, the GNEP program could [redacted] the development of hot cells and reprocessing R&D centers in non-weapons states, as well as the training of cadres of experts in plutonium chemistry and metallurgy, all of which could [redacted] proliferation risk.[13]

French nuclear decision-making

France made the decision to go massively for nuclear power in 1973, when the oil crisis pointed up the vulnerability of its electricity system, which used oil for nearly 40 percent of its generation. While nuclear power allowed France to essentially eliminate oil from its electricity sector (it has been around two percent in recent years), there was not much open debate about the merits of heavy reliance on nuclear. The opposition to nuclear power was largely overridden with rhetoric of energy independence. But in fact France imports all of its uranium – only the nine percent or so of its nuclear electricity that is derived from plutonium can reasonably be described as using domestic fuel. And it is as dependent as ever on oil imports because of the rising use in the transportation sector.

France's less than adequate public checks on the massive nuclear expansion was made much easier by the fact that it had just one electric utility, Electricité de France (EdF), that was 100 percent government-owned. Even today EdF is over 80 percent government-owned. Cogéma, the reprocessing company, was also 100 percent government-owned. Today it is part of the conglomerate AREVA, which is more than 80 percent French government-owned.

Conclusions

The French model of imposing added costs on its ratepayers and taxpayers, of polluting the oceans in the face of protests from neighboring governments, and of accumulating vast amounts of domestic and foreign surplus plutonium hardly seems like a model for the United States [redacted]. As noted in the accompanying articles, there is a reasonable, clear path to a renewable energy-based electricity sector that does not involve the headaches and risks of nuclear power, which is, moreover, expensive. There is not a shortage of low to zero-CO_2 energy sources. There are two limitations that are much more critical:

- The amount of time we have to address the problem of drastically reducing CO_2 emissions is small and shrinking.
- The amount of money is limited, so it should be applied where it will do the most good in the shortest period of time.

Nuclear plants will take many years to build. As noted in the article on nuclear power plant costs (page 1), there is a [redacted] if public policies would be designed to [redacted] instead of nuclear power.

France fixed the problem of its dependence on oil for electricity generation by going massively nuclear, but in doing so, it opened a whole other can of worms. Following in France's nuclear footsteps is not nearly as appetizing as the nuclear proponents have made it out to be. [redacted] to today's energy crisis. 54 percent are now opposed to investing 3 billion euros in the construction of a new reactor, while 8[redacted] renewable energy.[14] [redacted] for themselves proportionally than the United States.

SEE **FRANCE'S NUCLEAR FIX?** ENDNOTES ON PAGE 8

Endnotes

1. IEER's website has a considerable number of materials relating to nuclear power in France. Under Publications, see "Low Carbon Diet without Nukes in France," "Cogéma: Above the Law", and "Plutonium End Game." Under ***Science for Democratic Action***, see Vol. 9, No. 2; Vol. 13, No. 4; and Vol. 14, No. 2.
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14. www.actu-environnement.com/ae/news/1872.php4

A Reliable Renewable Electricity Grid in the United States

BY ARJUN MAKHIJANI, Ph.D.[1]

Can an electricity grid consisting entirely of renewable energy sources be made at least as reliable as the one we have today in the United States? A lack of a clear answer to this question has, until now, persuaded many thoughtful people that nuclear power should be "left on the table" as we phase out the use of fossil fuels, especially coal, to generate electricity due to climate change concerns.

Today, coal is the fuel for about half of U.S. electricity consumption. Nuclear and natural gas fuel about 19 percent each. Almost all the rest comes from hydropower, geothermal and wood waste. Wind and solar contribute less than one percent, almost all of it from the former. Electricity generation is overwhelmingly centralized, with about 95 percent of it being generated in large power plants.

There is no question that the resources exist for a transition to a full renewable electricity sector. Just the land-based wind power resources of the top 20 states are about two-and-a-half times the entire U.S. electricity generation. They are roughly equivalent in thermodynamic terms to all of the oil output of OPEC (Organization of Petroleum Exporting Countries) combined. There are additional wind energy resources offshore. Solar energy resources on just one percent of the land area of the United States, converted to electricity at 20 percent efficiency, are three times larger than wind.

Until recently, economics has been a central problem with renewable energy compared to fossil fuels. But this does not take into account the costs of emitting CO_2, which is creating severe disruption of the Earth's climate. And for well over a decade, wind-generated electricity has been as economical as nuclear, though not as economical as coal without any cost attached to CO_2 emissions.

As noted in the accompanying article on nuclear power cost on page 1, solar photovoltaic electricity costs are declining rapidly, while nuclear electricity cost estimates are rising. Intermediate-scale and large solar PV (photovoltaic) costs are about the same as the cost of electricity generated at peak times using single-stage natural gas turbines. Solar PV costs are expected to decline to 10 cents per kWh or less in about a decade.

Further, solar thermal power plants are now beginning to be deployed on a large-scale after a hiatus of about two decades.[2] For instance, PG&E, a large Northern California utility has agreed to purchase 553 megawatts of power from a solar thermal power plant to be built in the desert areas of Southern California. It plans to expand its solar thermal power purchases to 1,000 MW by 2020, under a state mandate.[3]

Intermittency

The main issue with wind and solar is intermittency. Solar energy is by definition a daytime source, and its availability varies by season, the more so at northern latitudes. Wind energy is also intermittent; it can vary greatly from one hour to the next and from day to day, in addition to having seasonal patterns. But intermittency is not an obstacle to achieving a reliable renewable electricity sector if renewables are added to the grid in a planned manner, with due attention to geographic and other factors as well as to standby capacity.

At present, about 0.7 percent of U.S. electricity supply comes from wind and solar energy, almost all of it from wind. Increasing wind energy to 10 percent of electricity generation or more while maintaining reliability has been shown to be feasible in Europe, as for instance in Denmark, which gets about 20 percent of its electricity from wind. Increasing wind-generated electricity beyond a few percent requires additions to standby capacity in order to maintain the reliability of the electricity system.

Development of wind resources in a manner that takes advantage of the large areas over which the resource is available provides a great advantage in that it reduces the time during which aggregate generation from wind energy is low. Studies have found that the costs of wind energy integration into the grid can be kept modest or small up to fairly high levels of penetration if geographic diversity is taken systematically into account as one design factor in the utilization of the resource.

For instance, a study commissioned by the Minnesota state legislature found that the ability to forecast available wind resources was considerably improved when the geographic diversity of the wind generation was increased. Dispersing wind turbines not only reduces the time during which no or low wind energy is available, it also improves the reliability of forecasting upon which reserve capacity requirements are based. One conclusion was that the *reserve requirements for Minnesota's electricity system* would increase from 5 percent with no wind generation to just over 7 percent with 25 percent of the generation coming from wind. This is a rather modest cost. There is ample reserve capacity in the U.S. electricity system to meet such additional reserve requirements.

A new study done at Stanford University came to the even stronger conclusions. It examined wind farms spread over a five state area — New Mexico, Colorado, Kansas, Oklahoma, and Texas:

> It was found that an average of 33% and a maximum of 47% of yearly-averaged wind power from interconnected farms can be used as reliable, baseload electric power. Equally significant, interconnecting multiple wind farms to a common point, then connecting that point to a far-away city can allow the long-distance portion of transmission capacity to be reduced, for example, by 20% with only a 1.6% loss of energy.

The fraction of reliable capacity can also be increased by coordinating additions to capacity with solar energy. Wind often blows at night, making it very advantageous to join

SEE **A RELIABLE RENEWABLE ELECTRICITY GRID** ON PAGE 10. ENDNOTES PAGE 11

FROM PAGE 9

wind and solar development in a way that would reduce costs for the same reliability.

Overall reliability planning

Whatever approach is chosen for future electricity development, planning at various levels – local, state, regional, and federal – is essential for maintaining reliability, not to speak of improving it.

Wind and solar can and should be coordinated with hydropower and natural gas standby. At prices in excess of $6.50 per million Btu of natural gas, as at present, it is economical to use natural gas as a standby for wind power. As solar PV costs decline to the level of about 10 cents per kWh (that is by about 50 percent from the present level of about 20 cents per kWh), natural gas standby can also be economically used for solar electricity. No additional natural gas capacity is needed, since a large surplus of natural gas capacity already exists in the country. Electric utility and independent generator natural gas capacity utilization was under 19 percent in 2006. This is because a huge amount of natural gas capacity was built in the 1990s and the first years of the present decade under the assumption that natural gas prices would remain low. But they have not. This economic error provides a great opportunity to both minimize the use of natural gas and rapidly increasing the fraction of solar and wind energy in the electricity system and maintaining the overall reliability of the system. This conclusion needs to be translated into specifics for the development of renewable energy in each grid that is operated in the United States, and overall for the three grid regions in the lower 48 states – the Eastern Interconnect, the Western Interconnect, and the Texas grid known as ERCOT (Electric Reliability Council of Texas).

With appropriate planning and policies regarding efficiency, reserve capacity requirements, coordination of solar and wind development to increase reliability, there should be no problem in increasing the proportion of renewables plus combined heat and power from about 5 percent at present to about 40 percent by 2030 (not including hydropower). A faster transition is also possible, given the right coordination and policies.

Beyond 15 to 20 years, significant storage capacity and some baseload capacity that operates on energy sources that are under the operator's control would be required to fully replace coal and nuclear. It is possible that the need for such capacity could be minimized through building a "smart grid" so that certain appliances in homes and businesses operate when there is renewable electricity available. But whatever the approach, reliability will require significant energy storage and baseload components.

The first thing to note is that there are fifteen to twenty years to develop and deploy such technologies on a significant scale. Sources of baseload or quasi-baseload capacity include:

- Solid biomass, such as dried algae or high productivity aquatic plants
- Hot rock geothermal energy
- Solar thermal power plants with 12-hour energy storage

Combined heat and power, hydropower, and standby combined cycle plants operated using biogas would provide additional elements of reliability and flexibility.

There are a number of energy storage technologies that could be used, including:

- Compressed air storage in underground caverns
- Advanced stationary batteries
- Batteries in electric cars and/or plug-in hybrids that would be connected to the grid when the cars are parked – a system known as "vehicle to grid" (V2G) technology. V2G can be combined with intermediate and small-scale solar PV development. Google has begun exploration of this concept in collaboration with PG&E.

Compressed air storage has already been demonstrated. Stationary batteries suitable for storage, notably sodium sulfur batteries, have been developed. Tokyo Electric Power and American Electric Power inaugurated the first U.S. sodium sulfur battery demonstration project in Columbus, Ohio, in September 2007.[4] The batteries have also been tested in Japan.

If public policy puts a suitably strong emphasis on plug-in hybrids and electric cars in the coming decade, there is every prospect that one or more electricity storage technologies will be commercialized as part of electric vehicle development. Electric cars or plug-in hybrids would make electricity storage even cheaper than stationary batteries, provided the batteries can be charged or discharged more times than is needed for the operation of the vehicle over the typical vehicle life of about ten years. Altairnano, a Reno, Nevada, company has already made lithium ion batteries that meet this test. They are being installed into an all-electric pickup truck by Phoenix Motorcars, Inc. in 2007. Such batteries are still too expensive, partly due to the newness of the technology and partly due to the small scale of manufacture.

A V2G system would be especially attractive as a form of electricity storage. Vehicles have a much larger installed power than the U.S. electricity system and, moreover, they are not in use over 90 percent of the time. A few percent of the vehicles plugged into the grid at any time and under the control of the grid operator could supply the electricity storage and power needed to maintain a reliable electricity grid.

Figure 1 shows one possible transition from the present fossil fuel and nuclear-dominated, centralized electricity sector to a distributed grid operating fully on renewable energy. Note that electricity demand remains about constant even as electric cars are introduced because homes and commercial buildings would be much more efficient. The inefficiency of present day buildings and the equipment in them is very great. Incandescent lamps, the most common kind, convert only about 3 percent of the electricity into visible light. Compact fluorescent lamps are three to four times as efficient. Light emitting diodes are

SEE A RELIABLE RENEWABLE ELECTRICITY GRID ON PAGE 11, ENDNOTES PAGE 11

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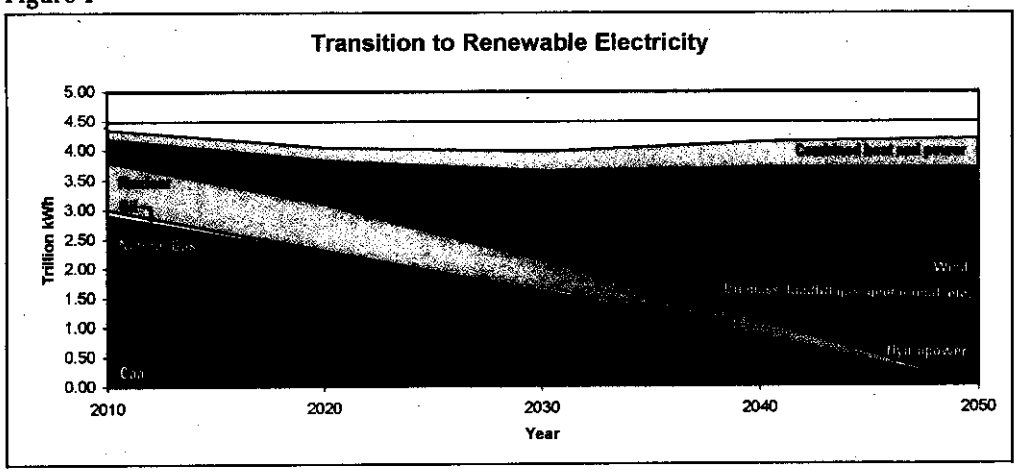
Figure 1



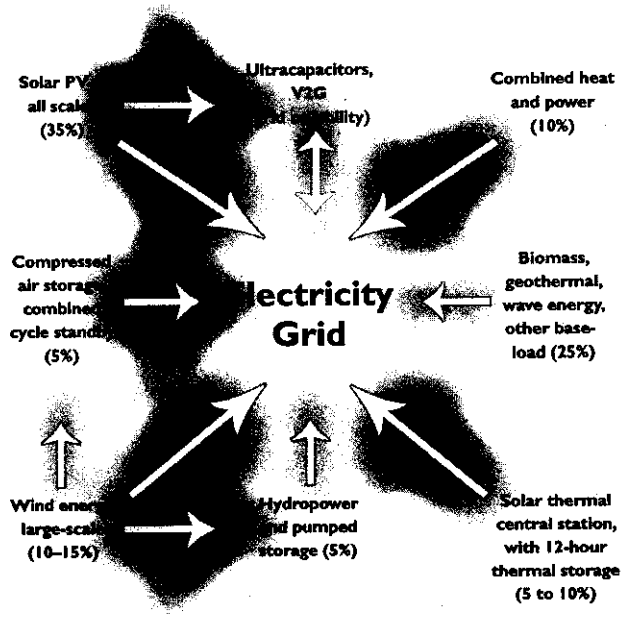
Source: IEER

more efficient than that. New lighting technologies, such as optical fibers that combine sunlight and electrical light sources to maintain constant interior lighting, are in the process of being commercialized. Similar opportunities exist in other areas of electricity use.

With a reasonable approach to efficiency and appropriate policies to coordinate the development of renewable energy sources and investments in energy storage technologies, a completely renewable electricity grid is not only technically feasible, it is the most desirable from an ecological and health standpoint. The overall cost of electricity services would remain about the same proportion of GDP as today. But there would be greater investment in efficiency relative to new generation than is typical at present.

Figure 2 shows a schematic of a fully renewable electricity grid. It is being republished here for convenience (it was also published in SDA Vol. 15, No. 1).

Figure 2



Source: IEER

A distributed grid, such as that shown in Figure 2, would be at least as reliable and far more secure that the present centralized grid. For instance, if events similar to the ones that have led to major blackouts in the past (New York 1965, Eastern United States 2003) were to occur, the whole system would not go down – local electricity sources and storage devices would still be supplying a significant fraction of the requirements. Further, a terrorist attack on one or more critical points of the transmission infrastructure would also not disrupt the entire system. By virtue of greatly reducing the impact of such an attack, the electricity system would be much less likely to be attacked.

Conclusion

There are many who have claimed that nuclear power "should be on the table" because a reliable electricity grid will require it. But this assertion has not been accompanied by any rigorous analysis to show that new nuclear power plants are actually needed. This analysis shows that neither coal nor nuclear power is needed for a reliable and secure electricity system, though it will likely take three to four decades to accomplish a complete transition to a renewable electricity system. Such a transition needs to be carefully carried out with due attention to efficiency, diversity of renewable supply, standby capacity, and storage, with the last being important at high levels of penetration. The bottom-line is clear: coal and nuclear can and should be phased out from the electricity sector simultaneously.

Endnotes

1. This article is based on Arjun Makhijani, *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy*, IEER Press and RDR Press, 2007, unless otherwise stated, especially the wind and solar energy sections in Chapter 3 and Chapter 5. References can be found there.
2. Several hundred megawatts of solar thermal power plants were built in California in the 1980s.
3. David R. Baker, "PG&E Embraces Solar Thermal Power Technology," *San Francisco Chronicle*, November 5, 2007, on the web at www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2007/11/05/BUBTT5KM2.DTL.
4. "AEP dedicates first U.S. use of stationary sodium sulfur battery," September 23, 2007, on the web at www.aep.com/newsroom/newsreleases/default.asp?dbcommand=displayrelease&ID=956, viewed on December 2, 2007.

Yucca Mountain, Nevada: *A Bad Repository Choice*

BY ARJUN MAKHIJANI, Ph.D.[1]

The nuclear industry has been quick to proclaim that a "nuclear renaissance" is occurring, or is at least in the offing, though not a single new reactor has been ordered at the time of this writing (mid-November 2007).

The industry has been correspondingly slow to say what will happen to all the spent fuel that will be generated by these new power plants, though the general assumption is that the government will take it away from reactor sites and do something with it – store it at its own sites (such as Savannah River Site in South Carolina), reprocess it (a variety of sites have been proposed), or put it in the proposed deep geologic repository at Yucca Mountain, Nevada.

Storage and reprocessing do not obviate the need for a repository; therefore the availability of Yucca Mountain (and/or some other yet-to-be-named repository) remains a consistent underlying theme of the much-vaunted "nuclear renaissance."

Yet, Yucca Mountain is in deep trouble (so to speak) for very good reasons. Though I have written a rather large volume of words on the topic,[2] it may serve as a useful reminder in the current context to summarize why Yucca Mountain is an unsound repository location. Indeed, in my opinion, it is the worst repository site that has been investigated in the United States. I will focus on the problems of Yucca Mountain in relation to some important criteria by which a sound repository program can be judged.

Repository standards and future radiation doses

Maximum estimated radiation doses to future generations at the time of peak dose should be within the general limits that we set for protecting our own generation. If they are expected to be much higher, then the repository will not meet the test of inter-generational equity. Yucca Mountain fails this test miserably.

Peak doses to the most exposed people are expected to be much higher than the current norms of 10 to 25 millirem per year incorporated in U.S. Environmental Protection Agency (EPA) radiation protection standards relating to nuclear facilities. Table 1 shows the various risks associated with the proposed EPA standard and with the peak doses (median and 95th percentile) estimated by the U.S. Department of Energy (DOE) in its 2002 Environmental Impact Statement.

The EPA's draft standard would limit radiation dose to 15 millirem per year for the first 10,000 years. Beyond that, it would allow half the affected people to get more than 350 millirem per year and half less. This is far in excess of present-day radiation protection norms for the general public. The average population fatal cancer risk (males and females combined) at 350 millirem per year over a lifetime is about 1 in 71, which is over 20 times the risk of a 15 millirem per year limit and over a hundred times greater than EPA's general goal of limiting lifetime fatal cancer risk to 1 in 10,000.

The draft EPA standard would allow five out of every hundred people to get radiation doses of 2,000 millirem per year or more. *At this level, the lifetime fatal cancer risk for females (over a 70-year exposure period) would be about 1 in 10. The corresponding cancer incidence risk would be 1 in 5. These last numbers are not much different than the risk of shooting oneself while playing Russian roulette – except here the present generation would be forcing it on those far in the future who had no part in our decisions.*

The Department of Energy (DOE) made its own estimates in its Final Environmental Impact Statement on Yucca Mountain. The DOE estimated that the 95th

Table 1: Projected radiation doses and cancer risks -- Yucca Mountain
Using draft EPA standard and DOE estimated peak dose estimates

	Draft EPA standard			DOE peak dose estimates (see note)	
	First 10,000 years	Median after 10,000 years	95th percentile value after 10,000 years	Median value	95th percentile value
Annual exposure, effective dose equivalent, millirem/year	15	350	2,000	140	600
Lifetime dose over 70 years, millirem	1,050	24,500	140,000	9,800	42,000
Average lifetime fatal cancer risk (males and females), expressed as 1 fatality among XXX exposed	1,656	71	12	177	41
Lifetime fatal cancer risk for females, expressed as 1 fatality among XXX exposed	1,394	60	10	149	35

Note: The DOE estimates that there will be many peaks of doses due to future climatic variations. These figures represent the largest estimated values of the peak dose. They are estimated to occur hundreds of thousands of years from the present.

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percentile of the peak dose would be about 600 millirem (see Figure 1). The lifetime fatal cancer risk to females from this dose would be about 1 in 35 (rounded). The "95th percentile" part of this means that five percent of women exposed to Yucca Mountain pollution at that time would be at greater risk than 1 in 35, while 95 percent would be at lower risk. Cancer incidence risk would be about double this value or about 1 in 17 (rounded).

EPA draft standard vs. DOE peak dose estimate

The U.S. Environmental Protection Agency is responsible for setting a limit for how much radiation the public can be exposed to by the proposed nuclear waste repository at Yucca Mountain. The EPA's draft standard would limit radiation dose to 15 millirem per year for the first 10,000 years. Beyond that, it would allow half the affected people to get more than 350 millirem per year and half less. A final standard has not been issued as of this writing (late November 2007).

In a federally-mandated environmental impact statement, the U.S. Department of Energy made projections for future radiation doses from the Yucca Mountain repository. The DOE estimated that median peak dose would be approximately 140 millirem per year and would occur roughly 400,000 to 500,000 years after repository closure.

Figure 1. Mean and 95th-percentile doses from Yucca Mountain spent fuel disposal estimated by the DOE

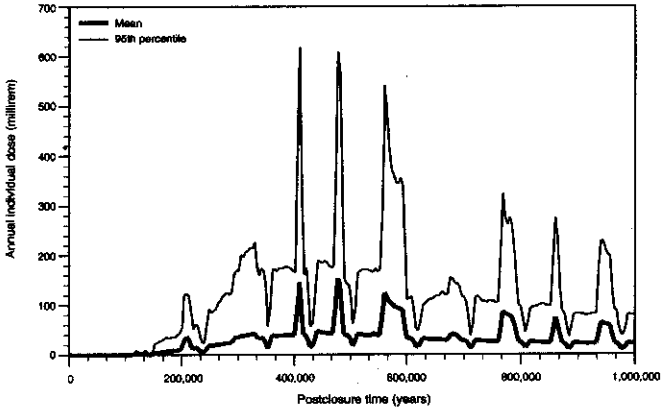
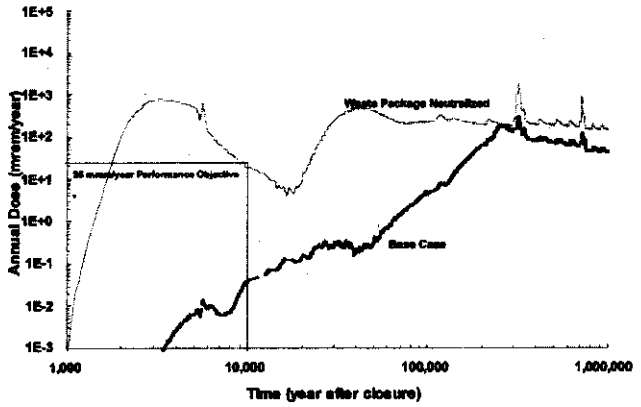


Figure 1 taken from page 5-26 of Volume 1 of the Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, February 2002. On the Web at http://www.eh.doe.gov/nepa/eis/eis0250/eis0250index.html.

Characteristics of the Yucca Mountain geologic setting

A minimum requirement of the geologic setting should be that, when the containers fail and begin to leak (and it is a question of when not if), the geology of the repository should be conducive to retarding the movement of the radioactive materials and to preventing most of them from reaching groundwater or surface water. Materials produced by the DOE for the Nuclear Waste Technical Review Board show that the Yucca Mountain rock is practically useless in holding back radioactive materials. Almost the entire functioning of the repository depends on the engineered barriers, mainly the metal containers. Unless they function as predicted by the DOE, Yucca Mountain will not meet the draft EPA standard even for the first ten thousand years. And since these containers will eventually rust, all calculations show that the peak dose will greatly exceed EPA's norms for radiation protection today.[3]

Figure 2: DOE Estimates of Yucca Mountain Total System Performance ("Base Case") and Performance without the Waste Package ("Waste Package Neutralized")



Note on y-axis figures: "1E-3" signifies 10^{-3} which also can be written 0.001. Similarly, 1E+5 = 10^{+5} = 100,000 and 1E+0 = 10^{0} = 1.

The graph in Figure 2 was prepared in 1999 by the DOE for the Nuclear Waste Technical Review Board (NWTRB), an advisory board created by Congress to oversee the Yucca Mountain Project. The Board had requested that the DOE evaluate each element in the geologic isolation system for its contribution to overall performance in meeting the then-assumed limit of 25 millirem per year for the first 10,000 years of repository operation. (No dose limit was proposed beyond that time. Later, a federal court invalidated the standard first proposed by EPA mainly because it too did not look beyond 10,000 years.

The DOE graph, supplied to the NWTRB as part of its request, shows that if the entire system were in place and performed as modeled, the dose limit of 25 millirem would be met rather easily for the first 10,000 years, though it would eventually be exceeded by a considerable margin at 100,000-plus years after repository closure. However, it shows that if the "waste package," which consists primarily of a huge metal container made of a special nickel-based alloy called C-22, degrades quickly (in hundreds of years or a few thousand years), the peak dose would rapidly increase to nearly 1,000 millirem well within 10,000 years, which is greatly in excess of any standard that has been proposed for that time period.

The waste package

As a result of the above, the reliability of the DOE estimate of the performance of the metal containers

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becomes critical to the performance of the repository. If the containers do not perform as estimated in the DOE's "base case" or close to it, the repository will be a terrible failure. As a result, a high confidence in the performance of these containers is essential. However, current knowledge does not admit such confidence. On contrary, basic as well as Yucca Mountain-specific considerations indicate that the waste package may degrade rather rapidly.

DOE's silver-bullet container may turn out to be a dud.

The Yucca Mountain geologic environment is oxidizing; it also has some humidity. The waste will be hot for an extended period and it will heat the surrounding materials and rock. This combination of heat, humidity, and oxygen is a recipe for rust. The rate of rusting in such an environment is a matter of some debate. The containers could, under some circumstances, corrode much faster than 10,000 years. Indeed, in some circumstances the containers may corrode in decades. Further, the metal alloy proposed for the containers is new – there is no long-term experience with its performance. As a result, there is a real possibility that DOE's silver-bullet container may turn out to be a dud. Since the repository location itself is not protective, a failure of the containers would lead to serious pollution of the groundwater and render it useless in an area where water is very scarce.

Since there is a large and growing amount of spent fuel to be disposed of, jamming a large amount of it into Yucca Mountain is a temptation. However, this would result in high temperatures in the repository conducive to rapid corrosion.[4] The DOE has so far refused to specify a repository design, though such a specification is an essential part of a minimally complete license application. The license application was due in 2002 and has not yet been filed. The DOE has stated that it will be filed in mid-2008.

Reliance on a single element of a complex system as the only guarantee of performance is risky under the best of circumstances. For instance, commercial passenger aircraft that have two engines are required to be able to operate in emergencies on only one, even though there is vast experience with jet engine reliability and performance. Redundancy is even more essential in a system of an unprecedented nature whose performance is very difficult to estimate under the best of circumstances due to the long times involved.

Redundancy in repository design means that if the containers fail, the rock should adsorb the radionuclides and prevent or greatly retard their migration into groundwater. By this criterion, Yucca Mountain is a near-total failure, since the performance of all waste isolation components taken together but without the waste package does not amount even to the proverbial hill of beans. That is the central message of Figure 2. The waste could be put in almost any geologic location with equal or better performance, since the performance of the Yucca Mountain host rock is next to nil. This is shown in Figures 3 and 4, also taken from the set produced by the DOE for the NWTRB.

Figure 3 shows that if the rocks surrounding the waste disposal zone ("unsaturated transport barrier") were removed, but the waste package performed as estimated in the "base case," there would be essentially no change in the performance of the system. In other words, the volcanic tuff at Yucca Mountain is practically useless in holding back the radionuclides once the waste package fails. Figure 4 shows that the same is true of the saturated zone. That is, once the waste reaches the groundwater, there will be no mechanism that would significantly reduce dose.

Figure 3: Unsaturated Yucca Mountain Transport Barrier Removed

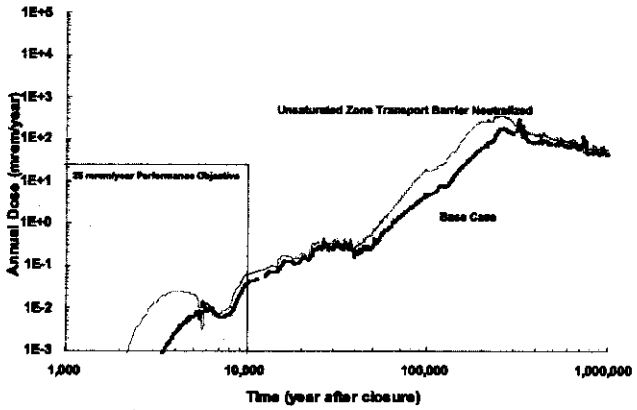
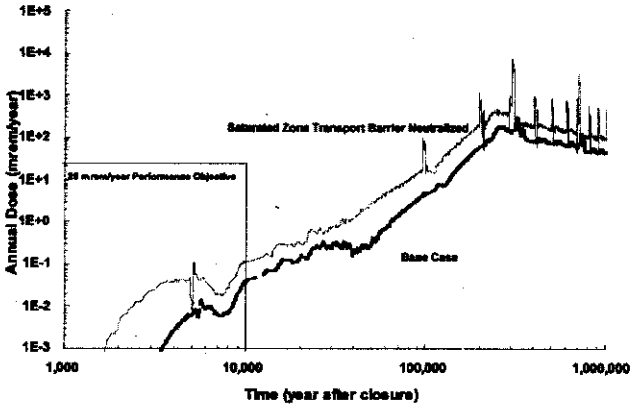


Figure 4: Saturated Yucca Mountain Transport Barrier Removed



Source for figures 2–4: U.S. DOE Office of Civilian Radioactive Waste Management, "NWTRB Repository Panel meeting: Postclosure Defense in Depth in the Design Selection Process," presentation for the Nuclear Waste Technical Review Board Panel for the Repository, January 25, 1999

Water resources

The performance of the repository in relation to groundwater matters more for Yucca Mountain because there are no surface water resources in that general region of Nevada. The only water source in the area is an aquifer

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that is currently being used in Amargosa Valley, just 20 miles downstream from Yucca Mountain.

The scarcity of water ensures two things. First, if the containers don't hold up, there will be little dilution and the water will become very polluted. Second, the lack of alternative water resources makes it likely that future residents may unknowingly use the polluted groundwater.

This is not a new finding. About a quarter of a century ago, the DOE had commissioned the National Research Council of the National Academy of Sciences to prepare a report that was supposed to guide it in its search for a sound repository. That report, published in 1983, four years before the 1987 legislation that restricted site characterization to Yucca Mountain, showed that radiation doses due to high-level radioactive waste disposal at Yucca Mountain could be very high, in large measure due to the scarcity of water.[5] To the best of my knowledge, the DOE does not appear to have used this report to substantially guide its repository program, though it paid for it.

The evidence shows that Yucca Mountain is an unsound repository program that should not be pursued further.

Conclusions

The evidence shows that Yucca Mountain is an unsound repository program that should not be pursued further. If there were a reasonably protective radiation standard – one that protected future generations to the time of peak dose according to present-day EPA norms – Yucca Mountain could not be licensed.

Security, health, safety, and environmental considerations indicate that the Yucca Mountain program should be scrapped and replaced by a repository program based on sound science and public health protection criteria. It should be managed not by the DOE but by an institution that does not itself generate high-level waste or spent nuclear fuel. The same considerations also point to the need for Hardened On-Site Storage (HOSS) of spent fuel as an interim step.[6]

A "nuclear renaissance" based even implicitly on the availability of Yucca Mountain for spent fuel from new reactors is founded on wrong-headed thinking similar to that of the 1950s that assumed waste disposal would be a problem that could be managed relatively easily. Based on that kind of thinking, the DOE, in the early 1980s, entered into contracts with nuclear utilities to begin take possession of spent fuel from them and start disposing it of in a deep geologic repository by January 31, 1998. That deadline has long since passed and the DOE has not even applied for a license.

The opening of Yucca Mountain, if it ever happens, appears more remote than ever for a host of reasons. Because the first repository characterization has been a costly failure so far by every reasonable measure of contract performance, assuming that the government would take responsibility for nuclear waste from new reactors decades from now may well add folly to the error of having created so much waste in the first place. Why then are so many so eager to pursue nuclear power, with its concomitant embrace of nuclear waste, when we don't need the headaches of nuclear to completely eliminate fossil fuel use from the U.S. economy?[7]

Endnotes

1. Based on "Comments of Dr. Arjun Makhijani on Yucca Mountain and the draft EPA standard submitted for the record of the Senate Environment and Public Works Committee hearing on the 'Examination of the Licensing Process for the Yucca Mountain Repository'," October 31, 2007, and on IEER comments on the EPA draft standard for Yucca Mountain, November 2005, on the Web respectively at www.ieer.org/comments/waste/yucca071031.html and www.ieer.org/comments/waste/yuccaepa.pdf
2. See IEER's web site, specifically www.ieer.org/webindex.html#waste.
3. For instance, the maximum routine exposure to the public from a single nuclear fuel cycle facility from all pathways, including air, water, and food, is limited to 25 millirem per year to any organ (except 75 millirem to the thyroid) or to the whole body. (40 CFR 190.10(a))
4. Paul P. Craig, "Rush to Judgment at Yucca Mountain," *Science for Democratic Action, Vol. 12, No. 3, June 2004*, on the Web at www.ieer.org/sdafiles/12-3.pdf
5. Waste Isolation Systems Panel, Board on Radioactive Waste Management, National Research Council. *A Study of the Isolation System for Geologic Disposal of Radioactive Waste*. Washington, DC: National Academy Press, 1983.
6. See www.ieer.org/comments/waste/yuccaalt.html for a discussion of HOSS.
7. For a roadmap to a nuclear-free renewable energy economy, see Arjun Makhijani, *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy*, IEER Press and RDR Books, 2007. On the Web at www.ieer.org/carbonfree/.

Arjun Makhijani is president of the Institute for Energy and Environmental Research in Takoma Park, Md. He earned his doctorate degree in electrical engineering from the University of California-Berkeley , where he specialized in nuclear fusion. Makhijani is author of "Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy" and a consultant to a number of electric utilities including the Tennessee Valley Authority

State of Florida

Public Service Commission

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-M-E-M-O-R-A-N-D-U-M-

DATE: February 25, 2008

TO: Ann Cole, Commission Clerk - PSC, Office of Commission Clerk

FROM: Stephen C. Larson, Executive Secretary to Commissioner Argenziano

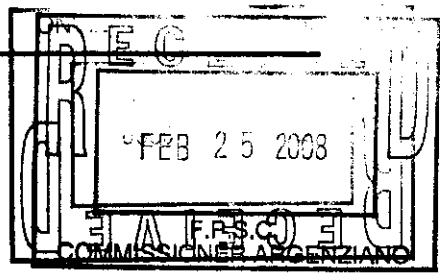
RE: Docket No. 070650-EI FPL Turkey Point 6+7

Please place the attached correspondence from Barry Parsons in the correspondence side of the above referenced docket. Please note that this may be a duplicate of Exhibit #92. If you have any questions, please do not hesitate to contact me.

Attachment

Barry G. Parsons

1011 NW **Bobwhite Terrance . Madison, Florida 32340 PHONE: (850) 973 - 3351**



re. Docket No. 070650-EI FPL Turkey Point 6 and 7

Dear Commissioner :

To make amends for my not having enough copies of the booklet, "Why a Future for the Nuclear Industry is Risky" booklet (Exhibit #92, I believe), I am enclosing your own personal copy of it.

I have written a summary of footnoted items and a few comments that I suspect may be more salient items for your purposes. But I strongly urge you to read the whole booklet, if you haven't yet had a chance. It is well written and an easy read.

Let me reiterate that most of the information in this booklet was taken from a series of speeches by Peter Bradford (noted on the front cover) with whom the publisher, the Southern Alliance for Clean Energy, toured a few years ago. All of the information, as you can see, is extensively documented.

Mr. Bradford, as you'll recall --and can see on the front cover-- is not only the former chair of two state PSCs but also a former commissioner with the U.S. Nuclear Regulatory Commission. You might find it informative to compare his take on many of the nuclear power issues with that of another ex-NRC commissioner, FPL witness, Dr. Diaz.

Ahead of this one-page summary and booklet, please find my OPEN LETTER to you, to the Florida PSC. I wanted to share with you and with others a few of my impressions of the recent hearing.

Thank you for your hard (and incredibly tedious !),hard work for the people of Florida.

Enc. Open Letter to PSC
booklet & one page summary
bonus: January, 2008 publication of Science for Democratic Action, by Arjun Makhijani, Ph.D.

Sincerely,

barry parsons

PLEASE RECYCLE

Open Letter to the Florida Public Service Commission and the People of Florida, from Barry G. Parsons, Madison

This is a personal opinion from this member of the public regarding the recent PSC hearing on the application (Docket No. 070650-EI) of Florida Power and Light Co. for needs determination for two new nuclear power plants (Turkey Point 6 & 7) in Dade County, held January 30 – February 1, the first two days of which I attended.

I. Thin Assumptions.

Here are just a few of the more troubling examples of assumptions and speculation, copiously and prejudicially number-crunched by FPL and only minimally challenged.

1. That this most expensive of all energy choices ($12 to 24 billion) is somehow "cost effective."
2. That the increased use of lower quality uranium due to the disappearing stocks of high-grade uranium ore won't be a problem because it can be enriched – only not in the USA (fear of public reaction?). Rather, it will be shipped to Britain or France for enrichment, across the Atlantic Ocean and back. And that somehow this won't raise costs significantly. Or increase the probability of being hit by natural disasters or a terrorist attack.
3. That the intractable and ominous problem of handling and containment of long-term hazardous nuclear waste --which may, again, be shipped across the Atlantic, this time for reprocessing in France—will somehow by solved (it hasn't for the last half century). And that this somehow won't eventually drive the cost of nuclear power even higher.
4. That the problem-plagued history of nuclear energy, including "permissible" low level radiation emissions, isn't anything to worry about. This ignores the heightened rates of leukemia associated with such routine emissions right now, as recorded in France and Germany. We are to presume that this won't happen here, driving up medical costs from the resulting excess cancer morbidity.
5. That the failure of the first nuclear era in America was mostly political. I lived through that period. I observed that the politics came mostly from the powerful combination of government and industry, in favor of nuclear power. In fact, that's the main reason the early build-out moved too fast, compromising safety such that events like Three Mile Island were more likely.
6. And specific to Florida, that the dramatic slowdown of growth (87% in the last two years) is just part of an economic cycle. How do they know that those with other explanations, like climate change and the long-running environmental destruction in this state, are wrong?
7. That the deepening back-to-back droughts in Florida are also "cyclical" and will soon reverse. This assumption is as much a hope, a prayer, on the part of FPL as it is fact. Because if global warming renders drought permanent and progressive, it would constrict the crucial ability to use water to cool dangerously radioactive material. This implication goes beyond cost to the sheer existence of the nuclear industry.

These concerns contribute to the disinclination of investors to go nuclear. Latest examples: the state of Utah's recent canceling of a new nuclear plant proposal; and Germany's decision to decommission two (and possibly more) of their functioning nuclear plants and not plan any new ones. Italy, too, is ceasing construction of new nuclear plants.

As I have said before and will say again at every opportunity: How does it make sense to subsidize and promote the one energy choice that is the MOST polluting, the MOST hazardous and the MOST expensive? Especially when other countries are proving that solar and wind can and do provide reliable electric power without all these negatives?

II. The Arrogance of the "in advance" mentality.

The proof of the frailty behind the techno-bravado of FPL and its associated promoters of nuclear power lies in the unusual list of special favors that this industry, so well represented by FPL, want in advance of the completion of the permitting process.

This industry is not only unapologetically holding out its hand for taxpayer supported subsides, loan and insurance guarantees, tax breaks and the limiting of liability in cases of catastrophic radioactivity releases. It is also, in the case of FPL, making the following incredible demands of the state of Florida.

1. That FPL be allowed to bill ratepayers in advance for the costs of nuclear power plant construction. Have we forgotten the still fresh lessons of the TECO and OUC coal gasification plant projects?

2. That they get from the PSC, in advance, a statement of "explicit and unwavering support" over the next ten years (!), in the words of FPL head, Armando Olivera.

3. That they get from the PSC ("Issue# 9") an acknowledgement, a judgement, of the "prudence" of FPL shelling out $16 million of ratepayer money to buy a place in line with the Japanese steel works that builds the huge nuclear plant vessels. In advance, of course.

4. That they want all of the above before even settling on the final design, which may not come until as late as the end of this year.

Taken together, these actions would constitute a premature PSC approval that FPL will surely use to its political advantage in approaching other regulatory entities and the court of public opinion. These machinations are striking in their hubris, and amount to a set-up, a gaming of the needs determination process. My impression is that FPL is attempting to back the PSC into a corner from which it will be uncomfortable in the future, given the investment that will have been made, in denying FPL any subsequent favors it requests, as cost overruns mount. And if successful, surely others, like Progress Energy, may follow suit.

The checks and balances, therefore, of the proposed PSC "annual reviews" of FPL's nuclear construction progress --or lack thereof-- would become markedly compromised if not moot.

III. A Summary Perspective.

I believe PSC Commissioner Edgar was justified in her lengthy expression of frustration (January 30) with these demands, specifically "Issue # 9" (item II. 3., above) regarding advance approval for FPL expenditures related to this as yet unpermitted project. I shared her frustration with all of that, including the confusing legalese so pathetically put forth by FPL in response.

Similarly, I believe that Commissioner Argenziano's concerns held traction on the issues of:

1. The large water use by nuclear power plants, so critical for cooling, in this era of declining water body depths and minimum flow levels across the state.

2. The fact of Germany decommissioning two of their existing nuclear plants, and maybe more. The explanation given by the FPL witness, Dr. Diaz, that the original decision by the German government to shut down all 16 of its nuclear plants (1/4 of the nation's electrical power) was made merely for purposes of political accommodation, is preposterous on the face of it.

Regarding the conduct of the PSC hearing, I admit to concern, as a member of the public, about the unlevel playing field wherein an intervenor unable to afford an attorney was pummeled by a veritable football team of lawyers for FPL. It seems to me that the process should provide for a sort of "public defender" for such intervenors, arranging for the services of counsel for the public rather than lawyers that, in this case, represented other utility companies and the legislature and appeared to be just along for the ride.

That said ---and despite other moments that appeared to be biased in favor of FPL and my own confusion over possibly non-uniform guaranteed rates of return for coal and nuclear energy compared to solar and other clean renewables-- it is my overall sense that the Public Service Commission process, via this hearing, still demonstrated its value to the people of Florida. For in my opinion, it revealed to those with some knowledge of the subject and who paid attention that nuclear power is not only NOT ready for a "renaissance" but is inappropriate by its very nature to continue to be taken seriously as a rational energy choice for Florida.

The bottom line is that no matter how hard the nuclear industry strains to explain away their history and convince us that this time things will be different, and even given the improvements in nuclear technology, things really haven't changed much. As a Florida citizen and taxpayer, I know that we will have to pony up some serious tax and ratepayer dollars to implement whatever energy options the state decides on. I am one citizen who is ready to pay those taxes and fees IF the safest and cleanest renewable energies are chosen.

Barry G. Parsons,

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cc. Governor's office

various environmental groups

abstracts to select media outlets

Footnote summary, **Exhibit# 92**: "Why a Future for the Nuclear Industry is Risky"

First, the following series of references to STANDARD & POORS studies, and my comments.

Page 2, footnote 3; p.3, f. 9; p. 3, f. 15; and p. 4, f. 16.

The upshot from S&P is that federal assistance programs for the nuclear industry (the 2005 EPACT legislation is the example) do not really help nuclear's credit worthiness (new construction or expansion); that any given nuclear power plant may never actually begin operation; that as recently as 01/06, S&P believes "cost overruns are highly probable;" and that S&P apparently finds disturbing that "a regulatory process cannot provide recovery for underfunding."

Unless, of course, the nuclear industry can convince regulators to find ways to cover that, too, along with all the other special treatment requested.

Other major reports or studies.

Page 2, footnote 2. The UNIVERSITY OF CHICAGO's study for the DOE, 08/ 04, finding that the cost of recent new nuclear plants in Japan – a nation for which FPL witnesses expressed admiration for their nuclear programs—were much higher than anticipated.

p. 3, f. 8. A RAND CORP study that billion dollar "mega-projects" go way over first cost estimates and that "only one in three meets its profit goals." Florida's mega-examples: the TECO and OUC IGCC coal plants.

p. 3, f. 10. The DOE's annual Energy Outlook for 2005, stating their skepticism about new nuclear plants being economical.

p. 3, f. 11. The MIT study that finds the real levelized cost of electricity from nuclear reactors would be "more expensive than from pulverized coal or natural gas." Wasn't cost involved with the Glades decision?

Finally, p. 8, f. 41. MIT's report on the 2002 sale of a majority interest in the Seabrook nuclear power plant. It led MIT to say that "the market value of a fully licensed and operational nuclear power plant with a good performance record is *less than half* of the most optimistic cost estimates for .. a new nuclear..plant." And accordingly, that "the market value of nuclear plants is far below their replacement costs.."

This booklet concludes that the last 50 years of subsidies to the nuclear industry ($145 billion) amounted to more than all other energy sectors combined. What does this say about FPL's contention that their huge investments in nuclear energy will not drain funding from their truly renewable energy projects? Maybe it's because their solar projects in Florida are so small, relative to the MW need, that it wouldn't make much difference.

The conclusion also notes on page 8 that the growth in wind, solar and micropower in 2006 outperformed existing nuclear power, and was "mostly financed by private risk capitol." No bribing with loan guarantees or liability protection there.

WHY A FUTURE FOR THE NUCLEAR INDUSTRY IS RISKY

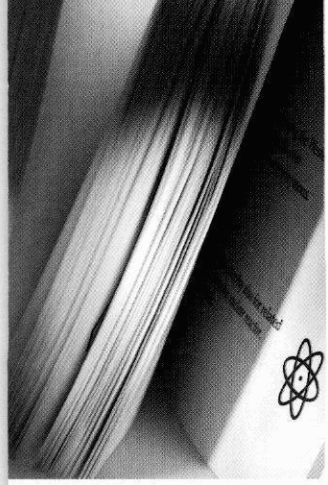
BASED IN PART ON PRESENTATIONS BY

PETER BRADFORD

Former Chair, New York State Public Service Commission,
Former Chair, Maine Public Utilities Commission,
Former Commissioner, U.S. Nuclear Regulatory Commission.

DAVID SCHLISSEL

Synapse Energy Economics, Inc.



JANUARY 2007

Sponsored by a coalition of environmental, health, social investment and public interest organizations concerned about the impacts of nuclear power including:

Friends of the Earth,

Interfaith Center on Corporate Responsibility (ICCR),

North Carolina Waste Awareness and Reduction Network (NC WARN),

Nuclear Information and Resource Service (NIRS),

Public Citizen,

Southern Alliance for Clean Energy (SACE), and

U.S. Public Interest Research Group (PIRG).

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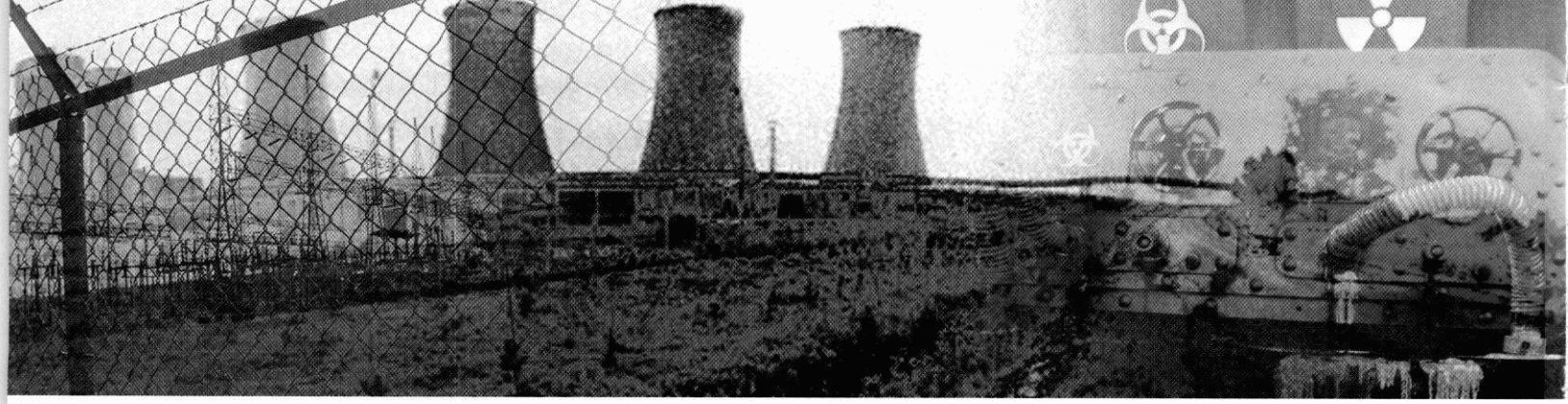


INTRODUCTION

Talk of a "nuclear renaissance" abounds. The accidents at Chernobyl and Three Mile Island are receding in public memory. Promises of improved safety and performance are coupled with billions of dollars of subsidies. However, the claims that nuclear power is a necessary energy source for displacing greenhouse gases hasn't convinced investors that new nuclear power plants will be safe and profitable investments.

New nuclear power plants will not be cost competitive with other electricity generating alternatives. Wind power and other renewable technologies, combined with energy efficiency, conservation and cogeneration can be much more cost effective and can be deployed much sooner than new nuclear power plants. Building expensive new nuclear plants will divert private and public investment from the cheaper and readily available renewable and energy efficiency options needed to protect our climate.

In competitive markets, new nuclear power plants will be bad investments. At the same time, worldwide private equity and venture capital investments in clean energy continue to grow. Worldwide investment in renewable energy capacity was almost $40 billion in 2005 and the renewable energy markets continue to grow robustly.[1]

DESPITE THE SIGNIFICANT SUBSIDIES PROVIDED IN THE ENERGY POLICY ACT OF 2005 (EPACT 2005), INVESTMENTS IN NEW NUCLEAR PLANTS REMAIN VERY RISKY

- The estimated cost of $1,500-$2,000 per KW for new nuclear plants is unlikely to be achieved and has recently been revised upward for some companies.
- The prices of recently built nuclear power plants in Japan were much higher, ranging between $1,796 and $2,827 per KW, in 2003 dollars.[2]
- The subsidies provided in EPACT 2005 are limited to a few plants and some require Congressional appropriations which are not guaranteed. Moreover, Standard & Poor's analysis of EPACT 2005 has concluded that the bill has few implications for the credit quality of nuclear developers and that the regulatory risk for new nuclear construction remains high, given the possibility that a plant for which construction has started may never actually commence operations.[3]
- None of the new nuclear power plant designs under consideration in the U.S. have actually been built. The industry's optimistic construction time and cost estimates are unproven and theoretical.
- Despite massive subsidies and R&D investments, there has not been an order for a new nuclear power plant in the U.S. for almost three decades.[4]
- Even with the subsidies in EPACT 2005, the U.S. Department of Energy has moved its target for bringing a new nuclear unit online from 2010 to 2014.[5]

1 "Renewables Global Status Report: 2006 Update," Renewable Energy Policy Network for the 21st Century, 2006, at pages 2-5, available at http://www.ren21.net/globalstatusreport/download/RE_GSR_2006_Update.pdf.

2 "Economic Future of Nuclear Power," The University of Chicago for the U.S. DOE, August 2004, at pages 2-14.

3 "Energy Policy Act 2005 has Limited Credit Implications: S&P," Nuclear Engineering International News, August 18, 2005, available at http://www.neimagazine.com/story.asp?sc=2030540&ac=7969460 and "Long-Awaited Energy Act Has Marginal Credit Implications for U.S. Utility And Oil And Gas Companies," Standard & Poor's, August 1, 2005.

4 "Nuclear Power: Economics and Climate Protection Potential," Amory Lovins, Rocky Mountain Institute, September 11, 2005, at page 9, available at http://www.rmi.org/images/other/Energy/E05-08_NukePwrEcon.pdf.

5 Statement of Samuel W. Bodman, Secretary of Energy, Before the Committee on Science, U.S. House of Representatives, Concerning the Department of Energy's FY 2007 Budget, February 15, 2006. available at http://resourcescommittee.house.gov/science/hearings/full06/Feb15/bodman.pdf.

- A recent article in The Energy Journal, published by the International Association for Energy Economics, concluded that in current liberalized markets, investors have no incentives to back the construction of new nuclear power plants because of their capital intensity, "engineering difficulties" and "regulatory creep."[6]

- Nuclear construction cost estimates in the U.S. have been notoriously inaccurate. In fact, the estimated costs of some existing nuclear units were wrong by factors of two or more. The total estimated cost of 75 of today's nuclear units was $45 billion (in 1990 dollars).[7] The actual cost turned out to be $145 billion (also in 1990 dollars). This $100 billion cost overrun was more than 200 percent above initial cost estimates.

  - New billion dollar mega-projects traditionally cost much more than their original estimates. As a result, a 1988 RAND Corporation study concluded that "the data on cost growth, schedule slippage and performance shortfalls of mega-projects are certainly sobering, but the most chilling statistic is that only about one in three of these projects is meeting its profit goals."[8]

  - Standard & Poor's stated that "given that construction [of new nuclear plants] would entail using new designs and technology, cost overruns are highly probable."[9]

  - The DOE's Energy Information Administration has clearly and concisely stated that "new [nuclear] plants are not expected to be economical."[10]

  - A 2003 study by the Massachusetts Institute of Technology forecasted that the base case real levelized cost (present value of building and running a plant for its lifespan) of electricity from new nuclear reactors with an estimated 85 percent capacity would be $.067 per kilowatt hour over a projected forty year operating life more expensive than from pulverized coal or natural gas.[11]

  - A 2005 assessment by Synapse Energy Economics, Inc. showed that the levelized cost of electricity from a new nuclear power plant would be $.068 per kilowatt hour, which was significantly higher than obtaining the same amount of energy from a combination of wind and gas-fired capacity and energy efficiency measures.[12] Additional studies have also concluded that overnight capital costs, lead construction times and interest rate premiums are likely to place the cost of electricity from any future nuclear power plants within the range of $.06 to $.07 per kilowatt hour.[13]

- Nuclear utilities have acknowledged that there are significant economic risks associated with the operation of nuclear power plants.

  - Plant O&M and capital expenditures could increase or the nuclear plant(s) could experience outages as a result of events at other operating nuclear power plants, new rules or regulations issued by the U.S. Nuclear Regulatory Commission (NRC), or as the result of deficiencies identified by the NRC.[14]

- Restructuring of the electric utility industry brings additional uncertainty to the ownership of new nuclear power plants. Without captive customers from whom increased costs can be recovered, plant owners are exposed to the risks of higher O&M expenses, higher decommissioning costs, and the lost revenues and higher costs of extended unit outages.

  - For example, Standard & Poor's stated that "Decommissioning risk remains an important factor in determining credit quality of U.S. firms and weighs more in the analysis of competitive nuclear generators. This is the case because, again, a regulatory process cannot provide recovery for underfunding."[15]

6 "Nuclear Power: A Hedge against Uncertain Gas and Carbon," Fabien A. Roques, William J. Nuttall, David M. Newbery, Richard de Neufville, Stephen Connor, The Energy Journal, Vol. 27, n. 4., 2006.

7 Study prepared by the Energy Information Administration of the U.S. DOE, "An Analysis of Nuclear Power Plant Construction Costs," 1986.

8 "Understanding the Outcomes of Megaprojects: A Quantitative Analysis of Very Large Civilian Projects," Edward W. Merrow, RAND Corporation, March 1988.

9 "Credit Aspects of North American and European Nuclear Power," Standard & Poor's, January 9, 2006.

10 Annual Energy Outlook 2005, Energy Information Administration, available at http://www.eia.doe.gov/emeu/plugs/plfeb05.html.

11 "The Future of Nuclear Power - Summary Report," MIT, 2003, available at http://web.mit.edu/nuclearpower/pdf/nuclearpower-summary.pdf.

12 Affidavit of Bruce Biewald, Synapse Energy Economics, in U.S. NRC Docket No. 52-007-ESP, at page 23.

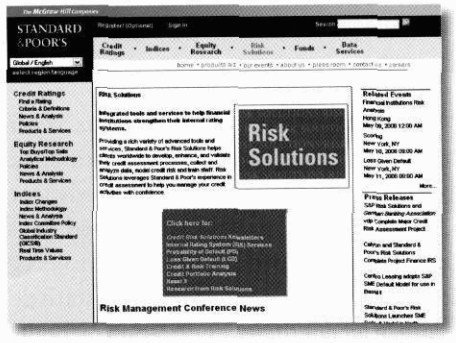
13 "Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Crisis - Summary," Brice Smith, Institute for Energy and Environmental Research, 2006, at page 6, available at http://www.ieer.org/reports/insurmountablerisks/summary.pdf.

14 For example, see the Testimony of Thomas Aller, in Iowa Utility Board Docket No. SPU-05-15, at page 15.

15 "Credit Aspects of North American and European Nuclear Power," Standard & Poor's, January 9, 2006.

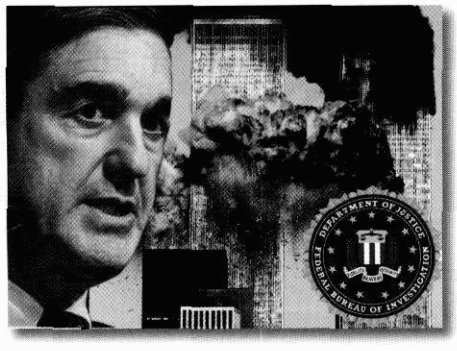
WALL STREET HAS EXPRESSED SERIOUS CONCERNS ABOUT THE CREDITWORTHINESS OF COMPANIES THAT PURSUE NEW NUCLEAR PLANTS

- Standard & Poor's Ratings Services found that "an electric utility with a nuclear exposure has weaker credit than one without and can expect to pay more on the margin for credit. Federal support of construction costs will do little to change that reality. Therefore, were a utility to embark on a new or expanded nuclear endeavor, Standard & Poor's would likely revisit its rating on the utility." [16]
- Standard & Poor's has also expressed concern that "from a credit perspective, [2005 Energy Policy Act] provisions may not be substantial enough to sustain credit quality and make [nuclear generation] a practical strategy."[17]
- The credit rating service Fitch reminds potential investors that "the overarching concern [regarding nuclear power generation] is the financial effect of an extended outage, forcing the generating company to buy potentially more expensive replacement power on the spot market to honor any existing supply commitments."[18]



NUCLEAR POWER PLANTS ARE STATED TERRORIST TARGETS: A SUCCESSFUL ATTACK COULD HALT NEW CONSTRUCTION EVEN AFTER SIGNIFICANT EXPENDITURE

In testimony before the Select Committee on Intelligence in the U.S. Senate in February 2005, FBI director Robert S. Mueller stated that, "Another area we consider vulnerable and target rich is the energy sector, particularly nuclear power plants. Al-Qa'ida planner Khalid Sheikh Mohammed had nuclear power plants as part of his target set and we have no reason to believe that Al-Qa'ida has reconsidered."[19]



- In October 2001, the Federal Aviation Administration temporarily restricted all private aircraft from flying over 86 nuclear facilities due to threats of terrorist attacks.[20]
- Over 53,000 metric tons of highly radioactive spent nuclear fuel is stored at commercial reactors in the U.S. Nearly 90% of this fuel is stored in cooling pools without adequate protection.[21] According to a recent study by the National Academy of Sciences, a terrorist attack on a spent fuel pool could lead to the release of large quantities of radioactive materials to the environment.[22] Such an event could result in thousands of cancer deaths and economic damages in the range of hundreds of billions of dollars.
- In the event of a major radioactive release from a nuclear power plant, public opinion would likely react strongly against nuclear power (as occurred after the Chernobyl and Three Mile Island accidents), resulting in the halting of construction of any new planned reactors.

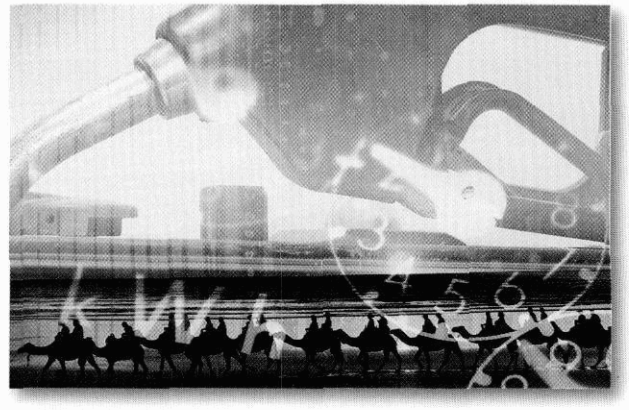
16 Ibid.
17 Ibid.
18 "Fitch's Approach to Rating U.S. Wholesale Energy Companies," October 2004.
19 "Testimony of Robert S. Mueller, III, Director, Federal Bureau of Investigation Before the Senate Committee on Intelligence of the United States Senate," February 16, 2005, available at http://www.fbi.gov/congress/congress05/mueller021605.htm.
20 "FAA Restricts All Private Aircraft Flying Over Nuclear Facilities," October 30, 2001, available at http://www.faa.gov/news/press_releases/news_story.cfm?newsId=5446.
21 "Spent Nuclear Fuel Storage Locations and Inventory," Anthony Andrews, Congressional Research Service, updated 2004.
22 "Safety and Security of Commercial Spent Fuel Storage: Public Report," Committee on the Safety and Security of Commercial Spent Fuel Storage, National Research Council, 2006, available at http://newton.nap.edu/catalog/11263.html#toc.

WEAKNESSES IN NUCLEAR REGULATORY COMMISSION (NRC) OVERSIGHT OFFER TROUBLESOME INDICATIONS THAT THE NRC IS PUTTING THE NUCLEAR INDUSTRY AHEAD OF SAFETY AND PUBLIC CONFIDENCE

- In recent years, the NRC appears to have retreated into a similar pro-industry mindset that was described in the assessment of the March 1979 accident at the Three Mile Island nuclear power plant that was prepared by a Presidential Commission: "We find that the NRC is so preoccupied with the licensing of plants that it has not given primary consideration to overall safety issues. [...] With its present organization, staff and attitudes, the NRC is unable to fulfill its responsibility for providing an acceptable level of safety for nuclear power plants."[23]
- For example, shortcomings in the U.S. nuclear regulatory process were clearly implicated in the 2001 near-accident at the Davis-Besse plant in Ohio. The NRC Inspector General's report on that incident found that there was a clear connection between cost considerations and NRC laxity in the fact that the licensee sought and the NRC staff allowed the Davis-Besse plant to operate without performing important inspections, and that this situation was driven in large part by a desire to lessen the financial impact that would result from an early shutdown.[24] A loss of coolant accident at Davis-Besse might well have eliminated all discussion of a nuclear revival in the U.S.
- NRC surveys have showed that almost half of all NRC employees thought that their careers would suffer if they raised safety concerns and nearly one-third of those who had raised safety concerns felt they had suffered harassment and/or intimidation as a result. [25]
- Streamlined licensing processes for construction and operating permits eviscerate public involvement as a check on laxity in the licensing process.

NUCLEAR POWER WILL NOT REDUCE U.S. DEPENDENCE ON ENERGY SUPPLIES FROM ABROAD

- The U.S. is importing more oil each year – most of it from the world's most unstable regions – increasing our country's economical and political vulnerability and making oil dependency among the largest threats to our economy and national security.
- Increasing reliance on nuclear power will not reduce our nation's dependency on foreign sources of oil – only about 3% of the electricity produced in the U.S. is from petroleum and almost none of that petroleum comes from the Middle East.[26]
- Nuclear power's only substantial contribution to oil displacement in the U.S. comes in regions in which natural gas displaced by nuclear power can penetrate further into oil's share of the markets, such as space heating in New England. [27]
- Indeed, transportation is the sector that accounts for most of U.S. oil consumption – about two-thirds of the country's oil consumption is used by vehicles, which corresponds to roughly 13 millions barrels a day.[28] Thus, possible nuclear power development would not have any influence over these statistics.



23 "Report of the President's Commission on the Accident at Three Mile Island: The Need for Change," October 1979, pages 51, 56.

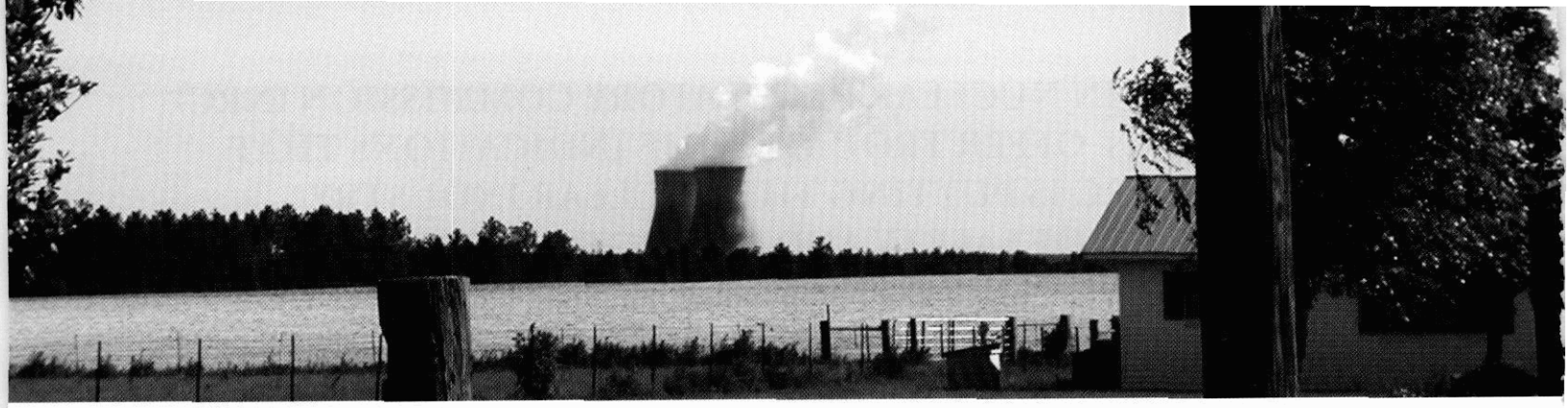
24 "NRC's Regulation of Davis Besse Regarding Damage to the Reactor Vessel Head," NRC Inspector General, Case No. 02-03S, December 30, 2002, at page 23.

25 "Special Evaluation: OIG 2002 Survey of NRC's Safety Culture and Climate," Office of the Inspector General, U.S. Nuclear Regulatory Commission, December 11, 2002, OIG-03-A-03; "Audit Report: Review of NRC'S Differing Professional View/Differing Professional Opinion Program," Office of the Inspector General, U.S. Nuclear Regulatory Commission, September 20, 2000, OIG-00-A-07.

26 U.S. Energy Information Administration, Electric Power Generation by Fuel Type (2004), available at http://www.eia.doe.gov/fuelelectric.html.

27 "Nuclear Power's Prospects in the Power Markets of the 21st Century," Peter A. Bradford, Nonproliferation Education Center, February 2005, available at: http://www.npec-web.org/Essays/Essay050131%20NPT%20Bradford%20Nuclear%20Powers%20Prospects.pdf.

28 "Peaking of World Oil: Impacts, Mitigation and Risk Management," Hirsch et al, Science Applications International Corporation, Department of Energy, February 2005, available at http://www.netl.doe.gov/publications/others/pdf/Oil_Peaking_NETL.pdf.



PERMANENT STORAGE OF SPENT NUCLEAR FUEL REMAINS UNRESOLVED

One of the riskiest elements of building new nuclear plants is that the long-term disposition of the waste is far from being resolved. The planned Yucca Mountain repository in Nevada is almost 20 years behind schedule and may never open. The projected opening date for this permanent spent fuel repository has been delayed countless times and, according to the Department of Energy, the current target date of 2017 is a "best-achievable schedule."[29]

A plan proposed by the Bush Administration, the Global Nuclear Energy Partnership (GNEP), that would allow the reprocessing of spent nuclear fuel, will face significant technical, legal, and political challenges and cannot be counted on as a realistic solution. Reprocessing results in large amounts of waste still needing disposal, and much of the technology essential to GNEP is unproven and undeveloped. Indeed, similar attempts to reprocess spent fuel in the past have been unsuccessful and the DOE does not have a lifecycle cost analysis for the program.

Interim storage of waste at Idaho National Engineering & Environmental Laboratory

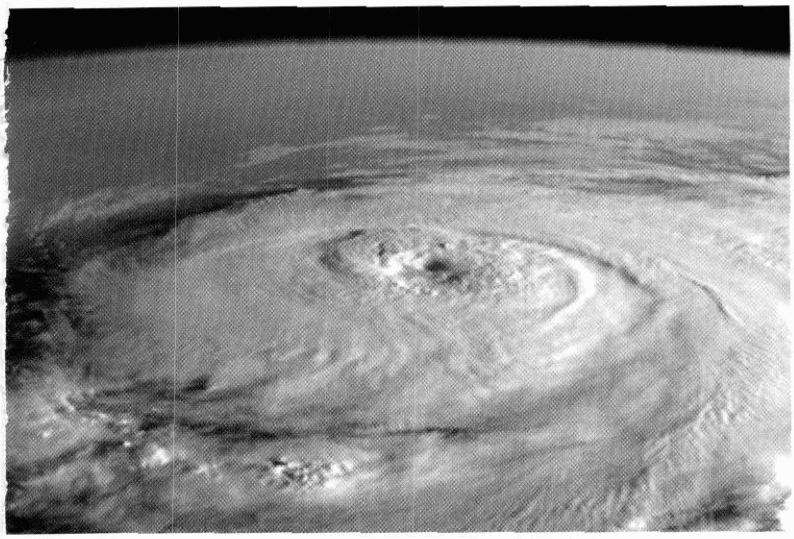
- Reprocessing would be a dangerous shift in U.S. global nonproliferation policy and would increase the likelihood that a terrorist could obtain fissile material to build a nuclear bomb. Moreover, DOE is trying to build momentum for the program before deliberations have been conducted by Congress to determine whether this path is in the best interests of U.S. national and energy security, as well as fiscally sound, even if it should eventually prove technically feasible.
- Reprocessing would increase the number of nuclear waste streams to be managed and secured and is the most polluting part of the nuclear fuel cycle. It would not alleviate the problem of used (spent) fuel storage on reactor sites or the need for a permanent waste repository.[30]
- U.S. taxpayers are still paying several billion dollars each year to clean up contamination from reprocessing programs in the 1960s and 1970s for nuclear weapons at the Hanford Site (WA) and the Savannah River Site (SC), as well as the reprocessing of naval irradiated fuel at the Idaho National Laboratory (ID) and commercial reprocessing at West Valley (NY), which all make this new reprocessing push unlikely and illogical.

29 Statement of Edward F. Sproat, III, Director for the Office of Civilian Radioactive Waste Management, U.S. Department of Energy, Before the Subcommittee on Energy and Air Quality, Committee on Energy and Commerce, U.S. House of Representatives. September 13, 2006, available at http://www.ocrwm.doe.gov/info_library/program_docs/testimonies/SPROAT9-13Testimony_FINAL.pdf.

30 Spent fuel rods must remain in on-site cooling pools for at least five years until they have cooled sufficiently to be transported. Reprocessing waste does not eliminate long-lived radioactive elements that necessitate secure storage for hundreds of thousands of years. GNEP proposes to transmute much of the nuclear waste, but this technology as yet to be proven.

WHAT ABOUT GLOBAL GLOBAL WARMING? BETTER SOLUTIONS EXIST

- Climate change is one of the most pressing threats of our time and it is imperative that we take swift and decisive action to avert its most severe impacts. However, building more nuclear power plants is not the answer.
- The claim that "we need all energy options" to face growing energy needs is disingenuous. On the contrary, we cannot afford all energy options. Further investment in nuclear power would squander the limited financial resources that are available to implement meaningful climate change mitigation policies.
- Nuclear power's role in mitigating climate change (and in reducing oil dependence) is constrained because its impact is limited to the electric sector.



Wind power and other renewables, such as solar and bioenergy, coupled with energy efficiency, conservation and cogeneration are much more cost effective and can be deployed much faster. Building new nuclear power plants will divert private and public investment from the cheaper, readily available options needed to protect our climate. Each dollar invested in electric efficiency in the U.S. displaces nearly seven times as much carbon dioxide as a dollar invested in nuclear power, and nuclear power saves as little as half as much carbon per dollar as wind power and cogeneration.[31]

- Recent studies analyzing the potential of nuclear power to combat global warming have concluded that between 1,000 and 2,000 new nuclear reactors would have to be built around the globe in the next decades to achieve a meaningful impact on CO_2 emissions.[32] These projections point to a clearly infeasible schedule, as new reactors would have to come online every few weeks.
- A 2005 study by Synapse Energy Economics, Inc. showed that the U.S. can substantially reduce global warming pollution through efficiency improvements in power generation. In fact, the report concludes that modest investments in efficiency and renewable energy would reduce global warming pollutants from the electricity sector by 47% by 2025.[33]

IMPACTS OF GLOBAL WARMING INCREASE RISKS OF OPERATING NUCLEAR POWER PLANTS

- Heat waves in the summer of 2006 forced U.S. and European utilities to shut down some reactors and reduce operations at others. Some companies in Europe also had to secure exemptions from regulations in order to discharge overheated water into the environment and others were forced to buy electricity on the spot market.[34]
- Rise in frequency and intensity of catastrophic weather events pose additional risks to nuclear plants' safety because reactors are particularly vulnerable to the effects of flooding, hurricanes, and tornados, as severe storms can disable the on and off-site power systems necessary to operate the plants' safety mechanisms.

31 "Return of the Nuclear Salesmen: Global Warming Gives Them a New Sales Pitch," Dave Reed, Rocky Mountain Institute Newsletter, Vol. XVI, #1, Spring 2000, pages 25 and 15, available at http://www.rmi.org/images/other/Newsletter/NLRMIspring20.pdf.

32 "The Future of Nuclear Power – Summary Report," MIT, 2003 and "Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Crisis – Summary," Brice Smith, Institute for Energy and Environmental Research, 2006, at page 6, available at http://www.ieer.org/reports/insurmountablerisks/summary.pdf.

33 "A Responsible Electricity Future: An Efficient, Cleaner and Balanced Scenario for the US Electricity System," Bruce Biewald et al. Synapse Energy Economics, Inc. and National Association of State PIRGS, May 2005, available at http://www.uspirg.org/uploads/w7/0S/w70S27rKa2G0k0LMyQqBNg/AResponsibleElectrictyFuture.pdf.

34 "Nuclear Power's Green Promise Dulled by Rising Temps," Susan Sachs, The Christian Science Monitor, August 10, 2006, available at http://www.csmonitor.com/2006/0810/p04s01-woeu.html; and "U.S. Heat Wave Heads to Northeast, May Break Records," update to Bloomberg News, July 31 2006, available at http://www.bloomberg.com/apps/news?pid=20601087&sid=aNtzVaLCaNc8&refer=home.

RENEWABLE ENERGY INVESTMENTS ARE BOOMING WHILE PRICES FOR CONSUMERS KEEP DROPPING

- Worldwide investment in renewable energy capacity was almost $40 billion in 2005. In the U.S., renewable power capacity expanded to 23 GW.[35]
- In 2005, wind energy in the U.S. grew by almost 2,500 MW of installed capacity – a 35% increase in just one year.[36] Total wind-generating capacity in the United States now stands at over 9,000 MW, enough to power more than 2.3 million average American homes.[37]
- Venture capital investment in U.S. based solar companies totaled more than $150 million in 2005 – double the investment from the previous year.[38]
- The International Energy Agency predicts a cost reduction up to 25% for wind power and 50% for solar photovoltaics from 2001 to 2020.[40]
- In the global marketplace, nuclear power is already losing to its faster, cheaper, less financially risky competitors that are NOT centralized power stations.
  - In 2005, micropower (low-carbon fossil-fueled cogeneration, 2/3 of it gas-fired, plus decentralized renewables) added 4 times as much output and 8 times as much capacity as nuclear power.
  - These alternatives have eclipsed nuclear power in both capacity (in 2002) and output (in 2006) .
  - In 2005, micropower provided 32% of the additional global electrical output and was mostly financed by private risk capitol. Thus, investors focusing on actual market behavior must conclude that nuclear power is not preferred.[39]

HOW THE EVOLUTION OF POWER SUPPLY MARKETS AFFECTS NUCLEAR POWER

Assessing the future of nuclear power begins by understanding the past. Nuclear power is a technology force fed into an unsophisticated power supply selection process at a pace too fast for the nuclear industry to assimilate the lessons of operating experience. Moreover, the evolution occurred in ways that concealed or understated the real costs and problems, assuring a series of unpleasant surprises, deepening public mistrust, and, ultimately, reform of the power supply selection processes under which nuclear power had momentarily thrived.

- A real nuclear revival will not exist until private capital is available to build plants, which will require market prices that assure competitive success and profitability. However, even with their ability to compete on the basis of operating costs, the most recent sales of nuclear units have not been at prices that would support the building of a new plant.[41]
- In short, nuclear power's asserted comeback rests not on a newfound competitiveness in power plant construction, but on an old formula: massive government subsidies and licensing shortcuts, and perhaps, guaranteed purchases with risks borne by customers. Climate change has replaced oil dependence as the bogeyman from which supposedly only nuclear power can save us.

35 "Renewables Global Status Report: 2006 Update," Renewable Energy Policy Network for the 21st Century, 2006, at pages 2-5, available at http://www.ren21.net/globalstatusreport/download/RE_GSR_2006_Update.pdf.

36 "U.S. Wind Industry Ends Most Productive Year, Sustained Growth Expected for At Least Next Two Years," American Wind Energy Association, January 24, 2006, available at http://www.awea.org/news/US_Wind_Industry_Ends_Most_Productive_Year_012406.html.

37 "Global Wind 2005 Report," Global Wind Energy Council, 2005, available at http://www.gwec.net/fileadmin/documents/Publications/Global_WindPower_05_Report.pdf.

38 Ibid, page 4.

39 "The Rise of Micropower" Armory Lovins, Rocky Mountain Institute, Updated July 2006, available at www.rmi.org/sitepages/pid171.php#E05-04.

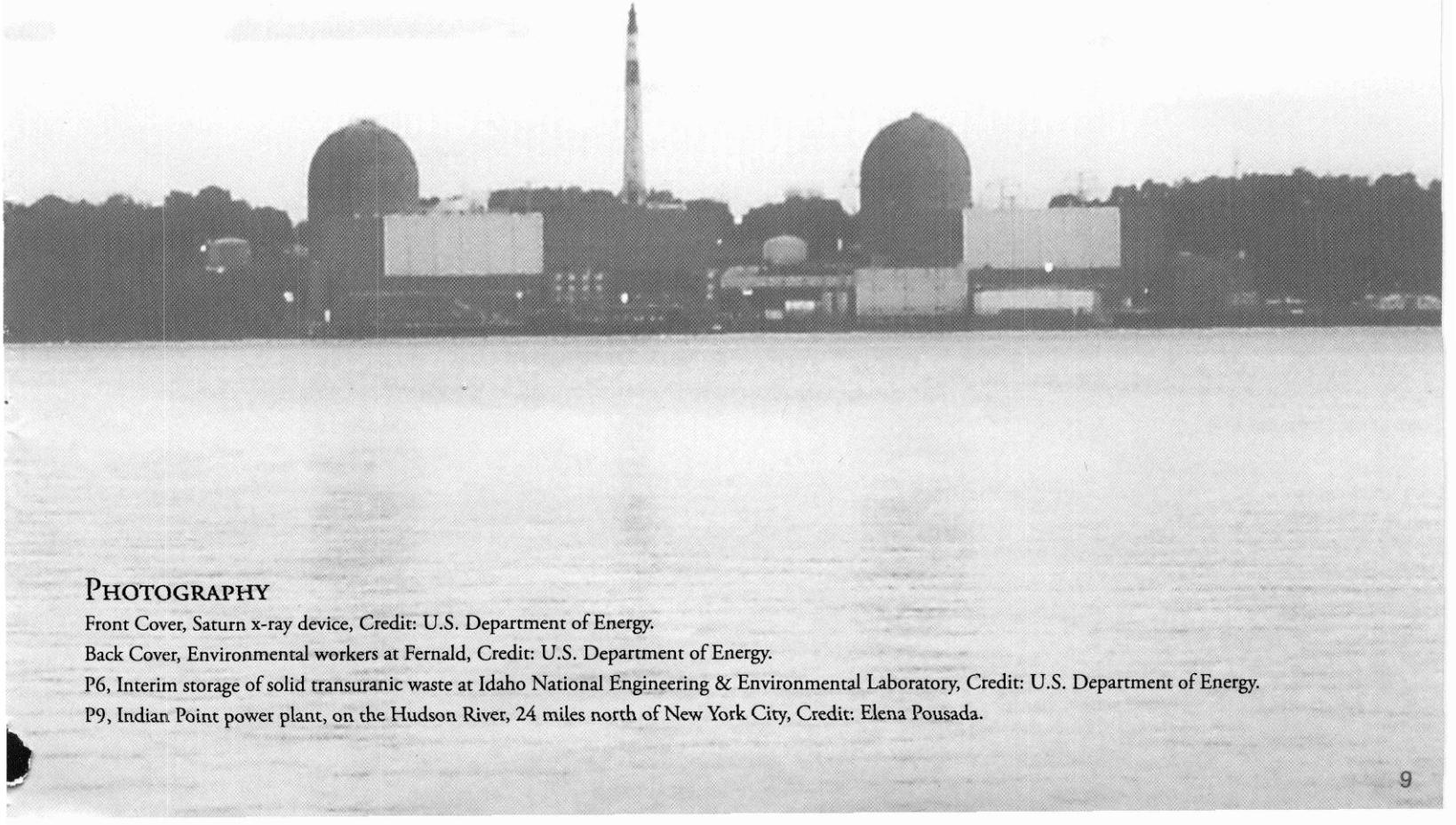
40 "Renewable Energy," International Energy Agency, available at http://www.iea.org/textbase/papers/2002/renewable.pdf.

41 The MIT study, in discussing the 2002 sale of 88% of the Seabrook station, notes that the price "implies that the market value of a fully licensed and operational nuclear power plant with a good performance record is less than half of the most optimistic cost estimates for building a new nuclear power plant....Comparable analyses of other nuclear power plant sales come to very similar conclusions. The market value of nuclear plants is far below their replacement cost, a result that is inconsistent with merchant investment in new nuclear plants." ("The Future of Nuclear Power," Appendix 5, p. 140.)

CONCLUSION

The genesis of nuclear power was the "Atoms for Peace Program" which was intended to make the public more comfortable with the horrifying destruction of the nuclear bomb. Originally, the promise was that the technology would provide energy that would be "too cheap to meter." However, in the last 50 years, nuclear energy subsidies have totaled close to $145 billion and amount to more taxpayer dollars for R&D than for all other energy sectors combined. In fact, nuclear power became the energy that is "too expensive to matter."

A nuclear revival is financially risky. The likelihood of large numbers of new nuclear units being built on the basis of favorable economics is very unlikely. Nuclear power is not competitive today and for nuclear power to succeed it must achieve major cost cuts, avoid even one serious accident, resolve the nuclear waste storage and disposal issue in an enduring way, sever its links to proliferation of nuclear weapons, and get the benefit of its status as a lower carbon-emitting power source. However, even if all of these things occur over the next decade, success will not be guaranteed. Nuclear power may still be more expensive and offset much fewer greenhouse gas emissions than a portfolio of renewable and energy efficiency options.



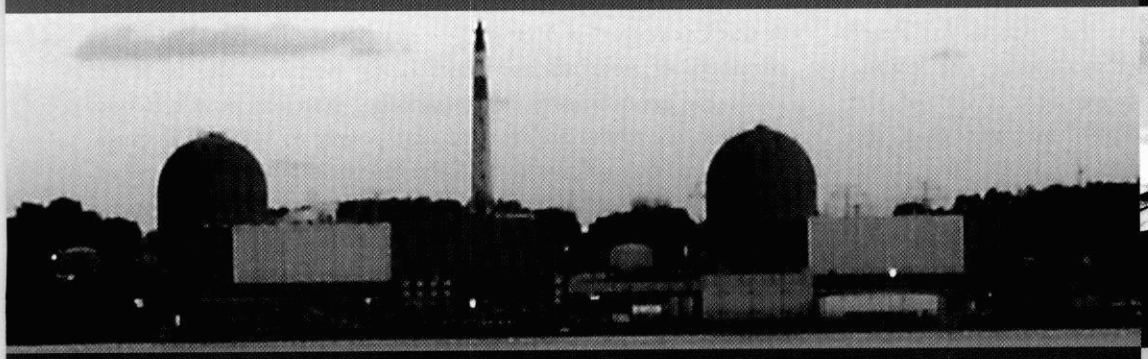
Photography

Front Cover, Saturn x-ray device, Credit: U.S. Department of Energy.

Back Cover, Environmental workers at Fernald, Credit: U.S. Department of Energy.

P6, Interim storage of solid transuranic waste at Idaho National Engineering & Environmental Laboratory, Credit: U.S. Department of Energy.

P9, Indian Point power plant, on the Hudson River, 24 miles north of New York City, Credit: Elena Pousada.



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Nuclear Power Costs: *High and Higher*

BY ARJUN MAKHIJANI, Ph.D.

After the spectacular crash of the 1950s propaganda of nuclear power that would be "too cheap to meter," evidenced in dozens of cancelled nuclear power plants because they were too costly to build or complete, there is a new push for nuclear power in the United States. Some advocates of a nuclear power "renaissance" are basing their appeals on the notion that nuclear power will be an inexpensive way to get new baseload capacity and to combat global warming. Others believe that it may become economical if there is a high enough price on carbon dioxide emissions.

Cost estimates of nuclear power

The principal cost associated with commercial nuclear power is the capital cost of the plant. Operating costs consist of fuel, which is generally low enriched uranium; other operating and maintenance costs constitute a relatively small fraction of the total cost of nuclear power. The costs of spent fuel management and disposal as well as decommissioning costs would be in addition to these two items.

Capital costs of nuclear power consist mainly of two components:

- The "overnight cost" of the power plant – this is the cost that would be incurred if the plant could be built at once.
- Additional costs incurred during construction, notably interest costs.

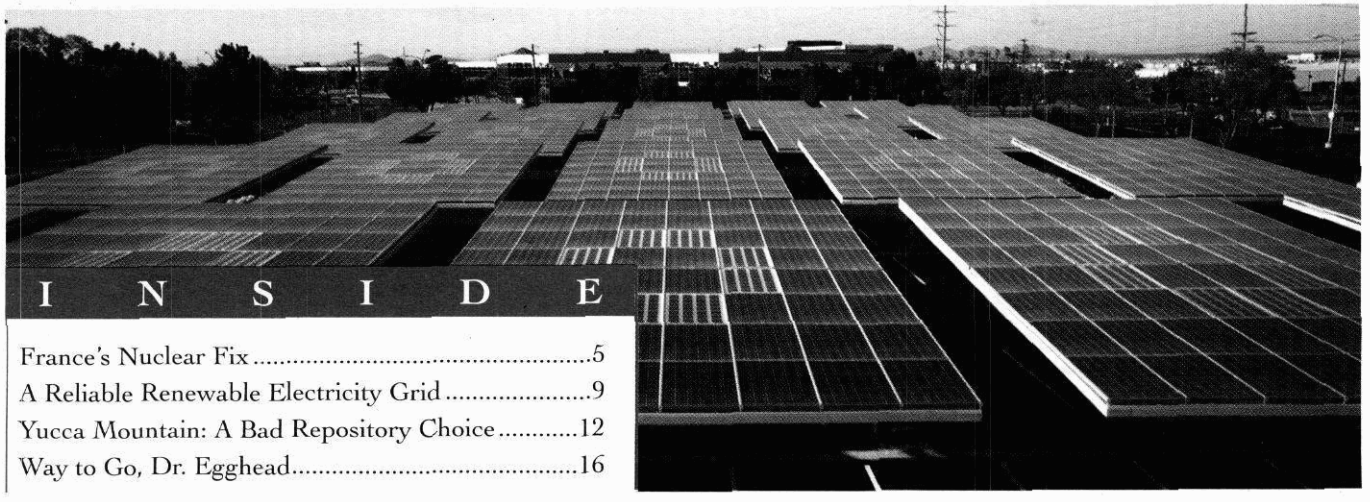
The overnight cost of nuclear power is a matter of some debate. A 2003 MIT report, which advocates building nuclear power plants, estimated it at $2,000 per kilowatt (kW), while a 2004 University of Chicago study estimated it at $1,500 per kW.[1] Current U.S. estimates and actual experience in Western Europe with the European Pressurized Water Reactor are much higher.

For instance, the CEO of Duke Energy, which wants to build nuclear power plants, gave his estimate of the capital cost of $2,500 to $2,600 per kW.[2] Using $2,500 per kW as the starting point, the overnight capital cost contribution to electricity cost alone is over 4 cents per kilowatt-hour (kWh). Interest during construction would add 1 to 2 cents per kWh (depending on borrowing rates, risk premium, and construction time). Fuel costs and other operating and maintenance costs are 1.5 to 2 cents.[3] Adding 0.1 cent per kWh for spent fuel disposal (the current federal charge) and a small charge for decommissioning[4] gives a total cost of about 7 cents to over 8 cents per kWh.

These are costs based on industry figures and the assumptions of those who favor nuclear power. A more realistic consideration was made by a joint fact-finding committee, which included nuclear industry personnel as well as those more skeptical of a renewed role for nuclear power. It was put together by the Keystone Center. Its cost investigation concluded that completed nuclear power plant capital costs, including interest during construction, would be in the range of $3,600 to $4,000 per kilowatt. The resultant cost estimates are shown in Table 1, on the following page, reproduced from Table 6 of the Keystone Center's report.

SEE **NUCLEAR POWER COSTS** ON PAGE 2, ENDNOTES PAGE 4

Solar Grove, San Diego, California. The parking lot of Kyocera's North American headquarters is a 25-panel, 235-kilowatt solar electric generating system that also provides shade for 186 vehicles.



I N S I D E

Table 1: Estimated nuclear electricity costs from new power plants in the United States

Cost Category	Low Case	High Case
Capital Costs	4.6	6.2
Fuel	1.3	1.7
Fixed O&M	1.9	2.7
Variable O&M	0.5	0.5
Total (Levelized Cents/kWH)	**8.3**	**11.1**

Source: Keystone Center

Real world experience is proving to be even more problematic. The only nuclear power plant being constructed in the West that is well along in its construction is a European Pressurized Water Reactor (EPR) being built in Finland by AREVA, the French reactor vendor and reprocessing company. The cost of the reactor, which is rated at 1,600 megawatts, was originally estimated at 3 billion euros, but it has now escalated to 4.5 billion euros. At the present rate of exchange, this amounts to about $4,000 per kW, which is at the high end of the capital cost estimate made by the Keystone Center report. Moreover, the reactor is not yet complete. So far, there has been a two year delay.[5]

Wall Street casts a skeptical eye on nuclear power plants and no company is ready to order one without federal loan guarantees.

Notably, AREVA made a turnkey contract with Finland, agreeing to absorb all costs more than 3.2 billion euros.[6] Since the company is about 85 percent owned by the French government, French taxpayers will pick up most of the cost overrun. Evidently, the hidden hand of the nuclear power industry is to be found in the pocketbooks of taxpayers' or ratepayers, or both.

Wall Street and nukes

No new nuclear power plants have been ordered in the United States since 1978. The last one that was actually completed and put into operation was ordered in October 1973.

The risks of nuclear power are such that Wall Street casts a skeptical eye on nuclear power plants and no company is ready to order one without federal loan guarantees. That is why despite all the talk of a "nuclear renaissance," no company in the United States has as yet ordered a nuclear power plant, though some have applied for various kinds of licenses that will be necessary to build one. The nuclear industry is waiting with a large hat in hand for 100 percent loan guarantees from the federal government, which would lower interest costs.

The Wall Street firm Moody's estimated in October 2007 that the "all-in" capital nuclear costs of new nuclear plants (including interest during construction and upgrades to existing sites with nuclear power plants needed for construction) were being underestimated and that they would likely be in the range of $5,000 to $6,000 per kW. Using the latter figure would increase the Keystone Center report's upper end estimate of nuclear

SEE NUCLEAR POWER COSTS ON PAGE 3, ENDNOTES PAGE 4

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electricity from new plants to about 14 cents per kWh (since the capital cost would increase from 6.2 cents per kWh to about nine cents per kWh).

Views from the industry

Many in the industry, such as the Duke Energy CEO, understand that nuclear power is risky, which is why they are pressing for government loan guarantees. However, some would-be nuclear entrepreneurs are still promoting a retro-1950s fantasy of cheap nuclear power.

For instance, the 2007 Integrated Resource Plan of the western U.S. electricity producer PacifiCorp estimates that a new nuclear power plant can be built for $2,635 per kW, including interest during construction. Using a low effective rate for interest and return on equity, the annual capital charges are estimated at only $210.97 per kW.[7] At an 85 percent capacity factor, this means that the capital cost of nuclear power would amount to only 2.8 cents per kWh in 2006 dollars. This is lower than the MIT study, which was done in 2003 — and costs have escalated for nuclear as well as coal-fired and wind power plants since that time.

PacifiCorp further estimates operating and maintenance costs of about 2.3 cents per kWh, for a total cost of electricity of about 5.1 cents per kWh. Given the trends in costs, this is far lower than any realistic estimate of nuclear electricity, such as that in the Keystone Center study or the actual costs being incurred in the Finnish EPR project. It would be interesting to know if PacifiCorp would stand behind its estimate and provide a turnkey project to, for instance, the State of Utah along the same lines that AREVA provided to Finland — that is, a fixed total installed cost, including all construction and interest costs.[8]

As a more extreme example, Alternate Energy Holdings, Inc., proposes to build the European Pressurized Water Reactor in Owyhee County in southwestern Idaho. In a radio interview on July 30, 2007,[9] the following interchange took place between the host and the company's CEO, Don Gillispie:

> Interviewer: And it's a 3.5 billion dollar plant.
> Mr. Gillispie: Yeah. They're not cheap. New plants produce electricity power very cheaply but they have high capital cost. Normally the capital cost, as you may know, in any investment is not borne by the, it's really borne by the investors pretty much and the lenders, but essentially we can produce electricity between 1 and 2 cents a kilowatt-hour. There is nothing in the United States that can do that. The only thing that comes close to that is hydro. Of course, we're dying on hydro. Hydro's down to six percent of our power source in the U.S.

While part of Mr. Gillispie's statement is realistic — that expanding hydropower significantly is not a viable option — the rest of the exchange is misleading. First, fuel and non-fuel operating costs are very unlikely to be as low as one cent per kWh. The higher estimate of 2 cents would be more typical of current costs, into which the recent run-up in uranium prices has not been factored. Given high uranium prices and shortages of skilled labor, the operating and maintenance costs could well be higher. The Keystone Center report estimated them to be in the range of 3.7 to 4.9 cents per kWh. Even PacifiCorp estimated them at about 2.3 cents per kWh.

Second, while investors and lenders normally provide the capital, they do not do this as a public service or charity. They do it to get a return on investment. Given the risk of nuclear projects, investors would normally demand a premium for investing in them. These costs are included in the electricity rates and must be paid by consumers – that is, the people and businesses in Idaho who would purchase the power and those outside the state who may choose to buy it. These costs, including interest during construction, would be on the order of 4 to 6 cents per kWh, and possibly more.

Alternatives to nuclear

Besides all this, there is the real risk that nuclear power plants will be economically obsolete before they are built. Wind energy is already more economical than nuclear energy. Expansion of wind capacity is taking place rather rapidly, especially in some parts of the United States.

A review of solar photovoltaic (PV) costs in my book, *Carbon-Free and Nuclear-Free*, indicates that installed solar PV costs are likely to be $2,000 per peak kilowatt or less within the next decade.[10] The U.S. Department of Energy (DOE) expects solar energy to be competitive in a few years. It has stated that solar energy is "on track to reduce the cost of electricity produced by PV from current levels of $0.18-$0.23 per kWh to $0.05-$0.10 per kWh by 2015 — a price that is competitive in markets nationwide."[11]

Given this prognosis, solar electricity costs may well be about equal to or less than the costs of nuclear electricity by 2015, which is the earliest possible date at which a new nuclear power plant could come on line in the United States. Further, intermediate-scale solar energy, such as that installed on large commercial rooftops and in large parking lots (see photo on page 1), will not have transmission or distribution costs added to it, unlike nuclear electricity. If such installations supply entire neighborhoods, some distribution costs will be incurred, since investments to upgrade distribution systems will likely be needed. Typically, that cost might be 1 to 2 cents per kWh.

If the delivered cost of solar electricity to the commercial sector is in the 5 to 10 cents per kWh range and if that to the residential sector from intermediate station installations is in the 7 to 12 cents range, new nuclear power plants will become economically obsolete rather soon, possibly before the first example of the "nuclear renaissance" comes on line.

Nuclear electricity is at least as risky today as it was in the 1970s when a wave of plants was ordered, resulting in dozens of cancelled plants and tens of billions of dollars in wasted money. Will consumers and taxpayers have to bail out the nuclear industry again, incurring tens of billions of dollars in additional costs? They already have once in the

SEE **NUCLEAR POWER COSTS** ON PAGE 4, ENDNOTES PAGE 4

form of "stranded costs" in the 1990s when nuclear utilities were deregulated.

This time the stakes are much higher than just money. We have precious little time to waste on pursuing false economic trails, particularly ones that create more nuclear waste and proliferation headaches than we already have. Those who say that nuclear power should "remain on the table" as an option should have the burden of proof, since IEER has already shown that a reliable electricity system can be built without it and without fossil fuels (see accompanying article on page 9).[12]

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3. The Nuclear Energy Institute gives fuel costs in 2006 as 0.46 cents per kWh and other operating and maintenance costs as 1.26 cents per kWh, for a total operating cost in 2006 of 1.72 cents per kWh. On the Web at www.nei.org/resourcesandstats/nuclear_statistics/costs.
4. The Nuclear Regulatory Commission estimates that shutting down and decommissioning a reactor "may cost $300 million or more…." See www.nrc.gov/reading-rm/basic-ref/students/decommissioning.html. The Keystone report assumed a decommissioning cost of $500 million. Based on this the cost would be less than 0.1 cent per kWh. See Keystone Center, *Nuclear Power Joint Fact-Finding* (Keystone, CO: Keystone Center, June 2007), on the Web at www.keystone.org/spp/documents/FinalReport_NJFF6_12_2007(1).pdf.
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6. Dominique Voynet, Coût du nucléaire français à l exportation pour le contribuable," 21 juin 2006, on the Web at http://dominiquevoynet.net/v2/index.php/2006/06/21/18-cout-du-nucleaire-francais-a-lexportation-pour-le-contribuable.
7. PacifiCorp used a payment factor of only 8.01 percent to estimate annual cost for an investment of $2,635. Interestingly, the company assumed a higher payment factor for wind power of 9.48 percent. (PacifiCorp, *2007 Integrated Resource Plan* (PacificCorp: Portland, OR, 2007), p. 95, on the Web at http://psc.state.wy.us/htdocs/dwnload/irp/2007PacifiCorpIRP.pdf).
8. Peter Bradford, former Nuclear Regulatory Commission member, suggested this as a strategy to officials in Utah during a visit there on November 2, 2007. PacifiCorp's IRP states that it is investigating nuclear power as a "viable option" for the future.
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France's Nuclear Fix?

BY ARJUN MAKHIJANI, Ph.D.[1]

The nuclear establishment regularly points to France as the model nuclear energy state. Almost eighty percent of its electricity comes from nuclear power plants. It reprocesses its spent nuclear fuel to recover the plutonium, which it makes into mixed oxide fuel – a mixture of plutonium dioxide and depleted uranium dioxide called MOX fuel. This supplies 30 percent of the fuel for 20 of its 58 reactors.

This "recycling" is held up as the solution to nuclear waste problems — with the implication that France has solved them. All this is supposed to help solve the problem of reducing carbon dioxide emissions (and there is near general agreement that this is a global imperative of considerable urgency). Finally, the French public is said to be more sensible in that they support clean nuclear energy as distinct from the skepticism of the U.S. public.

Let us disentangle the fairy tales from the facts. First the facts from the side of the ledger that the nuclear establishment loves:

1. France does get nearly 80 percent of its electricity from nuclear power.
2. It does reprocess most of its uranium spent fuel at the largest commercial reprocessing facility in the world, located on the Normandy Peninsula at La Hague. France has two reprocessing units there, one for reprocessing domestic spent fuel and the other for foreign spent fuel. The site also stores highly radioactive liquid waste arising from reprocessing and highly radioactive glass logs that result from mixing the high-level liquid waste with molten glass. The volume of these radioactive glass logs is about a third of the volume of the spent fuel that is reprocessed.
3. France imports all of its uranium requirements.
4. MOX fuel generates less than ten percent of France's nuclear electricity.

Now for some of the inconvenient realities.

Pollution from reprocessing

Like every other country that has nuclear power plants, France has a large and complex nuclear waste problem that it is nowhere close to solving. Reprocessing and vitrification do reduce the volume of high-level radioactive waste, but they create other problematic waste streams.

For instance, the La Hague plant uses a pipeline to discharge hundreds of millions of liters of liquid radioactive waste into the English Channel each year, polluting the oceans all the way to the Arctic. This egregious pollution continues on the basis of a disingenuous renaming of liquid waste as "discharges." If the same waste were put into 55-gallon drums and dumped overboard from a ship, it would be illegal under the 1970 London Dumping Convention. But somehow the "discharges" are permitted. Twelve of the fifteen governmental parties to the Oslo-Paris agreement have asked France and Britain, which has two reprocessing plants in Northwestern England, to stop these discharges, to no avail. It is a weak treaty – the abstaining parties, Britain and France, are not required to comply.

Further, reprocessing creates new streams of solid waste. For instance, there are significant volumes of waste contaminated with plutonium, called long-lived intermediate-level waste in France, much of which is like transuranic waste in the United States. This is designated for disposal in a deep geologic repository, along with the highly radioactive vitrified waste. French waste data do not allow easy comparison of reprocessing and non-reprocessing waste volumes for repository waste. But it should be noted that the volume of French long-lived intermediate waste to be disposed of in a repository is more than ten times greater than the volume of high-level waste.[2]

Then there is the contaminated uranium that is recovered as part of the reprocessing system. Table 1 shows the approximate composition of fresh and spent fuel from a pressurized water reactor (the type used in France and also the most common one in the United States).

Table 1: Approximate composition of pressurized water reactor fuel (rounded)

Material	Fresh Fuel (weight percent)	Spent Fuel (weight percent)	Comments
Uranium-235	4	1	Each kilogram of enriched fuel creates about seven kilograms of depleted uranium in the course of enrichment
Uranium-238	96	94	
Plutonium (plus smaller amounts of other transuranic radionuclides)	0	1	Mixture of various isotopes from Pu-238 to Pu-242. Can be used to make nuclear weapons. Predetonation is more likely for bombs made with reactor-grade plutonium than with weapon-grade plutonium.
Fission products	0	4	Fission products contain the vast majority of the radioactivity in the spent fuel.

Note: Trace quantities of U-234 and activation products are not shown. Reproduced from Arjun Makhijani, Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy *(Takoma Park, MD: IEER Press; Muskegon, MI: RDR Books), 2007. On the web at www.ieer.org/carbonfree/.*

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Only about one percent of mass of spent fuel is plutonium. This is the part that is "recycled." This recycled part creates MOX spent fuel which has a degraded isotopic composition of plutonium that is more complex to reprocess and more difficult to use in light water reactors. Eventually MOX spent fuel will likely be disposed of in a deep geological repository along with the vitrified waste and transuranic waste.

Reprocessing and depleted uranium waste

Ninety-five percent of the mass of spent fuel is uranium, almost all of it uranium-238, which is not a fissile material. This uranium is contaminated with traces of fission products, plutonium, and other radioactive materials. In theory it can be re-enriched and used as a fuel, but since it is contaminated, it makes the problem of processing and enrichment of uranium more complex and costly.

For starters, the equipment for uranium processing and enrichment gets contaminated with these materials, which are much more radioactive per unit mass than natural or low-enriched uranium. France conveniently sends this contaminated uranium to Russia,[3] which apparently does not mind contaminating its enrichment plants. It should be noted that the U.S. compensation program for nuclear weapons workers exposed to radiation was triggered in large measure by the revelations that the Paducah enrichment plant in Kentucky had been contaminated with plutonium[4] and other transuranic radionuclides and that these materials may have contributed significantly to worker radiation exposure.[5]

Even if the contamination of the enrichment plants is accepted, the vast majority of the uranium, which is non-fissile uranium-238, would have to be disposed of as a waste. Proponents of nuclear power since the 1950s have dreamed that uranium-238 would be converted to fuel in "breeder reactors" which would use plutonium as a fuel, but make even more from uranium-238 – an energy system that was described as a "magical" energy source for that reason by Alvin Weinberg, the first director of Oak Ridge National Laboratory.

But despite $100 billion of expenditures (1996 dollars) worldwide, the combination of reprocessing and breeder reactors has never been commercialized.[6] In fact breeder reactors have operated so erratically – some well, some poorly – that there is no realistic prospect of significant use of commercial breeders for decades. So far as reprocessing is concerned, France, which operates the most efficient of the world's commercial reprocessing plants, spends about two cents more for every kilowatt-hour generated from MOX fuel, compared to uranium fuel.

Reprocessed uranium would add to the vast amounts of depleted uranium that has been generated as a result of enriching uranium for reactor fuel. Like the United States, France has not solved either problem. In recent years, there have been calls for disposing of depleted uranium as a Class A low-level radioactive waste in shallow land burial, even though such disposal would create long-term radiation doses greatly in excess of present-day radiation protection standards.[7] Disposal of reprocessing-derived uranium would be even worse, because it has a greater radioactivity per unit mass.

When radioactivity and biological impacts are taken into account, depleted and reprocessing-derived uranium would have to be disposed of in a deep geologic repository, as is transuranic waste. This would add to the burdens of waste disposal that have not yet been solved in any country.

Deep geologic repository

Finally, France will still need a deep geologic repository for its high-level and transuranic waste. Its repository program has faced public opposition not much different from that in the United States. For instance, France, like the United States, had planned to characterize two different repository rocks, including one in granite. When the names of the possible granite sites were announced, the public uproar caused the second repository site to be abandoned in 2000[8], much as the U.S. granite sites were abandoned under pressure in 1986. An earlier attempt to characterize a repository had to be abandoned in the face of militant opposition from farmers who raised gourmet chickens ("poulets de Bresse") in the region.[9]

Like the United States, France is characterizing just one repository, which continues to face significant technical and political issues.

Accident and security risks

France is rightly proud of its culinary and viticultural traditions. As noted above, a part of the militant opposition to a nuclear waste repository was motivated by farmers who supply gourmet chickens designed to please particular Parisian palates. Yet, little attention has been given as to what would happen if there were to be a severe accident releasing large amounts of radioactivity, of the same order of magnitude as Chernobyl. Such an accident is less probable in France. Its reactors are of a different design, for one thing. Yet, while the mechanisms would be different and the probability is likely lower, the occurrence of such an accident would irreparably harm the finest traditions of the country. When I debated a French proponent of nuclear power in Paris in the 1990s and pointed this out, much of the audience was shocked at this realization.

Despite a larger use of plutonium fuel than any other country, France has a huge stock of surplus plutonium. As of 2005, 81 metric tons of plutonium were stockpiled at La Hague, of which about 51 metric tons belonged to France.[10] France does not have much scope to expand its plutonium fuel consumption, since only eight more reactors (for a total of 28) are suitable for using MOX fuel up to 30 percent in the reactor core. The plutonium is stored in tens of thousands of containers. There is a risk of terrorist attacks either on the plutonium stocks or on the liquid high level waste tanks.

There are also proliferation risks, the most notable of which relates to Japan. France reprocesses Japanese spent fuel and has helped Japan to build and commission a large commercial reprocessing plant, Rokkasho-mura.[11] Japan

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has had ambitions to use MOX fuel in its reactors for many years, but to date has not yet used any due to a host of problems. Its breeder reactor program has also been plagued with difficulties, including a sodium fire at its Monju demonstration plant in 1995.

The temptation to weaponize stocks of surplus plutonium separated in commercial reprocessing plants was most dramatically expressed when Ichiro Ozawa, the leader of Japan's Labor Party, opined in 2002 that Japan could use its commercial nuclear assets to make thousands of nuclear weapons if China got too powerful and "inflated."[12]

Overall, the security problem of surplus plutonium continues to mount. There were about 250 metric tons of surplus commercial separated plutonium around the world in 2005, with the British stock being even larger than the French – at 107 metric tons. Britain continues to reprocess though it does not have even a single reactor that is using MOX fuel. One of its two reprocessing plants suffered a large internal leak of highly radioactive material and has been closed for two years.

The Keystone Center Joint Nuclear Fact-Finding (NJFF), which included nuclear industry representatives, had some rather stark cautions about reprocessing risks and about the promotion of reprocessing by the Bush administration's Global Nuclear Energy Partnership (GNEP):

> *While the NJFF agrees with several premises of the GNEP, the program is not a strategy for resolving either the radioactive waste problem or the weapons proliferation problem. The NJFF group agrees with the following proliferation concerns that GNEP attempts to address:*
>
> - All grades of plutonium, regardless of the source, could be used to make nuclear explosives and must be controlled.
> - Reprocessing poses a problem in non-weapons states Widespread use of mixed-oxide fuel by both weapons states and non-weapons states is similarly troublesome.
> - Even in the weapons states, plutonium must be protected, and one should not increase stocks of plutonium in separated or easily separated forms such as mixed-oxide fuel.
>
> *The NJFF participants believe that critical elements of the GNEP are unlikely to succeed because:*
>
> - GNEP requires the deployment of commercial scale reprocessing plants, and a large fraction of the U.S. and global commercial reactor fleets would have to be fast reactors.
> - To date, deployment of commercial reprocessing plants has proven uneconomical.
> - Fast reactors have proven to be uneconomical and less reliable than conventional light-water reactors.
>
> Although it is not its aim, the GNEP program could encourage the development of hot cells and reprocessing R&D centers in non-weapons states, as well as the training of cadres of experts in plutonium chemistry and metallurgy, all of which pose a grave proliferation risk.[13]

French nuclear decision-making

France made the decision to go massively for nuclear power in 1973, when the oil crisis pointed up the vulnerability of its electricity system, which used oil for nearly 40 percent of its generation. While nuclear power allowed France to essentially eliminate oil from its electricity sector (it has been around two percent in recent years), there was not much open debate about the merits of heavy reliance on nuclear. The opposition to nuclear power was largely overridden with rhetoric of energy independence. But in fact France imports all of its uranium – only the nine percent or so of its nuclear electricity that is derived from plutonium can reasonably be described as using domestic fuel. And it is as dependent as ever on oil imports because of the rising use in the transportation sector.

France's less than adequate public checks on the massive nuclear expansion was made much easier by the fact that it had just one electric utility, Electricité de France (EdF), that was 100 percent government-owned. Even today EdF is over 80 percent government-owned. Cogéma, the reprocessing company, was also 100 percent government-owned. Today it is part of the conglomerate AREVA, which is more than 80 percent French government-owned.

Conclusions

The French model of imposing added costs on its ratepayers and taxpayers, of polluting the oceans in the face of protests from neighboring governments, and of accumulating vast amounts of domestic and foreign surplus plutonium hardly seems like a model for the United States or anyone else to follow. As noted in the accompanying articles, there is a reasonable, clear path to a renewable energy-based electricity sector that does not involve the headaches and risks of nuclear power, which is, moreover, expensive. There is not a shortage of low to zero-CO_2 energy sources. There are two limitations that are much more critical:

- The amount of time we have to address the problem of drastically reducing CO_2 emissions is small and shrinking.
- The amount of money is limited, so it should be applied where it will do the most good in the shortest period of time.

Nuclear plants will take many years to build. As noted in the article on nuclear power plant costs (page 1), there is a reasonable prospect that intermediate-scale solar power may make nuclear power economically obsolete in a decade or less, especially if public policies would be designed to favor it in that period instead of nuclear power.

France fixed the problem of its dependence on oil for electricity generation by going massively nuclear, but in doing so, it opened a whole other can of worms. Following in France's nuclear footsteps is not nearly as appetizing as the nuclear proponents have made it out to be. Even the French are having second thoughts. Less than 31 percent of the French public favor nuclear energy as a response to today's energy crisis. 54 percent are now opposed to investing 3 billion euros in the construction of a new reactor, while 84 percent favor the development of renewable energy.[14] But the French are stuck and will be for some time, since they have dug a much deeper nuclear hole for themselves proportionally than the United States.

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Endnotes

1. IEER's website has a considerable number of materials relating to nuclear power in France. Under Publications, see "Low Carbon Diet without Nukes in France," "Cogéma: Above the Law", and "Plutonium End Game." Under ***Science for Democratic Action***, see Vol. 9, No. 2; Vol. 13, No. 4; and Vol. 14, No. 2.
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11. See "Rokkasho: A Troubled Nuclear Fuel Cycle Complex" by Masako Sawai in SDA Vol. 9, No. 4. On the web at www.ieer.org/sdafiles/vol_9/9-4/.
12. Reuters. *Japanese nukes could counter China* - politician, April 6, 2002. Dateline: Tokyo. On the Web at www.nci.org/02NCI/04/japan-articles.htm. Viewed on December 2, 2007.
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A Reliable Renewable Electricity Grid in the United States

BY ARJUN MAKHIJANI, Ph.D.[1]

Can an electricity grid consisting entirely of renewable energy sources be made at least as reliable as the one we have today in the United States? A lack of a clear answer to this question has, until now, persuaded many thoughtful people that nuclear power should be "left on the table" as we phase out the use of fossil fuels, especially coal, to generate electricity due to climate change concerns.

Today, coal is the fuel for about half of U.S. electricity consumption. Nuclear and natural gas fuel about 19 percent each. Almost all the rest comes from hydropower, geothermal and wood waste. Wind and solar contribute less than one percent, almost all of it from the former. Electricity generation is overwhelmingly centralized, with about 95 percent of it being generated in large power plants.

There is no question that the resources exist for a transition to a full renewable electricity sector. Just the land-based wind power resources of the top 20 states are about two-and-a-half times the entire U.S. electricity generation. They are roughly equivalent in thermodynamic terms to all of the oil output of OPEC (Organization of Petroleum Exporting Countries) combined. There are additional wind energy resources offshore. Solar energy resources on just one percent of the land area of the United States, converted to electricity at 20 percent efficiency, are three times larger than wind.

Until recently, economics has been a central problem with renewable energy compared to fossil fuels. But this does not take into account the costs of emitting CO_2, which is creating severe disruption of the Earth's climate. And for well over a decade, wind-generated electricity has been as economical as nuclear, though not as economical as coal without any cost attached to CO_2 emissions.

As noted in the accompanying article on nuclear power cost on page 1, solar photovoltaic electricity costs are declining rapidly, while nuclear electricity cost estimates are rising. Intermediate-scale and large solar PV (photovoltaic) costs are about the same as the cost of electricity generated at peak times using single-stage natural gas turbines. Solar PV costs are expected to decline to 10 cents per kWh or less in about a decade.

Further, solar thermal power plants are now beginning to be deployed on a large-scale after a hiatus of about two decades.[2] For instance, PG&E, a large Northern California utility has agreed to purchase 553 megawatts of power from a solar thermal power plant to be built in the desert areas of Southern California. It plans to expand its solar thermal power purchases to 1,000 MW by 2020, under a state mandate.[3]

Intermittency

The main issue with wind and solar is intermittency. Solar energy is by definition a daytime source, and its availability varies by season, the more so at northern latitudes. Wind energy is also intermittent; it can vary greatly from one hour to the next and from day to day, in addition to having seasonal patterns. But intermittency is not an obstacle to achieving a reliable renewable electricity sector if renewables are added to the grid in a planned manner, with due attention to geographic and other factors as well as to standby capacity.

At present, about 0.7 percent of U.S. electricity supply comes from wind and solar energy, almost all of it from wind. Increasing wind energy to 10 percent of electricity generation or more while maintaining reliability has been shown to be feasible in Europe, as for instance in Denmark, which gets about 20 percent of its electricity from wind. Increasing wind-generated electricity beyond a few percent requires additions to standby capacity in order to maintain the reliability of the electricity system.

Development of wind resources in a manner that takes advantage of the large areas over which the resource is available provides a great advantage in that it reduces the time during which aggregate generation from wind energy is low. Studies have found that the costs of wind energy integration into the grid can be kept modest or small up to fairly high levels of penetration if geographic diversity is taken systematically into account as one design factor in the utilization of the resource.

For instance, a study commissioned by the Minnesota state legislature found that the ability to forecast available wind resources was considerably improved when the geographic diversity of the wind generation was increased. Dispersing wind turbines not only reduces the time during which no or low wind energy is available, it also improves the reliability of forecasting upon which reserve capacity requirements are based. One conclusion was that the reserve requirements for Minnesota's electricity system would increase from 5 percent with no wind generation to just over 7 percent with 25 percent of the generation coming from wind. This is a rather modest cost. There is ample reserve capacity in the U.S. electricity system to meet such additional reserve requirements.

A new study done at Stanford University came to the even stronger conclusions. It examined wind farms spread over a five state area — New Mexico, Colorado, Kansas, Oklahoma, and Texas:

> It was found that an average of 33% and a maximum of 47% of yearly-averaged wind power from interconnected farms can be used as reliable, baseload electric power. Equally significant, interconnecting multiple wind farms to a common point, then connecting that point to a far-away city can allow the long-distance portion of transmission capacity to be reduced, for example, by 20% with only a 1.6% loss of energy.

The fraction of reliable capacity can also be increased by coordinating additions to capacity with solar energy. Wind often blows at night, making it very advantageous to join

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wind and solar development in a way that would reduce costs for the same reliability.

Overall reliability planning

Whatever approach is chosen for future electricity development, planning at various levels – local, state, regional, and federal – is essential for maintaining reliability, not to speak of improving it.

Wind and solar can and should be coordinated with hydropower and natural gas standby. At prices in excess of $6.50 per million Btu of natural gas, as at present, it is economical to use natural gas as a standby for wind power. As solar PV costs decline to the level of about 10 cents per kWh (that is by about 50 percent from the present level of about 20 cents per kWh), natural gas standby can also be economically used for solar electricity. No additional natural gas capacity is needed, since a large surplus of natural gas capacity already exists in the country. Electric utility and independent generator natural gas capacity utilization was under 19 percent in 2006. This is because a huge amount of natural gas capacity was built in the 1990s and the first years of the present decade under the assumption that natural gas prices would remain low. But they have not. This economic error provides a great opportunity to both minimize the use of natural gas and rapidly increasing the fraction of solar and wind energy in the electricity system and maintaining the overall reliability of the system. This conclusion needs to be translated into specifics for the development of renewable energy in each grid that is operated in the United States, and overall for the three grid regions in the lower 48 states – the Eastern Interconnect, the Western Interconnect, and the Texas grid known as ERCOT (Electric Reliability Council of Texas).

With appropriate planning and policies regarding efficiency, reserve capacity requirements, coordination of solar and wind development to increase reliability, there should be no problem in increasing the proportion of renewables plus combined heat and power from about 5 percent at present to about 40 percent by 2030 (not including hydropower). A faster transition is also possible, given the right coordination and policies.

Beyond 15 to 20 years, significant storage capacity and some baseload capacity that operates on energy sources that are under the operator's control would be required to fully replace coal and nuclear. It is possible that the need for such capacity could be minimized through building a "smart grid" so that certain appliances in homes and businesses operate when there is renewable electricity available. But whatever the approach, reliability will require significant energy storage and baseload components.

The first thing to note is that there are fifteen to twenty years to develop and deploy such technologies on a significant scale. Sources of baseload or quasi-baseload capacity include:

- Solid biomass, such as dried algae or high productivity aquatic plants
- Hot rock geothermal energy
- Solar thermal power plants with 12-hour energy storage

Combined heat and power, hydropower, and standby combined cycle plants operated using biogas would provide additional elements of reliability and flexibility.

There are a number of energy storage technologies that could be used, including:

- Compressed air storage in underground caverns
- Advanced stationary batteries
- Batteries in electric cars and/or plug-in hybrids that would be connected to the grid when the cars are parked – a system known as "vehicle to grid" (V2G) technology. V2G can be combined with intermediate and small-scale solar PV development. Google has begun exploration of this concept in collaboration with PG&E.

Compressed air storage has already been demonstrated. Stationary batteries suitable for storage, notably sodium sulfur batteries, have been developed. Tokyo Electric Power and American Electric Power inaugurated the first U.S. sodium sulfur battery demonstration project in Columbus, Ohio, in September 2007.[4] The batteries have also been tested in Japan.

If public policy puts a suitably strong emphasis on plug-in hybrids and electric cars in the coming decade, there is every prospect that one or more electricity storage technologies will be commercialized as part of electric vehicle development. Electric cars or plug-in hybrids would make electricity storage even cheaper than stationary batteries, provided the batteries can be charged or discharged more times than is needed for the operation of the vehicle over the typical vehicle life of about ten years. Altairnano, a Reno, Nevada, company has already made lithium ion batteries that meet this test. They are being installed into an all-electric pickup truck by Phoenix Motorcars, Inc. in 2007. Such batteries are still too expensive, partly due to the newness of the technology and partly due to the small scale of manufacture.

A V2G system would be especially attractive as a form of electricity storage. Vehicles have a much larger installed power than the U.S. electricity system and, moreover, they are not in use over 90 percent of the time. A few percent of the vehicles plugged into the grid at any time and under the control of the grid operator could supply the electricity storage and power needed to maintain a reliable electricity grid.

Figure 1 shows one possible transition from the present fossil fuel and nuclear-dominated, centralized electricity sector to a distributed grid operating fully on renewable energy. Note that electricity demand remains about constant even as electric cars are introduced because homes and commercial buildings would be much more efficient. The inefficiency of present day buildings and the equipment in them is very great. Incandescent lamps, the most common kind, convert only about 3 percent of the electricity into visible light. Compact fluorescent lamps are three to four times as efficient. Light emitting diodes are

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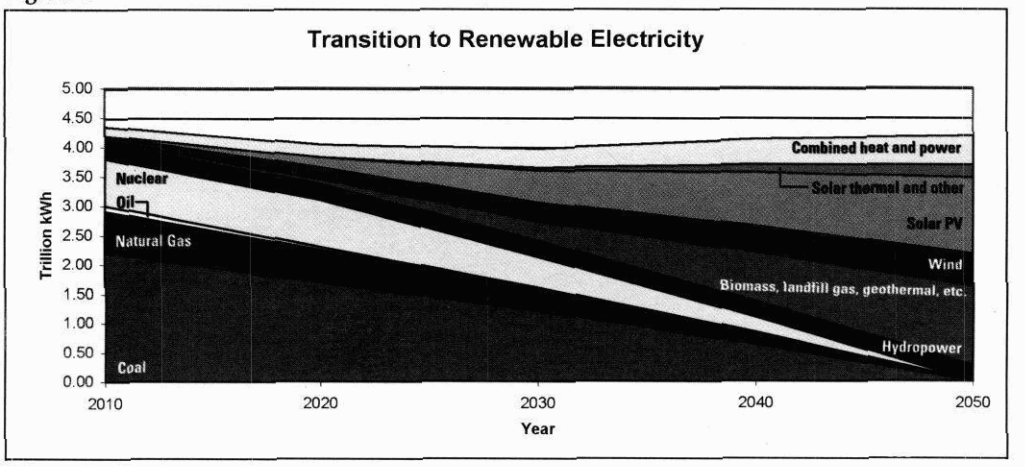
Figure 1



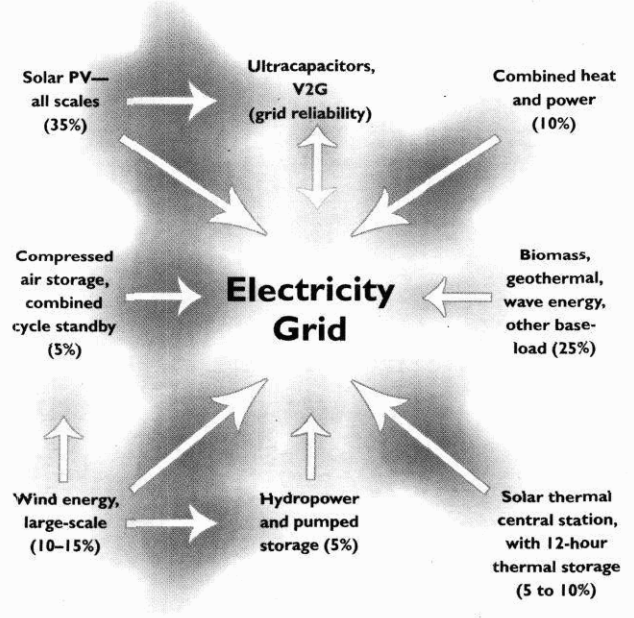
Source: IEER

more efficient than that. New lighting technologies, such as optical fibers that combine sunlight and electrical light sources to maintain constant interior lighting, are in the process of being commercialized. Similar opportunities exist in other areas of electricity use.

With a reasonable approach to efficiency and appropriate policies to coordinate the development of renewable energy sources and investments in energy storage technologies, a completely renewable electricity grid is not only technically feasible, it is the most desirable from an ecological and health standpoint. The overall cost of electricity services would remain about the same proportion of GDP as today. But there would be greater investment in efficiency relative to new generation than is typical at present.

Figure 2 shows a schematic of a fully renewable electricity grid. It is being republished here for convenience (it was also published in SDA Vol. 15, No. 1).

Figure 2



Source: IEER

A distributed grid, such as that shown in Figure 2, would be at least as reliable and far more secure that the present centralized grid. For instance, if events similar to the ones that have led to major blackouts in the past (New York 1965, Eastern United States 2003) were to occur, the whole system would not go down – local electricity sources and storage devices would still be supplying a significant fraction of the requirements. Further, a terrorist attack on one or more critical points of the transmission infrastructure would also not disrupt the entire system. By virtue of greatly reducing the impact of such an attack, the electricity system would be much less likely to be attacked.

Conclusion

There are many who have claimed that nuclear power "should be on the table" because a reliable electricity grid will require it. But this assertion has not been accompanied by any rigorous analysis to show that new nuclear power plants are actually needed. This analysis shows that neither coal nor nuclear power is needed for a reliable and secure electricity system, though it will likely take three to four decades to accomplish a complete transition to a renewable electricity system. Such a transition needs to be carefully carried out with due attention to efficiency, diversity of renewable supply, standby capacity, and storage, with the last being important at high levels of penetration. The bottom-line is clear: coal and nuclear can and should be phased out from the electricity sector simultaneously.

Endnotes

1. This article is based on Arjun Makhijani, *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy*, IEER Press and RDR Press, 2007, unless otherwise stated, especially the wind and solar energy sections in Chapter 3 and Chapter 5. References can be found there.
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Yucca Mountain, Nevada: *A Bad Repository Choice*

BY ARJUN MAKHIJANI, Ph.D.[1]

The nuclear industry has been quick to proclaim that a "nuclear renaissance" is occurring, or is at least in the offing, though not a single new reactor has been ordered at the time of this writing (mid-November 2007).

The industry has been correspondingly slow to say what will happen to all the spent fuel that will be generated by these new power plants, though the general assumption is that the government will take it away from reactor sites and do something with it – store it at its own sites (such as Savannah River Site in South Carolina), reprocess it (a variety of sites have been proposed), or put it in the proposed deep geologic repository at Yucca Mountain, Nevada.

Storage and reprocessing do not obviate the need for a repository; therefore the availability of Yucca Mountain (and/or some other yet-to-be-named repository) remains a consistent underlying theme of the much-vaunted "nuclear renaissance."

Yet, Yucca Mountain is in deep trouble (so to speak) for very good reasons. Though I have written a rather large volume of words on the topic,[2] it may serve as a useful reminder in the current context to summarize why Yucca Mountain is an unsound repository location. Indeed, in my opinion, it is the worst repository site that has been investigated in the United States. I will focus on the problems of Yucca Mountain in relation to some important criteria by which a sound repository program can be judged.

Repository standards and future radiation doses

Maximum estimated radiation doses to future generations at the time of peak dose should be within the general limits that we set for protecting our own generation. If they are expected to be much higher, then the repository will not meet the test of inter-generational equity. Yucca Mountain fails this test miserably.

Peak doses to the most exposed people are expected to be much higher than the current norms of 10 to 25 millirem per year incorporated in U.S. Environmental Protection Agency (EPA) radiation protection standards relating to nuclear facilities. Table 1 shows the various risks associated with the proposed EPA standard and with the peak doses (median and 95th percentile) estimated by the U.S. Department of Energy (DOE) in its 2002 Environmental Impact Statement.

The EPA's draft standard would limit radiation dose to 15 millirem per year for the first 10,000 years. Beyond that, it would allow half the affected people to get more than 350 millirem per year and half less. This is far in excess of present-day radiation protection norms for the general public. The average population fatal cancer risk (males and females combined) at 350 millirem per year over a lifetime is about 1 in 71, which is over 20 times the risk of a 15 millirem per year limit and over a hundred times greater than EPA's general goal of limiting lifetime fatal cancer risk to 1 in 10,000.

The draft EPA standard would allow five out of every hundred people to get radiation doses of 2,000 millirem per year or more. *At this level, the lifetime fatal cancer risk for females (over a 70-year exposure period) would be about 1 in 10. The corresponding cancer incidence risk would be 1 in 5. These last numbers are not much different than the risk of shooting oneself while playing Russian roulette – except here the present generation would be forcing it on those far in the future who had no part in our decisions.*

The Department of Energy (DOE) made its own estimates in its Final Environmental Impact Statement on Yucca Mountain. The DOE estimated that the 95th

Table 1: Projected radiation doses and cancer risks -- Yucca Mountain
Using draft EPA standard and DOE estimated peak dose estimates

	Draft EPA standard			DOE peak dose estimates (see note)	
	First 10,000 years	Median after 10,000 years	95th percentile value after 10,000 years	Median value	95th percentile value
Annual exposure, effective dose equivalent, millirem/year	15	350	2,000	140	600
Lifetime dose over 70 years, millirem	1,050	24,500	140,000	9,800	42,000
Average lifetime fatal cancer risk (males and females), expressed as 1 fatality among XXX exposed	1,656	71	12	177	41
Lifetime fatal cancer risk for females, expressed as 1 fatality among XXX exposed	1,394	60	10	149	35

Note: The DOE estimates that there will be many peaks of doses due to future climatic variations. These figures represent the largest estimated values of the peak dose. They are estimated to occur hundreds of thousands of years from the present.

SEE **YUCCA MOUNTAIN** ON PAGE 13. ENDNOTES PAGE 15

percentile of the peak dose would be about 600 millirem (see Figure 1). The lifetime fatal cancer risk to females from this dose would be about 1 in 35 (rounded). The "95th percentile" part of this means that five percent of women exposed to Yucca Mountain pollution at that time would be at greater risk than 1 in 35, while 95 percent would be at lower risk. Cancer incidence risk would be about double this value or about 1 in 17 (rounded).

EPA draft standard vs. DOE peak dose estimate

The U.S. Environmental Protection Agency is responsible for setting a limit for how much radiation the public can be exposed to by the proposed nuclear waste repository at Yucca Mountain. The EPA's draft standard would limit radiation dose to 15 millirem per year for the first 10,000 years. Beyond that, it would allow half the affected people to get more than 350 millirem per year and half less. A final standard has not been issued as of this writing (late November 2007).

In a federally-mandated environmental impact statement, the U.S. Department of Energy made projections for future radiation doses from the Yucca Mountain repository. The DOE estimated that median peak dose would be approximately 140 millirem per year and would occur roughly 400,000 to 500,000 years after repository closure.

Figure 1. Mean and 95th-percentile doses from Yucca Mountain spent fuel disposal estimated by the DOE

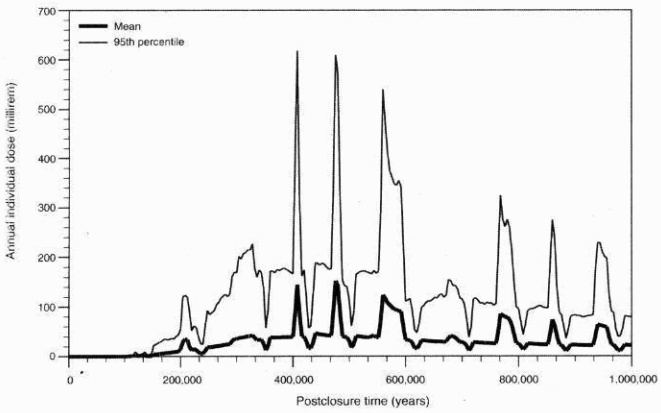
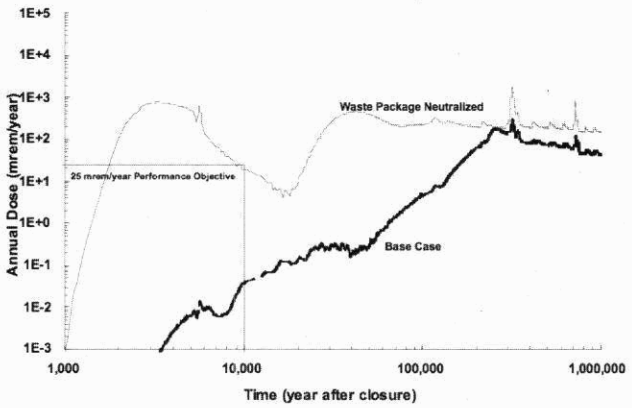


Figure 1 taken from page 5-26 of Volume 1 of the Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, February 2002. On the Web at http://www.eh.doe.gov/nepa/eis/eis0250/eis0250index.html.

Characteristics of the Yucca Mountain geologic setting

A minimum requirement of the geologic setting should be that, when the containers fail and begin to leak (and it is a question of when not if), the geology of the repository should be conducive to retarding the movement of the radioactive materials and to preventing most of them from reaching groundwater or surface water. Materials produced by the DOE for the Nuclear Waste Technical Review Board show that the Yucca Mountain rock is practically useless in holding back radioactive materials. Almost the entire functioning of the repository depends on the engineered barriers, mainly the metal containers. Unless they function as predicted by the DOE, Yucca Mountain will not meet the draft EPA standard even for the first ten thousand years. And since these containers will eventually rust, all calculations show that the peak dose will greatly exceed EPA's norms for radiation protection today.[3]

Figure 2: DOE Estimates of Yucca Mountain Total System Performance ("Base Case") and Performance without the Waste Package ("Waste Package Neutralized")



Note on y-axis figures: "1E-3" signifies 10^{-3} which also can be written 0.001. Similarly, 1E+5 = 10^{+5} = 100,000 and 1E+0 = 10^{0} = 1.

The graph in Figure 2 was prepared in 1999 by the DOE for the Nuclear Waste Technical Review Board (NWTRB), an advisory board created by Congress to oversee the Yucca Mountain Project. The Board had requested that the DOE evaluate each element in the geologic isolation system for its contribution to overall performance in meeting the then-assumed limit of 25 millirem per year for the first 10,000 years of repository operation. (No dose limit was proposed beyond that time. Later, a federal court invalidated the standard first proposed by EPA mainly because it too did not look beyond 10,000 years.

The DOE graph, supplied to the NWTRB as part of its request, shows that if the entire system were in place and performed as modeled, the dose limit of 25 millirem would be met rather easily for the first 10,000 years, though it would eventually be exceeded by a considerable margin at 100,000-plus years after repository closure. However, it shows that if the "waste package," which consists primarily of a huge metal container made of a special nickel-based alloy called C-22, degrades quickly (in hundreds of years or a few thousand years), the peak dose would rapidly increase to nearly 1,000 millirem well within 10,000 years, which is greatly in excess of any standard that has been proposed for that time period.

The waste package

As a result of the above, the reliability of the DOE estimate of the performance of the metal containers

SEE YUCCA MOUNTAIN ON PAGE 14, ENDNOTES PAGE 15

becomes critical to the performance of the repository. If the containers do not perform as estimated in the DOE's "base case" or close to it, the repository will be a terrible failure. As a result, a high confidence in the performance of these containers is essential. However, current knowledge does not admit such confidence. On contrary, basic as well as Yucca Mountain-specific considerations indicate that the waste package may degrade rather rapidly.

DOE's silver-bullet container may turn out to be a dud.

The Yucca Mountain geologic environment is oxidizing; it also has some humidity. The waste will be hot for an extended period and it will heat the surrounding materials and rock. This combination of heat, humidity, and oxygen is a recipe for rust. The rate of rusting in such an environment is a matter of some debate. The containers could, under some circumstances, corrode much faster than 10,000 years. Indeed, in some circumstances the containers may corrode in decades. Further, the metal alloy proposed for the containers is new – there is no long-term experience with its performance. As a result, there is a real possibility that DOE's silver-bullet container may turn out to be a dud. Since the repository location itself is not protective, a failure of the containers would lead to serious pollution of the groundwater and render it useless in an area where water is very scarce.

Since there is a large and growing amount of spent fuel to be disposed of, jamming a large amount of it into Yucca Mountain is a temptation. However, this would result in high temperatures in the repository conducive to rapid corrosion.[4] The DOE has so far refused to specify a repository design, though such a specification is an essential part of a minimally complete license application. The license application was due in 2002 and has not yet been filed. The DOE has stated that it will be filed in mid-2008.

Reliance on a single element of a complex system as the only guarantee of performance is risky under the best of circumstances. For instance, commercial passenger aircraft that have two engines are required to be able to operate in emergencies on only one, even though there is vast experience with jet engine reliability and performance. Redundancy is even more essential in a system of an unprecedented nature whose performance is very difficult to estimate under the best of circumstances due to the long times involved.

Redundancy in repository design means that if the containers fail, the rock should adsorb the radionuclides and prevent or greatly retard their migration into groundwater. By this criterion, Yucca Mountain is a near-total failure, since the performance of all waste isolation components taken together but without the waste package does not amount even to the proverbial hill of beans. That is the central message of Figure 2. The waste could be put in almost any geologic location with equal or better performance, since the performance of the Yucca Mountain host rock is next to nil. This is shown in Figures 3 and 4, also taken from the set produced by the DOE for the NWTRB.

Figure 3 shows that if the rocks surrounding the waste disposal zone ("unsaturated transport barrier") were removed, but the waste package performed as estimated in the "base case," there would be essentially no change in the performance of the system. In other words, the volcanic tuff at Yucca Mountain is practically useless in holding back the radionuclides once the waste package fails. Figure 4 shows that the same is true of the saturated zone. That is, once the waste reaches the groundwater, there will be no mechanism that would significantly reduce dose.

Figure 3: Unsaturated Yucca Mountain Transport Barrier Removed

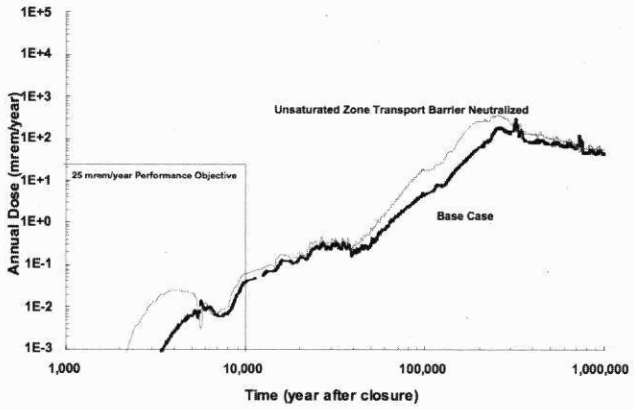
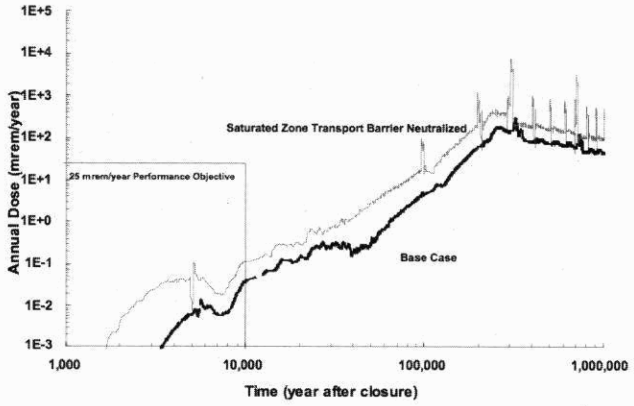


Figure 4: Saturated Yucca Mountain Transport Barrier Removed



Source for figures 2–4: U.S. DOE Office of Civilian Radioactive Waste Management, "NWTRB Repository Panel meeting: Postclosure Defense in Depth in the Design Selection Process," presentation for the Nuclear Waste Technical Review Board Panel for the Repository, January 25, 1999

Water resources

The performance of the repository in relation to groundwater matters more for Yucca Mountain because there are no surface water resources in that general region of Nevada. The only water source in the area is an aquifer

SEE YUCCA MOUNTAIN ON PAGE 15, ENDNOTES PAGE 15

that is currently being used in Amargosa Valley, just 20 miles downstream from Yucca Mountain.

The scarcity of water ensures two things. First, if the containers don't hold up, there will be little dilution and the water will become very polluted. Second, the lack of alternative water resources makes it likely that future residents may unknowingly use the polluted groundwater.

This is not a new finding. About a quarter of a century ago, the DOE had commissioned the National Research Council of the National Academy of Sciences to prepare a report that was supposed to guide it in its search for a sound repository. That report, published in 1983, four years before the 1987 legislation that restricted site characterization to Yucca Mountain, showed that radiation doses due to high-level radioactive waste disposal at Yucca Mountain could be very high, in large measure due to the scarcity of water.[5] To the best of my knowledge, the DOE does not appear to have used this report to substantially guide its repository program, though it paid for it.

The evidence shows that Yucca Mountain is an unsound repository program that should not be pursued further.

Conclusions

The evidence shows that Yucca Mountain is an unsound repository program that should not be pursued further. If there were a reasonably protective radiation standard – one that protected future generations to the time of peak dose according to present-day EPA norms – Yucca Mountain could not be licensed.

Security, health, safety, and environmental considerations indicate that the Yucca Mountain program should be scrapped and replaced by a repository program based on sound science and public health protection criteria. It should be managed not by the DOE but by an institution that does not itself generate high-level waste or spent nuclear fuel. The same considerations also point to the need for Hardened On-Site Storage (HOSS) of spent fuel as an interim step.[6]

A "nuclear renaissance" based even implicitly on the availability of Yucca Mountain for spent fuel from new reactors is founded on wrong-headed thinking similar to that of the 1950s that assumed waste disposal would be a problem that could be managed relatively easily. Based on that kind of thinking, the DOE, in the early 1980s, entered into contracts with nuclear utilities to begin take possession of spent fuel from them and start disposing it of in a deep geologic repository by January 31, 1998. That deadline has long since passed and the DOE has not even applied for a license.

The opening of Yucca Mountain, if it ever happens, appears more remote than ever for a host of reasons. Because the first repository characterization has been a costly failure so far by every reasonable measure of contract performance, assuming that the government would take responsibility for nuclear waste from new reactors decades from now may well add folly to the error of having created so much waste in the first place. Why then are so many so eager to pursue nuclear power, with its concomitant embrace of nuclear waste, when we don't need the headaches of nuclear to completely eliminate fossil fuel use from the U.S. economy?[7]

Endnotes

1. Based on "Comments of Dr. Arjun Makhijani on Yucca Mountain and the draft EPA standard submitted for the record of the Senate Environment and Public Works Committee hearing on the 'Examination of the Licensing Process for the Yucca Mountain Repository'," October 31, 2007, and on IEER comments on the EPA draft standard for Yucca Mountain, November 2005, on the Web respectively at www.ieer.org/comments/waste/yucca071031.html and www.ieer.org/comments/waste/yuccaepa.pdf
2. See IEER's web site, specifically www.ieer.org/webindex.html#waste.
3. For instance, the maximum routine exposure to the public from a single nuclear fuel cycle facility from all pathways, including air, water, and food, is limited to 25 millirem per year to any organ (except 75 millirem to the thyroid) or to the whole body. (40 CFR 190.10(a))
4. Paul P. Craig, "Rush to Judgment at Yucca Mountain," *Science for Democratic Action, Vol. 12, No. 3, June 2004*, on the Web at www.ieer.org/sdafiles/12-3.pdf
5. Waste Isolation Systems Panel, Board on Radioactive Waste Management, National Research Council. *A Study of the Isolation System for Geologic Disposal of Radioactive Waste*. Washington, DC: National Academy Press, 1983.
6. See www.ieer.org/comments/waste/yuccaalt.html for a discussion of HOSS.
7. For a roadmap to a nuclear-free renewable energy economy, see Arjun Makhijani, *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy*, IEER Press and RDR Books, 2007. On the Web at www.ieer.org/carbonfree/.

WAY TO GO, DR. EGGHEAD!

IEER's President Arjun Makhijani (a.k.a. Dr. Egghead) received two great honors the past year.

First, Ploughshares Fund honored Arjun as one of nine "Ploughshares Heroes," those who "make our world safer and our families more secure by their individual and collective actions."

Second, Arjun was elected a Fellow of the American Physical Society. Here are excerpts from the two award citations.

Congratulations, Arjun, on two well-deserved awards.

Dear Dr. Makhijani,

I have the honor of informing you that the Council of the American Physical Society at its November 2007 meeting acted favorably on your nomination for Fellowship in the Society upon the recommendation of the Forum on Physics & Society. As you may know, election to Fellowship in the American Physical Society is limited to no more than one half of one percent of the membership. Election to APS Fellowship is recognition by your peers of your outstanding contributions to physics.

The citation, which will appear on your Fellowship Certificate, will read as follows:

"For his tireless efforts to provide the public with accurate and understandable information on energy and environmental issues."

—Excerpt from the November 19, 2007, letter to Arjun Makhijani from Alan Chodos, Associate Executive Officer of the American Physical Society

Note from Arjun Makhijani: I am deeply grateful for this extraordinary recognition. Much of the credit should be shared with the staff of IEER, who, over the years, have contributed so greatly to the integrity and accessibility of my work. I would also like to thank Kitty Tucker and Bob Alvarez, who introduced me around 1980 to the idea of work on the health and environmental effects of nuclear weapons production and testing.

And thanks to the Ploughshares Fund, in turn a Hero for IEER. Its consistent and generous support has enabled the long-term work that underlies our common victories for health, environment, and disarmament.

Arjun Makhijani, Ploughshares Hero

"In a real, practical sense," says Arjun Makhijani, "the first arms control treaty was an environmental one." Public protests in the 1950s about contamination of breast milk and babies' teeth with strontium-90 were central to the 1963 Partial Test Ban Treaty. It is no surprise, then, that the near-total cessation of new nuclear weapons production in the U.S. over the past two decades has come largely in response to the people and organizations who have challenged the production and testing of nuclear weapons on the basis of the environmental devastation they cause.

Makhijani himself is a key reason these challenges have succeeded. A physicist whose Institute for Energy and Environmental Research conducts its own rigorous independent investigations into nuclear programs and their environmental liabilities, Makhijani has trained hundreds of activists who live in the shadows of nuclear weapons facilities, providing them with everything from a basic grasp of nuclear physics to more advanced understandings needed to engage the weapons establishment with sound, scientific arguments.

"It is a remarkable fact of nuclear weapons history that every nuclear weapon state has first of all harmed its own people in the name of national security," he says. From leaking underground waste tanks at Hanford in Washington, to radioactive tritium contaminating the Savannah River in South Carolina and Georgia, to new threats of environmental damage from reprocessing waste, Makhijani has documented the threats and questioned the standards used to measure risk. Most importantly, he has stood side by side with local groups who have worked to shut down the offending facilities and ensure that contaminated soil and waterways are cleaned up.

—Excerpt from Ploughshares Fund, Annual Report 2005-2006, on the Web at www.ploughshares.org/annual_reports.php. The eight other Ploughshares heroes were: Edie Allen, Thomas B. Cochran, Gloria Duffy, Gareth Evans, Pervez Hoodbhoy, Rebecca Johnson, Vladimir Orlov, and Amy Smithson.

The Institute for Energy and Environmental Research
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Takoma Park, MD 20912 USA

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Public Service Commission

February 19, 2008

R. Wade Litchfield, Vice President and
Associate General Counsel – Regulatory
Florida Power & Light Company
215 South Monroe Street, Suite 810
Tallahassee, Florida 32301-1859

Re: Return of Confidential Document to the Source, Docket No. 070650-EI

Dear Mr. Litchfield:

Commission staff have advised that confidential Document No. 00848-08, filed with the Commission but not admitted in the record at the hearing, can be returned to the source. Also enclosed is an extra copy of this document passed out to the Commission's General Counsel. The documents are enclosed.

Please do not hesitate to contact me if you have any questions concerning return of this material.

Sincerely,

AC

Ann Cole
Commission Clerk

AC:mhl
Enclosure

cc: Katherine Fleming, Office of the General Counsel
Shevie Brown, Division of Economic Regulation

DOCUMENT NO. DATE
09541-07 2/21/08
FPSC - COMMISSION CLERK

RECEIVED Ann LeBrun **DATE** 2/21/08

State of Florida

Public Service Commission

-M-E-M-O-R-A-N-D-U-M-

DATE: February 8, 2008

TO: Ann Cole, Commission Clerk

FROM: Jane Faurot, Chief, Hearing Reporter Services Section

RE: DOCKET NO. 070650-EI, HEARING HELD 01/30 - 02/01/08.

Attached for filing are exhibits 16 through 103, representing a partial filing of the exhibits identified and admitted into the record during the proceedings held in the above docket.

FPSC, CLK - CORRESPONDENCE
☑ Administrative ☐ Parties ☐ Consumer
DOCUMENT NO. 09541-07
DISTRIBUTION: _____

Acknowledged BY:

JF/rlm

Marguerite McLean

070650-EI ①

From: WIESE Martha W (AREVA NP INC) [Martha.Wiese@areva.com]
Sent: Tuesday, February 05, 2008 3:07 PM
To: Marguerite Lockard
Subject: RE: Procurement of a Confidential Document

Marguerite -

Thank you for your assistance.
Martha

Martha W. Wiese
AREVA NP Inc.
An AREVA and Siemens company
Strategic Planning Analyst
3315 Old Forest Road
Lynchburg, VA 24501
Tel: 434 832-3983
Fax: 434 832-3840
Email: martha.wiese@areva.com

From: Marguerite Lockard [mailto:MLOCKARD@PSC.STATE.FL.US]
Sent: Tuesday, February 05, 2008 2:57 PM
To: WIESE Martha W (AREVA NP INC)
Cc: Shevie Brown; Katherine Fleming; Ann Cole; Kimberley Pena; Tim Devlin; Jennifer Brubaker
Subject: RE: Procurement of a Confidential Document

Martha,
I have checked with staff and they have informed me that since you are not a party in the docket, the Commission will not be able to provide you with a copy of Confidential Document No. 00848-08 in Docket No. 070650-EI.

It is suggested that you contact FPL for this request.

thank you.
Marguerite H. Lockard
Commission Clerk II
Public Service Commission
1-850-413-6824

From: WIESE Martha W (AREVA NP INC) [mailto:Martha.Wiese@areva.com]
Sent: Monday, February 04, 2008 4:33 PM
To: Marguerite Lockard
Subject: Procurement of a Confidential Document

Marguerite -

Thank you for following up on the illegible fax. We are looking for document #00848-08, an exhibit that was filed during a hearing.

(2)

I am with a company called AREVA NP Inc. We service FPL's nuclear reactors on a regular basis and in fact just completed an outage at St. Lucie #2. We are aware that they are looking into the possibility of building two new nuclear power plants at their Turkey Point facility and in fact have discussed this with them. I have a copy of the initial filing but would like to have access to this document as well, if possible.

Thank you for your assistance.
Martha

Martha W. Wiese
AREVA NP Inc.
An AREVA and Siemens company
Strategic Planning Analyst
3315 Old Forest Road
Lynchburg, VA 24501
Tel: 434 832-3983
Fax: 434 832-3840
Email: martha.wiese@areva.com

(3)

Marguerite McLean

From: Marguerite Lockard
Sent: Tuesday, February 05, 2008 2:53 PM
To: Jennifer Brubaker; Katherine Fleming; Shevie Brown
Subject: RE: Docket No. 070650-EI - Procurement of a Confidential DN 00848-08

ok, thanks.

From: Jennifer Brubaker
Sent: Tuesday, February 05, 2008 2:47 PM
To: Katherine Fleming; Marguerite Lockard; Shevie Brown
Subject: RE: Docket No. 070650-EI - Procurement of a Confidential DN 00848-08

Katherine is correct - if Ms. Wiese wishes to view the docket, she will need to sign a non-disclosure agreement or make similar arrangements with FPL.

From: Katherine Fleming
Sent: Tuesday, February 05, 2008 2:42 PM
To: Marguerite Lockard; Shevie Brown
Cc: Jennifer Brubaker
Subject: RE: Docket No. 070650-EI - Procurement of a Confidential DN 00848-08

This document is confidential and it should be treated as confidential. One of the parties, at the hearing, did not get to view the documents either because it is confidential. In order to view the documents, they really need to contact FPL. Please check with Jennifer to confer if this is correct.

Thanks.

From: Marguerite Lockard
Sent: Tue 2/5/2008 2:16 PM
To: Shevie Brown
Cc: Katherine Fleming
Subject: RE: Docket No. 070650-EI - Procurement of a Confidential DN 00848-08

should i e-mail Martha Wiese and advise her that more than likely she will not be able to obtain this confidential document from the PSC since they are not a party to the case., & we're waiting for confirmation from our GCL. And advise her to contact FPL for the document?

From: Shevie Brown
Sent: Tuesday, February 05, 2008 2:12 PM
To: Marguerite Lockard
Subject: RE: Docket No. 070650-EI - Procurement of a Confidential DN 00848-08

No...I am not sure she is here today.

From: Marguerite Lockard
Sent: Tuesday, February 05, 2008 2:08 PM
To: Shevie Brown
Subject: RE: Docket No. 070650-EI - Procurement of a Confidential DN 00848-08

(4)

any word from Katherine yet ?

From: Shevie Brown
Sent: Tuesday, February 05, 2008 8:40 AM
To: Marguerite Lockard; Katherine Fleming
Cc: Tim Devlin; Ann Cole; Kimberley Pena
Subject: RE: Docket No. 070650-EI - Procurement of a Confidential DN 00848-08

I don't believe she'll be allowed to view these items mainly to the fact that she was not a party to the case. If anything, she would need to contact FPL for this request (since she mentioned she services their nuclear reactors on a regular basis. I will yield to Katherine just to make sure my views are correct.

From: Marguerite Lockard
Sent: Tuesday, February 05, 2008 8:32 AM
To: Shevie Brown; Katherine Fleming
Cc: Tim Devlin; Ann Cole; Kimberley Pena
Subject: Docket No. 070650-EI - Procurement of a Confidential DN 00848-08

Shevie & Katherine,

the Clerk's Office has received a request for a copy of Confidential Document No. 00848-08 in Docket No. 070650-EI. The Document is Confidential Hearing Exhibit No. 98 [(updated forecast by ICF) from 1/30-31/08 and 2/1/08 hearing].

Before i make a formal memo request to Tim Devlin, i wanted to check with ya'll 1st to see if these people should have access to this document. If not, i will refer Martha Wiese to one of ya'll to talk with her.

thanks,
Marguerite.

From: WIESE Martha W (AREVA NP INC) [mailto:Martha.Wiese@areva.com]
Sent: Monday, February 04, 2008 4:33 PM
To: Marguerite Lockard
Subject: Procurement of a Confidential Document

Marguerite -

Thank you for following up on the illegible fax. We are looking for document #00848-08, an exhibit that was filed during a hearing.

I am with a company called AREVA NP Inc. We service FPL's nuclear reactors on a regular basis and in fact just completed an outage at St. Lucie #2. We are aware that they are looking into the possibility of building two new nuclear power plants at their Turkey Point facility and in fact have discussed this with them. I have a copy of the initial filing but would like to have access to this document as well, if possible.

Thank you for your assistance.
Martha

Martha W. Wiese
AREVA NP Inc.

(5)

An AREVA and Siemens company
Strategic Planning Analyst
3315 Old Forest Road
Lynchburg, VA 24501
Tel: 434 832-3983
Fax: 434 832-3840
Email: martha.wiese@areva.com

(6)

Marguerite McLean

From: Marguerite Lockard
Sent: Wednesday, February 06, 2008 8:37 AM
To: Katherine Fleming
Subject: RE: Procurement of a Confidential Document

yes...thanks....

From: Katherine Fleming
Sent: Wednesday, February 06, 2008 8:33 AM
To: Marguerite Lockard
Cc: Shevie Brown
Subject: RE: Procurement of a Confidential Document

It's not that she's not a party, she just need to sign a non-disclosure agreement with FPL. There was a party to the proceeding that wasn't able to view the confidential documents because they did not sign the non-disclosure agreement. So, even if she would have been a party, she still would have had to sign a non-disclosure agreement to view the document. Regardless, she really should contact FPL.

Hope this helps.

From: Marguerite Lockard
Sent: Tuesday, February 05, 2008 2:57 PM
To: 'WIESE Martha W (AREVA NP INC)'
Cc: Shevie Brown; Katherine Fleming; Ann Cole; Kimberley Pena; Tim Devlin; Jennifer Brubaker
Subject: RE: Procurement of a Confidential Document

Martha,
I have checked with staff and they have informed me that since you are not a party in the docket, the Commission will not be able to provide you with a copy of Confidential Document No. 00848-08 in Docket No. 070650-EI.

It is suggested that you contact FPL for this request.

thank you.
Marguerite H. Lockard
Commission Clerk II
Public Service Commission
1-850-413-6824

From: WIESE Martha W (AREVA NP INC) [mailto:Martha.Wiese@areva.com]
Sent: Monday, February 04, 2008 4:33 PM
To: Marguerite Lockard
Subject: Procurement of a Confidential Document

Marguerite -

Thank you for following up on the illegible fax. We are looking for document #00848-08, an exhibit that was filed during a hearing.

(7)

I am with a company called AREVA NP Inc. We service FPL's nuclear reactors on a regular basis and in fact just completed an outage at St. Lucie #2. We are aware that they are looking into the possibility of building two new nuclear power plants at their Turkey Point facility and in fact have discussed this with them. I have a copy of the initial filing but would like to have access to this document as well, if possible.

Thank you for your assistance.
Martha

Martha W. Wiese
AREVA NP Inc.
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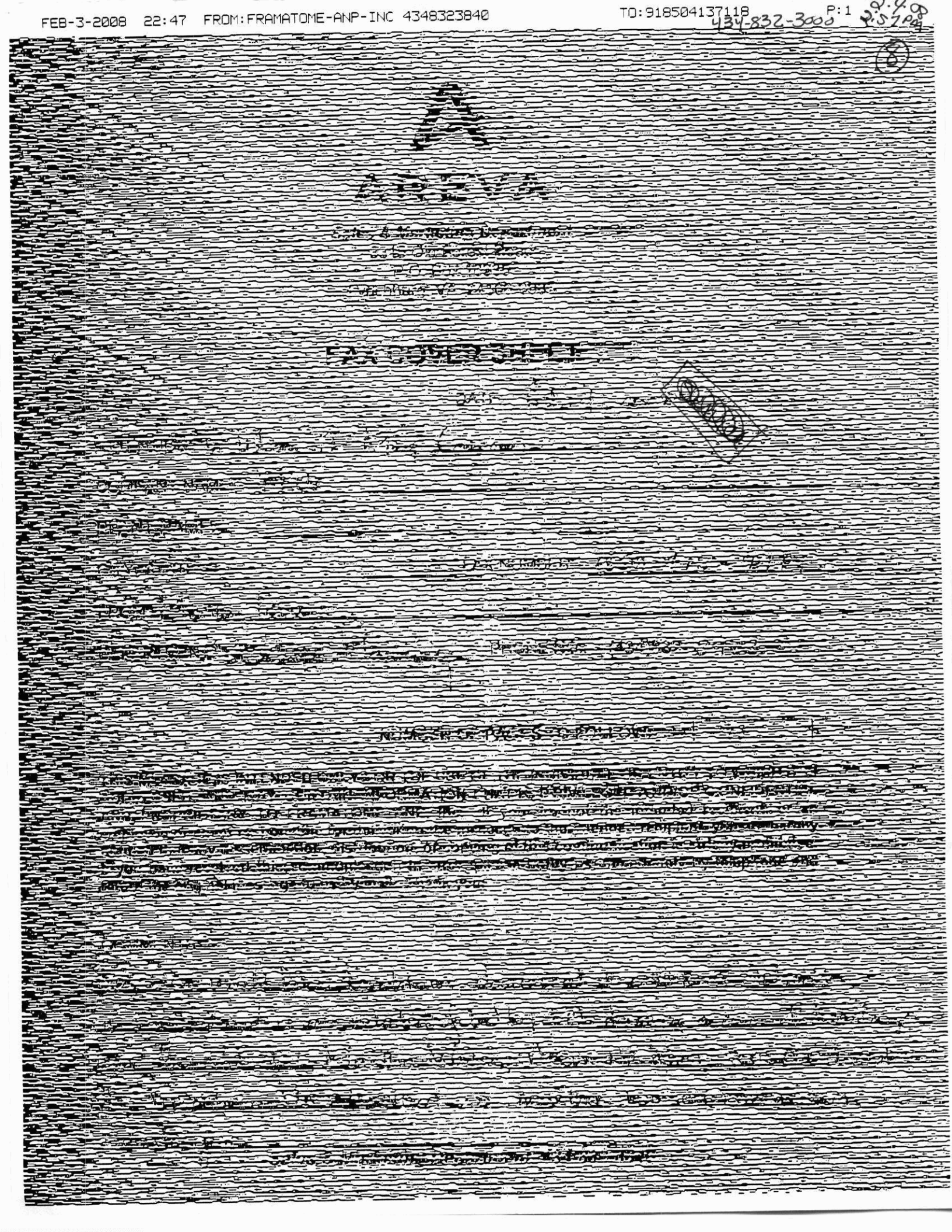
Tel: 434 832-3983
Fax: 434 832-3840
Email: martha.wiese@areva.com

434-832-3000 P.S 7 pg

(8)



State of Florida

Public Service Commission

-M-E-M-O-R-A-N-D-U-M-

DATE: January 31, 2008

TO: Ann Cole, Commission Clerk

FROM: Jane Faurot, Chief, Office of Hearing Reporter Services

RE: Docket No. 070650-EI, Hearing Held 01/30/08

Attached for filing are Exhibits 14 and 15 representing a partial filing of the exhibits identified and admitted into the record during the proceedings held in the above docket.

Acknowledged BY:

JF/rlm

State of Florida

Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: January 30, 2008

TO: Timothy J. Devlin, Director, Division of Economic Regulation

FROM: Jennifer Brubaker, Attorney Supervisor, Office of the General Counsel
Caroline Klancke, Staff Attorney, Office of the General Counsel

RE: Docket No. 070650-EI - Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Pursuant to Chapter 11.04-13c of the Administrative Procedures Manual, staff requests approval to make 14 copies of the following confidential document:

Document Description: Document No. 10888-07 – Response to Staff's fourth Request for Production of Documents (No. 16) – ICF International's report titled "U. S. Emissions & Fuel Market Outlook, 2006 Edition.

If necessary to answer questions at the hearing in Docket No. 060650-EI, scheduled for January 30 – February 1, 2008, staff will give one copy of the confidential exhibits to each of the following people:

Chairman Carter
Commissioner Edgar
Commissioner McMurrian
Commissioner Skop
Commissioner Argenziano
Court Reporter
Office of the Public Counsel
R. Wade Litchfield/John T. Butler (on behalf of FPL)
Bob and Jan Mr. Karsowski (appearing pro se Krasowski)
Frederick M. Bryant/Daniel B. O'Hagan (on behalf of FMEA and FMPA)
Bruce Page/Suzanne S. Brownless (on be half of JEA)
Roy C. Young (on behalf of OUC
Vicki Gordon Kaufman (on behalf of Seminole Elec. Coop.)
Katherine E. Fleming, Jennifer S. Brubaker, Caroline Klancke (PSC staff)

Approved
Thr Dah
1-30-08

After the hearing staff will collect the confidential exhibits and file them with the Division of Commission Clerk. The pages will then be shredded.

cc: Office of the Commission Clerk (Lockard)
Jennifer Brubaker
Caroline Klancke
Patti Zellner

(2)

Marguerite Lockard

From: Marguerite Lockard
Sent: Wednesday, January 30, 2008 3:18 PM
To: Caroline Klancke; Jennifer Brubaker
Cc: Tim Devlin; Michael Cooke; Patti Zellner
Subject: DN 10888-07 - Docket No. 070650-EI - Request to make copies

I will need a memo from GCL to Tim Devlin/ECR requesting copies to be made of Confidential DN 10888-07 for today's hearing. The one i received was not sufficient for appropriate approval of copying of this confidential document. Pursuant to APM 11.04 C.6.c(2)(d), the "responsible division director/office head" [OPR] in a particular docket is to authorize the copying of confidential documents.
thank you.

State of Florida

Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: January 30, 2008

TO: Jennifer Brubaker, Attorney Supervisor, Office of the General Counsel

FROM: Caroline Klancke, Staff Attorney, Office of the General Counsel

RE: Docket No. 070650-EI - Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

We request that Patti Zellner be given permission to check out the following confidential document to make fourteen copies for the Commissioners and staff in preparation for the hearing scheduled for January 30 through February 1, 2008. The copied documents will be returned to CCA at the conclusion of the hearing. The confidential document is:

Document No. 10888-07 – Response to Staff's Fourth Request for Production of Documents (No. 16) – ICF International's report titled "U.S. Emissions & Fuel Market Outlook, 2006 Edition.

RECEIVED-FPSC
08 JAN 30 AM 11:32
COMMISSION
CLERK

cc: Marguerite Lockard

Matilda Sanders PSC-08-0057-PCO-EI

From: Theresa Walsh
Sent: Monday, January 28, 2008 8:21 AM
To: CLK - Orders / Notices; Jennifer Brubaker; Caroline Klancke; Katherine Fleming
Subject: Order / Notice Submitted

Date and Time: 1/28/2008 8:18:00 AM
Docket Number: 070650
Filename / Path: 070650or.intv.Seminole.jsb.doc
Order Type: Signed / Hand Deliver

FPSC, CLK - CORRESPONDENCE
☑ Administrative ☐ Parties ☐ Consumer
DOCUMENT NO. 09541-07
DISTRIBUTION: _____

Please issue the above-referenced Order Granting Intervention in Docket No. 070650 today. Because this order is signed by Commissioner Skop, the original is on its way to you.

2/2/7

RECEIVED-FPSC
08 JAN 28 AM 10:42
COMMISSION CLERK

Matilda Sanders

From: **Matilda Sanders**
Sent: **Monday, January 28, 2008 12:44 PM**
To: **Jennifer Brubaker**
Cc: **Caroline Klancke; Katherine Fleming; Theresa Walsh**
Subject: **RE: Order / Notice Submitted**

Ok I'll change it.

From: Jennifer Brubaker
Sent: Monday, January 28, 2008 12:43 PM
To: Matilda Sanders
Cc: Caroline Klancke; Katherine Fleming; Theresa Walsh
Subject: RE: Order / Notice Submitted

Thanks so much, Matilda - I'm so glad you caught these! You're correct, the FPL response to Seminole's intervention petition was on 12/10/07, *not* 12/19/07. The word "FMPA", last sentence of the second paragraph, should be changed to "Seminole." All else is correct - Seminole filed its Motion for leave to file a reply on 12/12/07, and footnote 1 is also appropriate for the Seminole order.

From: Matilda Sanders
Sent: Monday, January 28, 2008 12:36 PM
To: Jennifer Brubaker
Cc: Caroline Klancke; Katherine Fleming; Theresa Walsh
Subject: RE: Order / Notice Submitted
Importance: High

Jennifer,

Can you check this Order, pg 1 2nd paragraph This is Seminole's Order.

On December 19, 2007, FPL filed a response in opposition to Seminole's petition. On December 12, 2007, FMPA filed a Motion for Leave to File a Reply to FPL's response in opposition. (at the end of this paragraph was a footnote number 1)

FPL (Butler) - Response in opposition to Seminole's petition to intervene. Was filied on 12/10/07

Seminole (Kaufman) - Motion for leave to file a reply; Reply to FPL's response in opposition to Seminole's petition to intervene. Was filed 12/12/07

It looks like incorrect date on 12/19/07 to 12/10/07, then, FMPA filed a Motion..... to Seminole filed a Motion..... ?.

Also, Jennifer what about that footnote 1 will that be correct for this being Seminole?

Please advise,

I'm working on these Intervention Orders now.

Matilda

From: Theresa Walsh
Sent: Monday, January 28, 2008 8:21 AM
To: CLK - Orders / Notices; Jennifer Brubaker; Caroline Klancke; Katherine Fleming
Subject: Order / Notice Submitted

FLORIDA PUBLIC SERVICE COMMISSION
CASE MANAGEMENT SYSTEM
PARTICIPATING EMAIL ADDRESSES FOR DOCKET 070650

PARTY NAME	COMPANY CODE	EMAIL ADDRESS	ADDRESS IN MASTER COMMISSION DIRECTORY
Bob and Jan M. Krasowski		Minimushomines@aol.com	No
Florida Municipal Electric Association (07)		bmoline@publicpower.com	No
Florida Municipal Power Agency (07a)		roger@fmpa.com	No
Florida Power & Light Company	EI802	wade_litchfield@fpl.com	No
Florida Power & Light Company (Juno07g)		Wade_litchfield@fpl.com	No
JEA (08)		DickJA@jea.com	No
Orlando Utilities Commission (07)		kksionek@ouc.com	No

State of Florida

Public Service Commission

-M-E-M-O-R-A-N-D-U-M-

DATE: January 23, 2008

TO: Ann Cole, Commission Clerk

FROM: Jane Faurot, Chief, Hearing Reporter Services Section

RE: DOCKET NO. 070650-EI, HEARING HELD 01/09/08.

Attached for filing are exhibits 1 through 13, representing a complete filing of the exhibits identified and admitted into the record during the proceedings held in the above docket.

Acknowledged BY:

Shannon Kiel

JF/rlm

ADMINISTRATIVE

Matilda Sanders PSC-08-0037-CFO-EI

From:	Theresa Walsh
Sent:	Monday, January 14, 2008 11:10 AM
To:	CLK - Orders / Notices; Katherine Fleming; Caroline Klancke; Jennifer Brubaker
Subject:	Order / Notice Submitted
Date and Time:	1/14/2008 11:08:00 AM
Docket Number:	070650
Filename / Path:	070650or.conf.kef.doc

DOCUMENT NO. DATE
09541-07 10/18/07
FPSC - COMMISSION CLERK

Please issue the above-referenced Order Granting Florida Power & Light Company's Request for Confidential Classification in Docket 070650-EI today. Because this order is signed by Commissioner Skop, the original is on its way to you.

1/2/3

RECEIVED-FPSC
08 JAN 14 PM 1:04
COMMISSION CLERK

FLORIDA PUBLIC SERVICE COMMISSION
CASE MANAGEMENT SYSTEM
PARTICIPATING EMAIL ADDRESSES FOR DOCKET 070650

PARTY NAME	COMPANY CODE	EMAIL ADDRESS	ADDRESS IN MASTER COMMISSION DIRECTORY
Bob and Jan M. Krasowski		Minimushomines@aol.com	No
Florida Power & Light Company	EI802	wade_litchfield@fpl.com	No
Florida Power & Light Company (Juno07g)		Wade_litchfield@fpl.com	No

Printed on 1/14/2008 at 3:19 PM

Matilda Sanders PSC-08-0036-PCO-EI **ADMINISTRATIVE**

From:	Theresa Walsh
Sent:	Monday, January 14, 2008 11:08 AM
To:	CLK - Orders / Notices; Katherine Fleming; Caroline Klancke; Jennifer Brubaker
Subject:	Order / Notice Submitted
Date and Time:	1/14/2008 11:06:00 AM
Docket Number:	070650
Filename / Path:	070650or.tpo.kef.doc

DOCUMENT NO. DATE

09541-07 10/18/07

FPSC - COMMISSION CLERK

Please issue the Order Granting Motion for Temporary Protective Order in Docket - 070650-EI today. Because this order was signed by Commissioner Skop, the original is on its way to you.

1/2/3

RECEIVED-FPSC
08 JAN 14 PM 1:04
COMMISSION CLERK

FLORIDA PUBLIC SERVICE COMMISSION
CASE MANAGEMENT SYSTEM
PARTICIPATING EMAIL ADDRESSES FOR DOCKET 070650

PARTY NAME	COMPANY CODE	EMAIL ADDRESS	ADDRESS IN MASTER COMMISSION DIRECTORY
Bob and Jan M. Krasowski		Minimushomines@aol.com	No
Florida Power & Light Company	EI802	wade_litchfield@fpl.com	No
Florida Power & Light Company (Juno07g)		Wade_litchfield@fpl.com	No

Matilda Sanders

From: Sandy Simmons
Sent: Friday, December 21, 2007 3:11 PM
To: Matilda Sanders
Subject: Proposed Changes to Form 070650-EI-00001

Attachments: CCS Form 070650-EI-00001-009.pdf

CCS Form
50-EI-00001-00

Docket Number 070650-EI - Form Number 070650-EI-00001-009

Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Add new appointment - Day 1 of a 1-day Oral Argument - 01/07/2008 - 9:30 a.m.-12:00 p.m. - in Tallahassee - Room E-148 - Involving Skop

Attached is a Case Scheduling/Rescheduling Advice (CSRA) in the referenced docket. If you have any questions regarding the form, please contact Sandy Simmons at 413-6008.

Case Scheduling/Rescheduling Advice

Last Revised 12/21/2007 at 3:09 p.m.

To:

[X] Commissioner Carter	[X] Deputy Executive Director	[X] Economic Regulation
[X] Commissioner McMurrian	[X] General Counsel	[X] Court Reporter
[X] Commissioner Argenziano	[ ] Strategic Analysis & Gov. Affairs	[X] Staff Contact - Tom Ballinger
[X] Commissioner Skop	[X] Commission Clerk	[ ]
[X] Executive Director	[ ] Competitive Markets/Enforcement	[ ]
[X] Public Information Officer	[X] Reg. Compliance/Consumer Asst.	[ ]

From: Office of Chairman Lisa Edgar

Docket Number: 070650-EI -- Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Oral Argument		01/07/2008	Tallahassee / E-148	9:30 a. - 12:00 p.

2. Hearing/Prehearing Assignment Information

Hearing Officers

Former Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		

Current Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					
ED	CT	MM	AG	SK	ADM

Commissioners					
ED	CT	MM	AG	SK	ADM
				X	

Remarks: Oral argument to be held before PHO Skop.

Matilda Sanders PSC-07-1019-PCO-EI

From: Theresa Walsh
Sent: Friday, December 28, 2007 8:18 AM
To: CLK - Orders / Notices; Katherine Fleming; Jennifer Brubaker; Adrienne Vining
Subject: Order / Notice Submitted

Date and Time: 12/28/2007 8:13:00 AM
Docket Number: 070650
Filename / Path: 070650or.intv.grant.krasowski.kef.doc

Please issue the ORDER GRANTING INTERVENTION in 070650 today. Because this order is signed by Commissioner Skop, the original is on its way to you.

Please make sure moved to Internet today. Thank you
Mary (per Commissioner's Office)

11/2/3

State of Florida

Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: December 24, 2007

TO: Chairman Lisa Polak Edgar
Commission Matthew M. Carter II
Commissioner Katrina J. Tew
Commissioner Nancy Argenziano
Commissioner Nathan A. Skop

FROM: Sandy Simmons, Scheduling Coordinator

RE: Docket No.070650-EI – Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant by Florida Power & Light Company.

The location listed below has been reserved for the purpose of holding a customer service hearing on January 9, 2008 at 4:00 p.m. in the referenced docket.

Miami Dade College
Wolfson Campus Auditorium
(Building 1000, 2nd Floor, Room 1261)
300 NE 2nd Avenue
Miami, FL
Contact: Victoria Hernandez 305-237-7563

A map and directions to the college and a map of the campus are attached for your convenience. If you have any questions regarding the hearing location please let me know.

Cc: Office of General Counsel (Brubaker, Fleming)
Office of Public Information (Muir, DeMello, Brunson)
Division of Economic Regulation (S. Brown)
Office of Hearing Reporter Services (Boles)
Office of Commission Clerk (Wang, Docket File)

Attachment

Marguerite Lockard

From:	Timolyn Henry
Sent:	Monday, December 24, 2007 9:58 AM
To:	CLK - Orders / Notices
Cc:	Jennifer Brubaker; Samantha Cibula
Subject:	Order / Notice Submitted
Date and Time:	12/24/2007 9:51:00 AM
Docket Number:	070650-EI
Filename / Path:	070650.Notice of Oral Argument.jsb.doc
Notice Type:	Memo for Issuance

2pg

NOTICE OF ORAL ARGUMENT

Please make sure the agency notice is e-mailed to all parties in the docket (including persons who have filed for intervention).

Thank you all.

4/2/14

Matilda Sanders

From: Sandy Simmons
Sent: Monday, December 10, 2007 12:05 PM
To: Matilda Sanders
Subject: Proposed Changes to Form 070650-EI-00001

Attachments: CCS Form 070650-EI-00001-008.pdf

CCS Form
50-EI-00001-00

Docket Number 070650-EI - Form Number 070650-EI-00001-008

Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Change in appointment - Day 1 of a 1-day Service Hearing - 01/10/2008 - 10:00 a.m.- 1:00 p.m. - in Miami - Involving All Commissioners

Change in appointment date
From 01/10/2008 to 01/09/2008
Change in appointment time
From 10:00 a.m.- 1:00 p.m. to 4:00 p.m.- 6:00 p.m.

Attached is a Case Scheduling/Rescheduling Advice (CSRA) in the referenced docket. If you have any questions regarding the form, please contact Sandy Simmons at 413-6008.

Case Scheduling/Rescheduling Advice

Last Revised 12/10/2007 at 12:04 p.m.

To:

[X] Commissioner Carter	[X] Deputy Executive Director	[X] Economic Regulation
[X] Commissioner McMurrian	[X] General Counsel	[X] Court Reporter
[X] Commissioner Argenziano	[ ] Strategic Analysis & Gov. Affairs	[X] Staff Contact - Tom Ballinger
[X] Commissioner Skop	[X] Commission Clerk	[ ]
[X] Executive Director	[ ] Competitive Markets/Enforcement	[ ]
[X] Public Information Officer	[X] Reg. Compliance/Consumer Asst.	[ ]

From: Office of Chairman Lisa Edgar

Docket Number: 070650-EI -- Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Service Hearing	01/10/2008	01/09/2008	Miami	4:00 p. - 6:00 p.

2. Hearing/Prehearing Assignment Information

	Former Assignments								Current Assignments							
	Commissioners						Hearing Exam.	Staff	Commissioners						Hearing Exam.	Staff
Hearing Officers	ALL	ED	CT	MM	AG	SK			ALL	ED	CT	MM	AG	SK		
									X							

	Former Assignments						Current Assignments					
	Commissioners						Commissioners					
Prehearing Officer	ED	CT	MM	AG	SK	ADM	ED	CT	MM	AG	SK	ADM
											X	

Remarks: OEP PSC-07-0869-PCO-EI, 10/30/07

Matilda Sanders

From: Sandy Simmons
Sent: Monday, December 10, 2007 10:31 AM
To: Matilda Sanders
Subject: Proposed Changes to Form 070602-EI-00001

Attachments: CCS Form 070602-EI-00001-005.pdf

CCS Form
02-EI-00001-00

BENCH DECISION MADE AT 12/10/07 HEARING. SUBSEQUENT HEARING DATES CANCELED.

Docket Number 070602-EI - Form Number 070602-EI-00001-005

Petition for determination of need for expansion of Turkey Point and St. Lucie nuclear power plants, for exemption from Bid Rule 25-22.082, F.A.C., and for cost recovery through the Commission's Nuclear Power Plant Cost Recovery Rule, Rule 25-6.0423, F.A.C.

Cancel day 2 of a 4-day Hearing - 12/11/2007 - 9:30 a.m.- 5:00 p.m. - in Tallahassee - Room E-148 - Involving All Commissioners Appointment converted to 3-day Hearing

Cancel day 2 of a 3-day Hearing - 12/12/2007 - 9:30 a.m.- 5:00 p.m. - in Tallahassee - Room E-148 - Involving All Commissioners Appointment converted to 2-day Hearing

Cancel day 2 of a 2-day Hearing - 12/13/2007 - 9:30 a.m.- 5:00 p.m. - in Tallahassee - Room E-148 - Involving All Commissioners Appointment converted to 1-day Hearing

Change in appointment - Day 1 of a 1-day Hearing - 12/10/2007 - 9:30 a.m.- 5:00 p.m. - in Tallahassee - Room E-148 - Involving All Commissioners

Change in appointment time
From 9:30 a.m.- 5:00 p.m. to 9:30 a.m.-10:20 a.m.

Attached is a Case Scheduling/Rescheduling Advice (CSRA) in the referenced docket. If you have any questions regarding the form, please contact Sandy Simmons at 413-6008.

Case Scheduling/Rescheduling Advice

Last Revised 12/10/2007 at 10:29 a.m.

To:

[X] Commissioner Carter	[X] Deputy Executive Director	[X] Economic Regulation
[X] Commissioner McMurrian	[X] General Counsel	[X] Court Reporter
[X] Commissioner Argenziano	[ ] Strategic Analysis & Gov. Affairs	[X] Staff Contact - Tom Ballinger
[X] Commissioner Skop	[X] Commission Clerk	[ ]
[X] Executive Director	[ ] Competitive Markets/Enforcement	[ ]
[X] Public Information Officer	[X] Reg. Compliance/Consumer Asst.	[ ]

From: Office of Chairman Lisa Edgar

Docket Number: 070602-EI -- Petition for determination of need for expansion of Turkey Point and St. Lucie nuclear power plants, for exemption from Bid Rule 25-22.082, F.A.C., and for cost recovery through the Commission's Nuclear Power Plant Cost Recovery Rule, Rule 25-6.0423, F.A.C.

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Hearing		12/10/2007	Tallahassee / E-148	9:30 a. - 10:20 a.
Hearing	12/11/2007	Cancelled	Tallahassee / E-148	9:30 a. - 5:00 p.
Hearing	12/12/2007	Cancelled	Tallahassee / E-148	9:30 a. - 5:00 p.
Hearing	12/13/2007	Cancelled	Tallahassee / E-148	9:30 a. - 5:00 p.

2. Hearing/Prehearing Assignment Information

Hearing Officers

Former Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		

Current Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					
ED	CT	MM	AG	SK	ADM

Commissioners					
ED	CT	MM	AG	SK	ADM
			X		

Remarks: OEP PSC-07-0819-PCO-EI, 10/11/07

STATE OF FLORIDA

OFFICE OF COMMISSION CLERK
ANN COLE
COMMISSION CLERK
(850) 413-6770

Public Service Commission

December 10, 2007

Rhonda Roff, President
Save It Now, Glades!
Post Office Box 1953
Clewiston, Florida 33440

Re: Docket No. 070650-EI - Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Dear Ms. Roff:

Please find enclosed an invoice reflecting charges for information obtained per your public records request. Please forward a check in the amount indicated, made payable to the Florida Public Service Commission. Once payment has been received, the materials will be promptly forwarded to you.

If you have any questions regarding this matter, please feel free to contact me.

Sincerely,

Marguerite H. Lockard
Commission Deputy Clerk II

mhl
Enclosure

DOCUMENT NO. DATE

09541-07 12/10/07
FPSC - COMMISSION CLERK

FLORIDA PUBLIC SERVICE COMMISSION

2540 Shumard Oak Blvd. ◆ Tallahassee, Florida 32399-0850

10537

This number must appear on all checks or correspondence regarding this invoice.

Date: 12/10/07

To: Rhonda Roff, President
Save It Now, Glades !
Post Office Box 1953
Clewiston, Florida 33440

Date Paid _____

Amount Paid _____

Check # _____

☐ Check ☐ Cash

PSC Signature _____

Please make checks payable to: FLORIDA PUBLIC SERVICE COMMISSION

QUANTITY	DESCRIPTION	PRICE	AMOUNT
61 pages	Copies of information in Docket 070650-EI for public records request	@.05¢ per page	$ 3.05
1 CD		@$1.00 per CD	$ 1.00
		TOTAL	$4.05

PSC/CCA 008-C Rev. 10/01

State of Florida

Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: May 19, 2005

TO: Chairman Lisa Polak Edgar
Commission Matthew M. Carter II
Commissioner Katrina J. Tew
Commissioner Nancy Argenziano
Commissioner Nathan A. Skop

FROM: Sandy Simmons, Scheduling Coordinator

RE: Docket No.070650-EI – Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant by Florida Power & Light Company.

The location listed below has been reserved for the purpose of holding a customer service hearing on January 10, 2008 at 10:00 a.m. in the referenced docket.

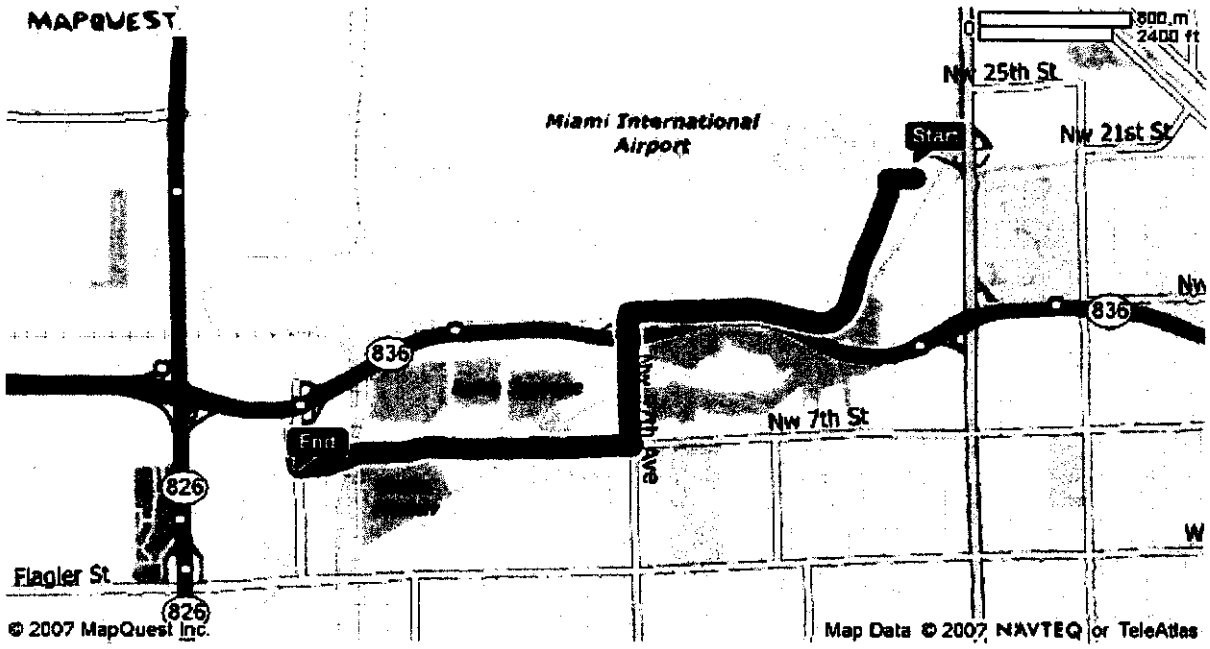
Sheraton Miami Mart Hotel
711 NW 72nd Avenue
Miami
Contact: Mindy Roman 305-260-8928

A map and directions to the hotel are attached for your convenience. (The hotel provides complimentary shuttle service from the airport.) If you have any questions regarding the hearing location please let me know.

Cc: Office of General Counsel (Fleming)
Office of Public Information (Muir, DeMello, Brunson)
Division of Economic Regulation (S. Brown)
Office of Hearing Reporter Services (Faurot, Boles)
Office of Commission Clerk (Wang, Docket File)

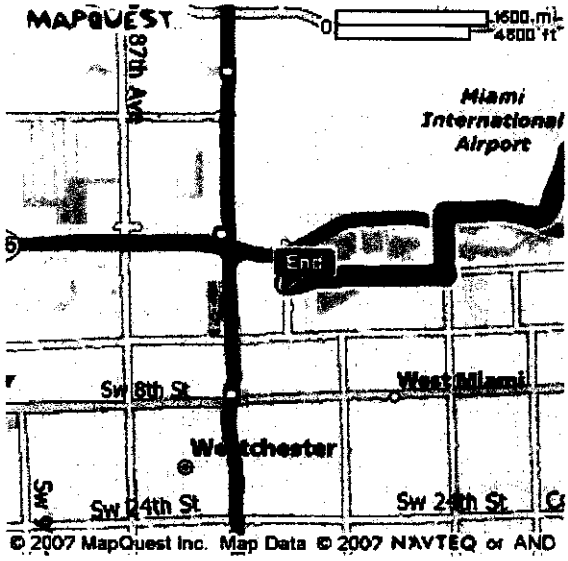
Attachment

SHERATON MIAMI MART HOTEL 711 NW 72ND AVENUE MIAMI, FL CONTACT: MINDY ROMAN 305-260-8928	
From the Miami International Airport, go **west** on **NW 20th St.**	.1 miles
Turn **left** onto **Permiter Rd.**	1.5 miles
Turn **left** onto **FL-959 S / NW 57th Ave.**	.5 miles
Turn **right** onto **NW 7th St.**	1.5 miles
Turn **right** onto **NW 72nd Ave. / Milam Dairy Rd. / FL-969 N**	<.1 miles
Keep **right at the fork** to go on **NW 72nd Ave. / Milam Dairy Rd.**	<.1 miles
Total estimated travel time: 9 minutes	Total estimated distance: 3.77 miles



Start:
Miami International Airport (MIA):
305-876-7000
Po Box 592075, Miami, FL 33159, US

End:
711 Nw 72nd Ave
Miami, FL 33126-3001, US



Matilda Sanders

From:	Theresa Walsh
Sent:	Tuesday, December 04, 2007 1:35 PM
To:	CLK - Orders / Notices; Katherine Fleming
Subject:	Order / Notice Submitted

Date and Time:	12/4/2007 1:34:00 PM
Docket Number:	070650
Filename / Path:	070650.not.serv.hrg.doc

2

FPSC, CLK - CORRESPONDENCE
☑ Administrative ☐ Parties ☐ Consumer
DOCUMENT NO. 09541-07
DISTRIBUTION: _____

Please issue the above-referenced notice today.

0/80/0

Matilda Sanders

From:	Theresa Walsh
Sent:	Tuesday, December 04, 2007 1:34 PM
To:	CLK - Orders / Notices; Katherine Fleming
Subject:	Order / Notice Submitted
Date and Time:	12/4/2007 1:33:00 PM
Docket Number:	070650
Filename / Path:	070650.Notice of Hearing and Prehearing.kef.doc
Notice Type:	Prehearing/Hearing

FPSC/CLK - CORRESPONDENCE
☑ Administrative ☐ Parties ☐ Consumer
DOCUMENT NO. 09541-07
DISTRIBUTION: _____

Please issue the above-referenced Notice today.

4

0/80/0

Matilda Sanders PSC-07-0965-PCO-EI

From:	Theresa Walsh
Sent:	Tuesday, December 04, 2007 8:13 AM
To:	CLK - Orders / Notices; Katherine Fleming
Subject:	Order / Notice Submitted
Date and Time:	12/4/2007 8:11:00 AM
Docket Number:	070650
Filename / Path:	070650or.ack.intv.opc.kef.doc

FPSC, CLK - CORRESPONDENCE
☑ Administrative ☐ Parties ☐ Consumer
DOCUMENT NO. 09541-07
DISTRIBUTION: _____

Please issue the above-referenced Order Acknowledging Intervention in 070650 today. Because this order is signed by Commissioner Skop, the original is on its way to you.

0/2/2

RECEIVED-FPSC
07 DEC -4 AM 10:43
COMMISSION CLERK

Matilda Sanders

From: Sandy Simmons
Sent: Monday, November 05, 2007 10:50 AM
To: Matilda Sanders
Subject: Proposed Changes to Form 070650-EI-00001

Attachments: CCS Form 070650-EI-00001-007.pdf

CCS Form
0-EI-00001-0

Docket Number 070650-EI - Form Number 070650-EI-00001-007

Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Add new appointment - Day 1 of a 1-day Service Hearing - 01/10/2008 - 10:00 a.m.- 1:00 p.m. - in Miami - Involving All Commissioners

Attached is a Case Scheduling/Rescheduling Advice (CSRA) in the referenced docket. If you have any questions regarding the form, please contact Sandy Simmons at 413-6008.

Case Scheduling/Rescheduling Advice

Last Revised 11/05/2007 at 10:49 a.m.

To:

[X] Commissioner Carter	[X] Deputy Executive Director	[X] Economic Regulation
[X] Commissioner McMurrian	[X] General Counsel	[X] Court Reporter
[X] Commissioner Argenziano	[ ] Strategic Analysis & Gov. Affairs	[X] Staff Contact - Tom Ballinger
[X] Commissioner Skop	[X] Commission Clerk	[ ]
[X] Executive Director	[ ] Competitive Markets/Enforcement	[ ]
[X] Public Information Officer	[X] Reg. Compliance/Consumer Asst.	[ ]

RECEIVED-FPSC
07 NOV -5 PM 3:12
COMMISSION CLERK

From: Office of Chairman Lisa Edgar

Docket Number: 070650-EI -- Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Service Hearing		01/10/2008	Miami	10:00 a. - 1:00 p.

2. Hearing/Prehearing Assignment Information

Hearing Officers

Former Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		

Current Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					
ED	CT	MM	AG	SK	ADM

Commissioners					
ED	CT	MM	AG	SK	ADM
				X	

Remarks: OEP PSC-07-0869-PCO-EI, 10/30/07

Matilda Sanders

From: Sandy Simmons
Sent: Tuesday, October 30, 2007 1:11 PM
To: Matilda Sanders
Subject: Proposed Changes to Form 070650-EI-00001

Attachments: CCS Form 070650-EI-00001-006.pdf

CCS Form
0-EI-00001-0

Docket Number 070650-EI - Form Number 070650-EI-00001-006

Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Change in appointment - Day 1 of a 1-day Prehearing Conference - Tentative - 01/14/2008 - 1:30 p.m.- 3:00 p.m. - in Tallahassee - Room E-148 - Involving Skop

Change in appointment status
From Tentative to Firm

Change in appointment - Day 1 of a 3-day Hearing - Tentative - 01/30/2008 - 9:30 a.m.- 5:00 p.m. - in Tallahassee - Room E-148 - Involving All Commissioners

Change in appointment status
From Tentative to Firm

Change in appointment - Day 2 of a 3-day Hearing - Tentative - 01/31/2008 - 9:30 a.m.- 5:00 p.m. - in Tallahassee - Room E-148 - Involving All Commissioners

Change in appointment status
From Tentative to Firm

Change in appointment - Day 3 of a 3-day Hearing - Tentative - 02/01/2008 - 9:30 a.m.- 5:00 p.m. - in Tallahassee - Room E-148 - Involving All Commissioners

Change in appointment status
From Tentative to Firm

Attached is a Case Scheduling/Rescheduling Advice (CSRA) in the referenced docket. If you have any questions regarding the form, please contact Sandy Simmons at 413-6008.

Case Scheduling/Rescheduling Advice

Last Revised 10/30/2007 at 1:09 p.m.

To:

- [X] Commissioner Carter
- [X] Commissioner McMurrian
- [X] Commissioner Argenziano
- [X] Commissioner Skop
- [X] Executive Director
- [X] Public Information Officer
- [X] Deputy Executive Director
- [X] General Counsel
- [ ] Strategic Analysis & Gov. Affairs
- [X] Commission Clerk
- [ ] Competitive Markets/Enforcement
- [X] Reg. Compliance/Consumer Asst.
- [X] Economic Regulation
- [X] Court Reporter
- [X] Staff Contact - Tom Ballinger
- [ ]
- [ ]
- [ ]

From: Office of Chairman Lisa Edgar

Docket Number: 070650-EI -- Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

RECEIVED-FPSC
07 OCT 30 AM 7:31
COMMISSION CLERK

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Prehearing Conference		01/14/2008	Tallahassee / E-148	1:30 p. - 3:00 p.
Hearing		01/30/2008	Tallahassee / E-148	9:30 a. - 5:00 p.
Hearing		01/31/2008	Tallahassee / E-148	9:30 a. - 5:00 p.
Hearing		02/01/2008	Tallahassee / E-148	9:30 a. - 5:00 p.

2. Hearing/Prehearing Assignment Information

Hearing Officers

Former Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		

Current Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					
ED	CT	MM	AG	SK	ADM

Commissioners					
ED	CT	MM	AG	SK	ADM
				X	

Remarks: OEP PSC-07-0869-PCO-EI, 10/30/07

Matilda Sanders PSC-07-0869-PCO-EI

From: Theresa Walsh
Sent: Tuesday, October 30, 2007 9:23 AM
To: CLK - Orders / Notices; Katherine Fleming
Subject: Order / Notice Submitted

10 attach' online

Date and Time: 10/30/2007 9:19:00 AM
Docket Number: 070650-EI
Filename / Path: s:\psc\CLK\WP\GCORDERS\070650.oep.doc

Please issue the Order Establishing Procedure in the above-referenced docket.

Because this order was signed by Commissioner Skop, you will receive the original today.

1/1 (+ 1 emailed)

Matilda Sanders

From:	**Theresa Walsh**
Sent:	**Monday, October 22, 2007 11:49 AM**
To:	**CLK - Orders / Notices; Katherine Fleming; Theresa Walsh**
Subject:	**Order / Notice Submitted**
Date and Time:	**10/22/2007 11:39:00 AM**
Docket Number:	**070650-EI**
Filename / Path:	**S:\psc\CLK\WP\GCORDERS\070650.not.com.jsb**

FPSC, CLK - CORRESPONDENCE
☑ Administrative ☐ Parties ☐ Consumer
DOCUMENT NO. 09541-07
DISTRIBUTION: _____

Notice of Commencement of Proceeding for Determination of Need for a Proposed Electrical Power Plant

email down

62/9

STATE OF FLORIDA

OFFICE OF COMMISSION CLERK
ANN COLE
COMMISSION CLERK
(850) 413-6770

Public Service Commission

ADMINISTRATIVE

October 18, 2007

R. Wade Litchfield
Florida Power & Light Company
7070 Universe Boulevard
Juno Beach, Florida 33408-0420

Re: Docket No. 070650-EI

Dear Mr. Litchfield:

This will acknowledge receipt of a petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company, which was received in this office on October 16, 2007, and assigned the above-referenced docket number. Appropriate staff members will be advised.

Mediation may be available to resolve any dispute in this docket. If mediation is conducted, it does not affect a substantially interested person's right to an administrative hearing. For more information, contact the Office of General Counsel at (850) 413-6248 or FAX (850) 413-7180.

Office of Commission Clerk

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Case Assignment and Scheduling Record

Section 1 - Office of Commission Cle

Docket No. 070650-EI Date Docketed: 10/16/2007 Title: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Company: Florida Power & Light Company

FPSC, CLK - CORRESPONDENCE
☒ Administrative ☐ Parties ☐ Consumer
DOCUMENT NO. 07641-07
DISTRIBUTION: _____

Official Filing Date: _____ Expiration: _____
Last Day to Suspend: _____
Referred to:
("()" indicates OPR)

ADM	CLK	CMP	(ECR)	GCL	PIF	RCA	SCR	SGA
			X	X				

Section 2 - OPR Completes and returns to CLK in 10 workdays.

Program Module B2(a)

Staff Assignments

OPR Staff

Staff Counsel

OCRs

Time Schedule

WARNING: THIS SCHEDULE IS AN INTERNAL PLANNING DOCUMENT IT IS TENTATIVE AND SUBJECT TO REVISION. FOR UPDATES CONTACT THE RECORDS SECTION: (850) 413-6770

[0] Current CASR revision level

		Due Dates Previous	Current
1.			
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Recommended assignments for hearing and/or deciding this case:

Full Commission ___ Commission Panel ___
Hearing Examiner ___ Staff ___

Date filed with CLK: _____

Initials OPR _____
Staff Counsel _____

Section 3 - Chairman Completes Assignments are as follows:

- Hearing Officer(s)

Commissioners						Hrg Exam	Staff
ALL	ED	CT	MM	AG	SK		

Prehearing Officer

Commissioners					ADM
ED	CT	MM	AG	SK	

Where panels are assigned the senior Commissioner is Panel Chairman: the identical panel decides the case.
Where one Commissioner, a Hearing Examiner or a Staff Member is assigned the full Commission decides the case.

Approved: _____
Date:

PSC/CLK015-C (Rev. 04/07) * COMPLETED EVENTS

Case Assignment and Scheduling Record

Section 1 - Office of Commission Clerk

Docket No. 070650-EI Date Docketed: 10/16/2007 Title: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Company: Florida Power & Light Company

Official Filing Date: _____ Expiration: _____

Last Day to Suspend: _____

Referred to: ("()" indicates OPR)	ADM	CLK	CMP	(ECR)	GCL	PIF	RCA	SCR	SGA
				X	X				

Section 2 - OPR Completes and returns to CLK in 10 workdays.

Program Module B2(a)

Time Schedule

WARNING: THIS SCHEDULE IS AN INTERNAL PLANNING DOCUMENT IT IS TENTATIVE AND SUBJECT TO REVISION. FOR UPDATES CONTACT THE RECORDS SECTION: (850) 413-6770

Staff Assignments				Due Dates	
		[0]	Current CASR revision level	Previous	Current
OPR Staff	S Brown	1.	Revised CASR Due	NONE	10/31/2007
	C Bulecza-Banks, S Garl	2.	Order Establishing Procedure	NONE	10/31/2007
	R Graves, C Hewitt	3.			
	P Lester, B McNulty	4.			
	M Springer, P Stallcup	5.			
		6.			
		7.			
Staff Counsel	K Fleming, J Brubaker	8.			
	C Klancke	9.			
		10.			
		11.			
OCRs		12.			
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Recommended assignments for hearing and/or deciding this case:

Full Commission X Commission Panel __
Hearing Examiner __ Staff __

Date filed with CLK: 10/19/2007

Initials OPR _____
Staff Counsel _____

Section 3 - Chairman Completes

Assignments are as follows:

- Hearing Officer(s)

Commissioners						Hrg Exam	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					ADM
ED	CT	MM	AG	SK	
				X	

Where panels are assigned the senior Commissioner is Panel Chairman: the identical panel decides the case.
Where one Commissioner, a Hearing Examiner or a Staff Member is assigned the full Commission decides the case.

Approved: ED Rhyne
Date: 10/19/2007

Case Assignment and Scheduling Record

Section 1 - Office of Commission Clerk

Docket No. 070650-EI Date Docketed: 10/16/2007 Title: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Company: Florida Power & Light Company

Official Filing Date: _____ Expiration: _____

Last Day to Suspend: _____

Referred to: ("()" indicates OPR)	ADM	CLK	CMP	(ECR)	GCL	PIF	RCA	SCR	SGA
				X	X				

Section 2 - OPR Completes and returns to CLK in 10 workdays.

Program Module B2(a)

Time Schedule

WARNING: THIS SCHEDULE IS AN INTERNAL PLANNING DOCUMENT IT IS TENTATIVE AND SUBJECT TO REVISION. FOR UPDATES CONTACT THE RECORDS SECTION: (850) 413-6770

Staff Assignments

OPR Staff	S Brown
	C Bulecza-Banks, S Garl
	R Graves, C Hewitt
	P Lester, B McNulty
	M Springer, P Stallcup
Staff Counsel	K Fleming, J Brubaker
	C Klancke
OCRs	

[1] Current CASR revision level

		Due Dates Previous	Current
1.	Petition Filed	NONE	10/16/2007
2.	Testimony - Company	NONE	10/16/2007
3.	Notice of Commencement of Proceedings	NONE	10/22/2007
4.	FAW Notice Filed - Prehearing & Hearing	NONE	11/27/2007
5.	Notice of Prehearing and Hearing	NONE	11/27/2007
6.	Testimony - Intervenor	NONE	12/03/2007
7.	Testimony (If Any) - Staff	NONE	12/07/2007
8.	Testimony - Rebuttal	NONE	12/19/2007
9.	Prehearing Statements	NONE	01/04/2008
10.	Prehearing	NONE	01/14/2008
11.	Transcript of Prehearing Due	NONE	01/16/2008
12.	Discovery Actions Complete	NONE	01/18/2008
13.	Prehearing Order	NONE	01/23/2008
14.	Hearing (01/30,31 & 02/1/08)	NONE	01/30/2008
15.	Transcript of Hearing Due (01/31, 02/01, 02/04	NONE	01/31/2008
16.	Briefs Due	NONE	02/15/2008
17.	Staff Recommendation	NONE	03/06/2008
18.	Agenda	NONE	03/18/2008
19.	Standard Order	NONE	04/07/2008
20.	Close Docket or Revise CASR	10/31/2007	05/12/2008
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Recommended assignments for hearing and/or deciding this case:

Full Commission X Commission Panel __
Hearing Examiner __ Staff __

Date filed with CLK: 11/02/2007

Initials OPR _____
Staff Counsel _____

Section 3 - Chairman Completes

Assignments are as follows: CSRA

- Hearing Officer(s)

Commissioners						Hrg Exam	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					ADM
ED	CT	MM	AG	SK	
				X	

Where panels are assigned the senior Commissioner is Panel Chairman: the identical panel decides the case.
Where one Commissioner, a Hearing Examiner or a Staff Member is assigned the full Commission decides the case.

Approved: ED/hmr
Date: 11/02/2007

PSC/CLK015-C (Rev. 04/07) * COMPLETED EVENTS

Case Assignment and Scheduling Record

Section 1 - Office of Commission Clerk

Docket No. 070650-EI Date Docketed: 10/16/2007 Title: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Company: Florida Power & Light Company

Official Filing Date: _____ Expiration: _____

Last Day to Suspend: _____

Referred to: ("()" indicates OPR)

ADM	CLK	CMP	(ECR)	GCL	PIF	RCA	SCR	SGA
			X	X				

Section 2 - OPR Completes and returns to CLK in 10 workdays.

Program Module B2(a)

Time Schedule

WARNING: THIS SCHEDULE IS AN INTERNAL PLANNING DOCUMENT IT IS TENTATIVE AND SUBJECT TO REVISION. FOR UPDATES CONTACT THE RECORDS SECTION: (850) 413-6770

Staff Assignments

OPR Staff: S Brown; C Bulecza-Banks, S Garl; R Graves, C Hewitt; P Lester, B McNulty; M Springer, P Stallcup; J Wu

Staff Counsel: K Fleming, J Brubaker; C Klancke

OCRs:

[2] Current CASR revision level

		Due Dates Previous	Current
1.	FAW Notice Filed - Prehearing & Hearing	SAME	11/27/2007
2.	Notice of Prehearing and Hearing	SAME	11/27/2007
3.	Testimony - Intervenor	SAME	12/03/2007
4.	Testimony (If Any) - Staff	SAME	12/07/2007
5.	Testimony - Rebuttal	SAME	12/19/2007
6.	Prehearing Statements	SAME	01/04/2008
7.	Service Hearing	NONE	01/10/2008
8.	Prehearing	SAME	01/14/2008
9.	Transcript of Prehearing Due	SAME	01/16/2008
10.	Transcript of Service Hearing Due	NONE	01/17/2008
11.	Discovery Actions Complete	SAME	01/18/2008
12.	Prehearing Order	SAME	01/23/2008
13.	Hearing (01/30,31 & 02/1/08)	SAME	01/30/2008
14.	Transcript of Hearing Due (01/31, 02/01, 02/04	SAME	01/31/2008
15.	Briefs Due	SAME	02/15/2008
16.	Staff Recommendation	SAME	03/06/2008
17.	Agenda	SAME	03/18/2008
18.	Standard Order	SAME	04/07/2008
19.	Close Docket or Revise CASR	10/31/2007	05/12/2008
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Recommended assignments for hearing and/or deciding this case:

Full Commission X Commission Panel __
Hearing Examiner __ Staff __

Date filed with CLK: 11/15/2007

Initials OPR _____
Staff Counsel _____

Section 3 - Chairman Completes

Assignments are as follows: C5RA

- Hearing Officer(s)

Commissioners						Hrg Exam	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					ADM
ED	CT	MM	AG	SK	
				X	

Where panels are assigned the senior Commissioner is Panel Chairman: the identical panel decides the case. Where one Commissioner, a Hearing Examiner or a Staff Member is assigned the full Commission decides the case.

Approved: Ed / 11/15
Date: 11/15/2007

PSC/CLK015-C (Rev. 04/07) * COMPLETED EVENTS

Case Assignment and Scheduling Record

Section 1 - Office of Commission Clerk

Docket No. 070650-EI Date Docketed: 10/16/2007 Title: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Company: Florida Power & Light Company

Official Filing Date: _____ Expiration: _____

Last Day to Suspend: _____

Referred to: ("()" indicates OPR)	ADM	CLK	CMP	(ECR)	GCL	PIF	RCA	SCR	SGA
				X	X				

Section 2 - OPR Completes and returns to CLK in 10 workdays.

Program Module B2(a)

Staff Assignments

OPR Staff	S Brown
	C Bulecza-Banks, S Garl
	R Graves, C Hewitt
	P Lester, B McNulty
	M Springer, P Stallcup
	J Wu
Staff Counsel	K Fleming, J Brubaker
	C Klancke
OCRs	

Recommended assignments for hearing and/or deciding this case:

Full Commission X Commission Panel __
Hearing Examiner __ Staff __

Date filed with CLK: 11/26/2007

Initials OPR _____
Staff Counsel _____

Time Schedule

WARNING: THIS SCHEDULE IS AN INTERNAL PLANNING DOCUMENT IT IS TENTATIVE AND SUBJECT TO REVISION. FOR UPDATES CONTACT THE RECORDS SECTION: (850) 413-6770

[3] Current CASR revision level

		Due Dates Previous	Current
1.	Testimony - Intervenor	SAME	12/03/2007
2.	FAW Notice Filed - Prehearing & Hearing	11/27/2007	12/04/2007
3.	Notice of Prehearing and Hearing	11/27/2007	12/04/2007
4.	Testimony (If Any) - Staff	SAME	12/07/2007
5.	Testimony - Rebuttal	SAME	12/19/2007
6.	Prehearing Statements	SAME	01/04/2008
7.	Service Hearing	SAME	01/10/2008
8.	Prehearing	SAME	01/14/2008
9.	Transcript of Prehearing Due	SAME	01/16/2008
10.	Transcript of Service Hearing Due	SAME	01/17/2008
11.	Discovery Actions Complete	SAME	01/18/2008
12.	Prehearing Order	SAME	01/23/2008
13.	Hearing (01/30,31 & 02/1/08)	SAME	01/30/2008
14.	Transcript of Hearing Due (01/31, 02/01, 02/04	SAME	01/31/2008
15.	Briefs Due	SAME	02/15/2008
16.	Staff Recommendation	SAME	03/06/2008
17.	Agenda	SAME	03/18/2008
18.	Standard Order	SAME	04/07/2008
19.	Close Docket or Revise CASR	10/31/2007	05/12/2008
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Section 3 - Chairman Completes Assignments are as follows:

- Hearing Officer(s)

Commissioners						Hrg Exam	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					ADM
ED	CT	MM	AG	SK	
				X	

Where panels are assigned the senior Commissioner is Panel Chairman: the identical panel decides the case.
Where one Commissioner, a Hearing Examiner or a Staff Member is assigned the full Commission decides the case.

Approved: _____
Date: 11/27/2007

PSC/CLK015-C (Rev. 04/07) * COMPLETED EVENTS

Case Scheduling/Rescheduling Advice

Last Revised 10/30/2007 at 1:09 p.m.

To:

[X] Commissioner Carter	[X] Deputy Executive Director	[X] Economic Regulation
[X] Commissioner McMurrian	[X] General Counsel	[X] Court Reporter
[X] Commissioner Argenziano	[ ] Strategic Analysis & Gov. Affairs	[X] Staff Contact - Tom Ballinger
[X] Commissioner Skop	[X] Commission Clerk	[ ]
[X] Executive Director	[ ] Competitive Markets/Enforcement	[ ]
[X] Public Information Officer	[X] Reg. Compliance/Consumer Asst.	[ ]

From: Office of Chairman Lisa Edgar

Docket Number: 070650-EI -- Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Prehearing Conference		01/14/2008	Tallahassee / E-148	1:30 p. - 3:00 p.
Hearing		01/30/2008	Tallahassee / E-148	9:30 a. - 5:00 p.
Hearing		01/31/2008	Tallahassee / E-148	9:30 a. - 5:00 p.
Hearing		02/01/2008	Tallahassee / E-148	9:30 a. - 5:00 p.

2. Hearing/Prehearing Assignment Information

Hearing Officers

Former Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		

Current Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					
ED	CT	MM	AG	SK	ADM

Commissioners					
ED	CT	MM	AG	SK	ADM
				X	

Remarks: OEP PSC-07-0869-PCO-EI, 10/30/07

Case Scheduling/Rescheduling Advice

Last Revised 11/05/2007 at 10:49 a.m.

To:

[X] Commissioner Carter	[X] Deputy Executive Director	[X] Economic Regulation
[X] Commissioner McMurrian	[X] General Counsel	[X] Court Reporter
[X] Commissioner Argenziano	[ ] Strategic Analysis & Gov. Affairs	[X] Staff Contact - Tom Ballinger
[X] Commissioner Skop	[X] Commission Clerk	[ ]
[X] Executive Director	[ ] Competitive Markets/Enforcement	[ ]
[X] Public Information Officer	[X] Reg. Compliance/Consumer Asst.	[ ]

From: Office of Chairman Lisa Edgar

Docket Number: 070650-EI -- Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Service Hearing		01/10/2008	Miami	10:00 a. - 1:00 p.

2. Hearing/Prehearing Assignment Information

Hearing Officers

Former Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		

Current Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					
ED	CT	MM	AG	SK	ADM

Commissioners					
ED	CT	MM	AG	SK	ADM
				X	

Remarks: OEP PSC-07-0869-PCO-EI, 10/30/07

Case Scheduling/Rescheduling Advice

Last Revised 12/10/2007 at 12:04 p.m.

To:

[X] Commissioner Carter	[X] Deputy Executive Director	[X] Economic Regulation
[X] Commissioner McMurrian	[X] General Counsel	[X] Court Reporter
[X] Commissioner Argenziano	[ ] Strategic Analysis & Gov. Affairs	[X] Staff Contact - Tom Ballinger
[X] Commissioner Skop	[X] Commission Clerk	[ ]
[X] Executive Director	[ ] Competitive Markets/Enforcement	[ ]
[X] Public Information Officer	[X] Reg. Compliance/Consumer Asst.	[ ]

From: Office of Chairman Lisa Edgar

Docket Number: 070650-EI -- Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Service Hearing	01/10/2008	01/09/2008	Miami	4:00 p. - 6:00 p.

2. Hearing/Prehearing Assignment Information

Hearing Officers

Former Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		

Current Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					
ED	CT	MM	AG	SK	ADM

Commissioners					
ED	CT	MM	AG	SK	ADM
				X	

Remarks: OEP PSC-07-0869-PCO-EI, 10/30/07

Case Assignment and Scheduling Record

Section 1 - Office of Commission Clerk

Docket No. 070650-EI Date Docketed: 10/16/2007 Title: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Company: Florida Power & Light Company

Official Filing Date: _____ Expiration: _____

Last Day to Suspend: _____

Referred to: ("()" indicates OPR)	ADM	CLK	CMP	(ECR)	GCL	PIF	RCA	SCR	SGA
				X	X				

Section 2 - OPR Completes and returns to CLK in 10 workdays.

Program Module B2(a)

Staff Assignments

OPR Staff	S Brown
	C Bulecza-Banks, S Garl
	R Graves, C Hewitt
	P Lester, B McNulty
	M Springer, P Stallcup
	J Wu
Staff Counsel	K Fleming, J Brubaker
	C Klancke
OCRs	

Recommended assignments for hearing and/or deciding this case:

Full Commission X Commission Panel __
Hearing Examiner __ Staff __

Date filed with CLK: 12/11/2007

Initials OPR _____
Staff Counsel _____

Time Schedule

WARNING: THIS SCHEDULE IS AN INTERNAL PLANNING DOCUMENT IT IS TENTATIVE AND SUBJECT TO REVISION. FOR UPDATES CONTACT THE RECORDS SECTION: (850) 413-6770

[4] Current CASR revision level

		Due Dates Previous	Current
1.	Testimony - Intervenor	SAME	12/03/2007
2.	Testimony (If Any) - Staff	SAME	12/07/2007
3.	Preliminary List of Issues	NONE	12/18/2007
4.	Testimony - Rebuttal	SAME	12/19/2007
5.	Prehearing Statements	SAME	01/04/2008
6.	Service Hearing	01/10/2008	01/09/2008
7.	Prehearing	SAME	01/14/2008
8.	Transcript of Prehearing Due	SAME	01/16/2008
9.	Transcript of Service Hearing Due	SAME	01/17/2008
10.	Discovery Actions Complete	SAME	01/18/2008
11.	Prehearing Order	SAME	01/23/2008
12.	Hearing (01/30,31 & 02/1/08)	SAME	01/30/2008
13.	Transcript of Hearing Due (01/31, 02/01, 02/04	SAME	01/31/2008
14.	Briefs Due	SAME	02/15/2008
15.	Staff Recommendation	SAME	03/06/2008
16.	Agenda	SAME	03/18/2008
17.	Standard Order	SAME	04/07/2008
18.	Close Docket or Revise CASR	10/31/2007	05/12/2008
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Section 3 - Chairman Completes

Assignments are as follows: C5RA

- Hearing Officer(s)

Commissioners						Hrg Exam	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					ADM
ED	CT	MM	AG	SK	
				X	

Where panels are assigned the senior Commissioner is Panel Chairman: the identical panel decides the case.
Where one Commissioner, a Hearing Examiner or a Staff Member is assigned the full Commission decides the case.

Approved: EDI
Date: 12/11/2007

PSC/CLK015-C (Rev. 04/07) * COMPLETED EVENTS

Section 1 - Office of Commission Clerk

Docket No. 070650-EI Date Docketed: 10/16/2007 Title: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Company: Florida Power & Light Company

Official Filing Date: _____ Expiration: _____

Last Day to Suspend: _____

Referred to: ("()" indicates OPR)	ADM	CLK	CMP	(ECR)	GCL	PIF	RCA	SCR	SGA
				X	X				

Section 2 - OPR Completes and returns to CLK in 10 workdays.

Program Module B2(a)

Staff Assignments

OPR Staff	S Brown
	C Bulecza-Banks, S Garl
	R Graves, C Hewitt
	P Lester, B McNulty
	M Springer, P Stallcup
	J Wu
Staff Counsel	K Fleming, J Brubaker
	C Klancke
OCRs	

Recommended assignments for hearing and/or deciding this case:

Full Commission X Commission Panel __
Hearing Examiner __ Staff __

Date filed with CLK: 12/11/2007

Initials OPR _____
Staff Counsel _____

Time Schedule

WARNING: THIS SCHEDULE IS AN INTERNAL PLANNING DOCUMENT IT IS TENTATIVE AND SUBJECT TO REVISION. FOR UPDATES CONTACT THE RECORDS SECTION:(850) 413-6770

[4] Current CASR revision level

		Due Dates Previous	Current
1.	Testimony - Intervenor	SAME	12/03/2007
2.	Testimony (If Any) - Staff	SAME	12/07/2007
3.	Testimony - Rebuttal	SAME	12/19/2007
4.	Prehearing Statements	SAME	01/04/2008
5.	Oral Argument	NONE	01/07/2008
6.	Service Hearing	01/10/2008	01/09/2008
7.	Prehearing	SAME	01/14/2008
8.	Transcript of Prehearing Due	SAME	01/16/2008
9.	Transcript of Service Hearing Due	SAME	01/17/2008
10.	Discovery Actions Complete	SAME	01/18/2008
11.	Prehearing Order	SAME	01/23/2008
12.	Hearing (01/30,31 & 02/1/08)	SAME	01/30/2008
13.	Transcript of Hearing Due (01/31, 02/01, 02/04	SAME	01/31/2008
14.	Briefs Due	SAME	02/15/2008
15.	Staff Recommendation	SAME	03/06/2008
16.	Agenda	SAME	03/18/2008
17.	Standard Order	SAME	04/07/2008
18.	Close Docket or Revise CASR	10/31/2007	05/12/2008
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Section 3 - Chairman Completes

Assignments are as follows: CSRA

- Hearing Officer(s)

Commissioners						Hrg Exam	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					ADM
ED	CT	MM	AG	SK	
				X	

Where panels are assigned the senior Commissioner is Panel Chairman: the identical panel decides the case.
Where one Commissioner, a Hearing Examiner or a Staff Member is assigned the full Commission decides the case.

Approved: ED/hrs
Date: 12/11/2007

PSC/CLK015-C (Rev. 04/07) * COMPLETED EVENTS

Case Scheduling/Rescheduling Advice

Last Revised 12/21/2007 at 3:09 p.m.

To:

[X] Commissioner Carter	[X] Deputy Executive Director	[X] Economic Regulation
[X] Commissioner McMurrian	[X] General Counsel	[X] Court Reporter
[X] Commissioner Argenziano	[ ] Strategic Analysis & Gov. Affairs	[X] Staff Contact - Tom Ballinger
[X] Commissioner Skop	[X] Commission Clerk	[ ]
[X] Executive Director	[ ] Competitive Markets/Enforcement	[ ]
[X] Public Information Officer	[X] Reg. Compliance/Consumer Asst.	[ ]

From: Office of Chairman Lisa Edgar

Docket Number: 070650-EI -- Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

1. Schedule Information

Event	Former Date	New Date	Location / Room	Time
Oral Argument		01/07/2008	Tallahassee / E-148	9:30 a. - 12:00 p.

2. Hearing/Prehearing Assignment Information

Hearing Officers

Former Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		

Current Assignments

Commissioners						Hearing Exam.	Staff
ALL	ED	CT	MM	AG	SK		
X							

Prehearing Officer

Commissioners					
ED	CT	MM	AG	SK	ADM

Commissioners					
ED	CT	MM	AG	SK	ADM
				X	

Remarks: Oral argument to be held before PHO Skop.