

Hard copy comments from the February 12, 2009, public meetings on  
the Draft Supplemental Environmental Impact Statement for proposed  
license renewal of Indian Point Nuclear Generating Unit Nos. 2 and 3  
(Draft Supplement 38 to NUREG-1437)

12/31/09

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RULES AND DIRECTIVES  
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Add = A. Stuyvenberg (9253)

## Would You like a World Safe and Clean?

Tune: "Would You Like to Swing on a Star?"

Would you like a world safe and clean?  
Where the air is fresh – good to breathe?  
And the water's so sweet to drink!  
< \* > Or would you rather have a nuke?

A nuke is an industry that piles up its waste.  
Which leaks from containers to the ground.  
The terrorists know where it's to be found  
And blowing it up kills for miles around!  
E-ons must pass before poison leaves the ground.  
< \* > There is no place to store the waste!

Would you like to have your home warm?  
With your power from earth and sun?  
That costs almost nothing to run  
< \* > Compared to what you pay for nukes!

A nuke's a monstrosity that we all finance.  
It sucks all us taxpayers dry.  
It costs lots to build, and more to fix.  
To keep it going, takes a lot of tricks!  
And by the way if you count external costs  
< \* > It's quite a monetary loss!

Would you like to breathe good fresh air?  
Grow your kids up strontium free?  
Don't live in our neighborhood then!  
< \* > Oh, 'cause you know we have a nuke!

Our nuke's had emissions that have poisoned our air.  
We've more thyroid woes than our fair share.  
We're told it's safe, and we do know it's not.  
The 'vacuation plan don't work; it's rot.  
And by the way, if the sirens ever blow  
There will be millions dead and gone.

Would you like your ground water pure?  
Want to drink, be healthy still, for sure?  
Eat fish without needing a cure?  
< \* > Or would you rather have a nuke?

Our nuke makes the river water too hot for fish.  
Endangered ones we are sure to miss!  
The cooling pipes leak. You don't hear much 'bout  
Fish eggs and fish in. Radiation's out.  
The antiquated coolers poison us and fish.  
< \* > It's all because we have a nuke!

Do you want our world safe and sane?  
'Government for the people' our game?  
By the will 'of the people' we are bound,  
< \* > People want that nuke shut down!

< \* > Oh don't you wish we had no nuke!

## I AM AGAINST NUCLEAR TOXICITY

My complaint is about the destructive power of nuclear waste.

First - There is no guarantee of safety when nuclear waste is in transit. There are no realistic plans for cleanup of a spill or accident of a truck load or train load of nuclear waste.

Secondly - There is no place to store the waste. The Native Americans don't want it on their lands. No place on earth wants it, and we cannot send it to outer space as it might return. What goes up must come down.

Thirdly - The worst thing about nuclear waste is that it has been used for hardening the tips of Bunker Bombs and Reliable Replacement Warheads. These weapons have been used against the civilians in Iraq, because they penetrate deeper and kill and maim with more intensity. Can the Iraqi people ever forgive us?

Do people who make or use electricity from a nuclear power plant ever think about where the waste product goes and about the people who have been destroyed or may be destroyed in the future?

Granny Betty **CYPSER**



**My name is Mike Tracey and I represent Local 91 of the Asbestos Workers and Insulators. I am pleased to join you today and urge all of you to support the relicensing of Indian Point.**

**Indian Point produces 2,000 megawatts of clean, reliable, emission-free electricity. It is responsible for hundreds of good-paying union jobs, and nearly three-quarters of a billion dollars in economic impact for our region.**

**Additionally, Indian Point serves as an important steward for our environment. Not only is the energy produced at Indian Point emissions-free, but the replacement options are guaranteed to harm our environment. Specifically, the replacement power would generate 14 million tons of carbon dioxide each year.**

**It is sad and unfortunate that should Indian Point's energy need to be replaced, the replacement power will be paid for in both dollars and in the health of our most vulnerable citizens – the very young, the very**

old, and those who already suffer from respiratory illnesses. The replacement power would be generated in this very region to the detriment of most of the people in this room.

And in this struggling economy, it is indefensible for certain environmental activists to place the fate of some fish eggs in the same light as jobs and economic growth. More than 1,000 jobs are directly tied to Indian Point, with hundreds of them being union. To try and shut down Indian Point over the fate of Hudson River fish eggs, is absurd, incomprehensible and shameful.

I ask you to take a common-sense approach and weigh the true benefits of Indian Point in your deliberations. It's a fact that Indian Point is a true economic engine for our community.

Thank you for your time.

NRC  
CASE NO.  
OFF. EXH. NO. 7PM  
ID. D/REC'D  
2/12/09

## Testimony of Michael Otis

Hello, my name is Michael Otis, and I am an Electrical/Computer Engineering Professor at a local (New York) university. I teach a variety of engineering courses as well as a non-engineering course for the masses titled "Renewable Energy." This course looks at several energy-providing solutions for the future by exploring different technologies and using a scientific approach.

Nuclear energy plays a very important role in this course and is an excellent topic to study when discussing viable solutions as well as public policy – it makes for great debate! I am pleasantly surprised by the open-mindedness of my students when they explore such a controversial (and interesting) topic using research (and math/science) as their tools.

At the beginning of this course many of them had already drawn conclusions (about nuclear energy) that were based on fear rather than fact. For most, that fear is gone, and their conclusions have changed.

A primary goal of our Engineering department is to engage our (engineering) students in the learning process through hands-on experiences, so the intertwined roles of both conducting student research and acquiring scholarship funds are both seen as critical components in educating this nation's next generation of scientists, mathematicians and engineers.

This investment is exactly why I am here today, before this distinguished panel of fellow men and women of science. I want to make sure that you understand the

important partnership my university has forged with Entergy and the Indian Point Energy Center in seeding the development of our students.

Together with Entergy, we have created an excellent internship program at Indian Point for both Electrical and Computer Engineering students. This site serves as one of the key locations for students in the School of Engineering, and for the past 3 summers, young men and women have gained invaluable experiences in their focus areas of study – far exceeding my expectations.

The reason this program works so well is because Entergy employees share the school's passion for science, and learning more about how we can continue harnessing nuclear power for a cleaner energy future for the country, if not the world.

Entergy is an investor in our students' futures, as well as this nation's future. We are developing the next generation of engineers that this country so desperately needs. Yet, we have come to the realization that their education cannot be confined to staying within the four walls of a classroom, and so field experience – working side-by-side with experienced engineers and technicians – has enhanced our students' chances for success and invaluable for those entering the workforce.

However, the benefit of Indian Point to our students and faculty runs deeper than just their investment in education. Indian Point provides affordable, clean energy to the New York Power Authority through long-term contracts, and that NYPA power flows through the heart of school systems just like ours throughout New York State. Therefore, during this time of great economic need, when our students are being asked to pay more for their education, I am frightened to think

of the impact much-higher electricity prices would have on the public education system of this state.

How can we afford to both lose 2,000 megawatts of much-needed power, and lose our capabilities to attract and educate those New York residents seeking a quality and affordable education – especially in those important areas of math and science we so desperately need in this state?

Equally CRITICAL and certainly overlooked is the simple fact that Indian Point generates electricity without producing virtually any greenhouse gas emissions, unlike natural gas or coal facilities. Annually, nuclear power in New York avoids 42,000 tons of nitrous oxide, which is the equivalent of 22 million passenger cars on our roads.

The relicensing of Indian Point is critical to the future of our students, the future of the state economy, and the future of nuclear power in the United States. Entergy exemplifies the best of corporate philanthropy, and they are providing the leadership and investment in education, while others are cutting and slashing their commitments to educate today's and tomorrow's youth.

That is why I strongly support the relicensing of Indian Point for an additional 20 years.

Thank you.

MRC

CASE NO.  
OFF. EXH. NO. 7PM  
ID'D/RECD  
DATE

2/12/09

# SHARE

**SAFE  
HEALTHY  
AFFORDABLE  
RELIABLE  
ENERGY**

WWW.SHARENY.ORG

Mr. Andrew Stuyvenberg  
Environmental Project Manager  
Division of License Renewal, Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Mail Stop O-11F1  
Washington, DC 2055-0001

RE: February 12, 2009 Public Hearing on the Relicensing of the Indian Point Energy Center

Good evening, my name is Craig Wilson and I am the Executive Director of SHARE. SHARE is a non-profit coalition of organizations committed to ensuring the continued supply of reliable, clean and affordable electricity for all New Yorkers. For too long, high electricity prices have placed an undue economic burden on New York's families and businesses, while poor air quality has led to high asthma rates which place our most vulnerable at risk.

Right now, as we are all too well aware, we are in the midst of the most severe economic crisis since the Great Depression. Community residents, small businesses and working men and woman from communities across the region are struggling. And as of right now, there isn't yet light at the end of the tunnel.

Recognizing the turmoil within our economy, now is not the time to shutter a source of clean, safe and affordable power for the region. As much as 40% of our power, used for everything from our schools, hospitals and businesses, comes from the Indian Point Energy Center. And if it were to be closed, it is estimated that electricity costs for small businesses would rise \$10,000 annually while individual residences would pay an additional \$1,500. Our members are simply not able to pay these dramatically higher electricity bills, particularly in these economic times.

Beyond the financial benefits, the Indian Point Energy Center greatly reduces the amount of pollution emitted into our air. Unlike all other power plants within the region, Indian Point does not release asthma causing pollutants or greenhouse gases into the atmosphere. This is of great benefit to our air quality as nearly all of the counties served by Indian Point consistently have their air quality rated an F by the American Lung Association. Clearly, we need more clean energy facilities like Indian Point, and not fewer.

Moreover, many of members live in low-income communities where asthma rates are four times the national average and one in four children suffer from this serious, life-altering disease. Nearly one-third of New York City children with asthma reside in the Bronx, with neighborhoods like Hunts-Point and Mott Haven having among the highest rates of asthma in the country.

For these reasons, SHARE, and its member organizations, firmly support the continued operation of the clean, safe and secure Indian Point Energy Center. Additionally, we are committed to working with local stakeholders in the New York metropolitan area to provide all New Yorkers with the clean and affordable power they deserve. Thank you.

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## Anti-Nuke Environmentalists

lyrics by Sunny Armer with the Raging Grannies... And Their Friends of Westchester, NY  
(adapted from a song written by the Raging Grannies of Seattle)

Tune: "She'll Be Coming Round the Mountain"

Call us anti-nuke environmentalists.  
We are anti-nuke environmentalists.  
We protect our air and water,  
You can't lead us to the slaughter,  
'Cause we're anti-nuke environmentalists.

We know tons of facts regarding nuclear waste.  
When it leaks into our water there's no taste,  
But it's poison all the same,  
Entergy is who we blame,  
So we're anti-nuke environmentalists.

If you get yourself relicensed and still run,  
There'll be lots more dead fish lying in the sun,  
More strontium in our babies' teeth,  
More leaks that millions hate to breathe  
With no evacuation they can't run.

There are twenty tons of new waste every year,  
All created by the Indian Point plant here  
You can swear on our own Bibles  
That it's "safe, secure and vital,"  
But we're sure not gonna swallow what we hear.

When we think about Chernobyl, we have qualms.  
You're a target for those terrorists with bombs.  
There's no anti-nuke insurance,  
Which means there's no assurance  
That we will not all be blown to Kingdom Come.

Bring us solar, bring us hydro, bring us wind.  
Bring us energy from sources that won't end.  
Before we could trust uranium,  
We'd need holes in our cranium.  
Call us anti-nuke environmentalists.

## We Ask for a Clean World

lyrics by Sunny Armer with the Raging Grannies... And Their Friends of Westchester, NY  
Tune: "The Man on the Flying Trapeze"

We ask for a clean world, a world that is kind.  
We look for a good world but what do we find?  
Too many people who don't seem to care  
Who dies from so much tainted air.

So much nuclear waste is piled up,  
Underground in containers that leak.  
Those leaky containers were built by no-brainers.  
And what else becomes of that waste?

We send it in weapons to an impoverished place  
To help in destroying powerless race:  
Palestinians in Gaza, Iraqis in Iraq—  
Let's stop making nuclear waste!

Oh, isn't it awful, oh, isn't it funny:  
Political power still follows the money.  
We hope those who don't care will learn to share  
The goods of the earth with the world

From the seats of great power many tumble,  
For the whole world belongs to the humble.  
Although critics mutter and grumble,  
We must have a clean source of power!

We ask for a kind world where everyone cares  
About clean, clear water and pure, sweet fresh air.  
And wind, sun, and water create energy  
And nuclear power's history.

Raging Grannies...and Their Friends of Westchester sing and work for peace, justice, the environment, and social and economic equality. We welcome new members. Our group is a blend of members of various talents and levels of ability.

Contact information: [RagingGrannies63@aol.com](mailto:RagingGrannies63@aol.com)  
General information is at <http://westchester.raginggrannies.org>



NRC  
CASE NO.  
OFF. EXH. NO. 7PM  
ID. D/RECD  
DATE  
2/12/09



LINDA D. PUGLISI  
TOWN SUPERVISOR

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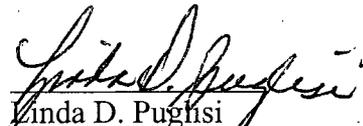
February 12, 2009

Nuclear Regulatory Commission  
Region I 475 Allendale Road  
King of Prussia, Pennsylvania 19406

To Whom It May Concern,

Enclosed please find the recommendations regarding the Indian Point Entergy Nuclear Facility's license renewal, from the Cortlandt Town Board and Supervisor. As you are aware, the Indian Point Entergy Facility is located in the Town of Cortlandt, New York. Please review the recommendations and contact me if you should have any questions.

Sincerely,

  
Linda D. Puglisi  
Town Supervisor

LDP/jp



LINDA D. PUGLISI  
TOWN SUPERVISOR

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February 12, 2009

Chief, Rules Review and Directives Branch  
U.S. Nuclear Regulatory Commission  
Mail Stop TWB-05-B01  
Washington, D.C. 20555-0001

Re: Comments to Draft Supplemental Environmental Impact Statement Regarding  
Indian Point Nuclear Generating Unit Nos. 2 and 3

Dear Sir or Madam:

The Town of Cortlandt ("Cortlandt") surrounds the Indian Point Nuclear Reactor, and its residents would be amongst the hardest hit if there was any leak or other malfunction at Indian Point. Nevertheless, Cortlandt is cognizant of the country's need for alternate energy sources and the suggestion by many that nuclear energy is part of the solution to our energy and related national security problem.

We realize that this forum is concerned about the adequacy of the Draft Supplemental Environmental Impact Statement ("DSEIS") as it relates to the relicensing of Indian Point, and therefore the competing issues of safety and national security cannot be resolved in this proceeding. However, the competing issues cause us to focus on what must be the central concern of these proceedings, the ongoing safety of Indian Point and the potential harm to human health and the environment. The Nuclear Regulatory Commission ("NRC") must put aside procedural technicalities about what should be studied outside of the re-licensing process and address to the satisfaction of Cortlandt and the people of America that if Indian Point Units 2 and 3 are re-licensed, there will be no threat to human health, no adverse impact on the environment, and that Entergy, the applicant, under the watchful eye of a diligent government, will take all the necessary steps to insure that these goals are met.

To this end, we must be assured that the requirements of the National Environmental Policy Act (“NEPA”) are carried out with the utmost diligence and dispatch. However, the substantial inadequacies found in the DSEIS demonstrate that the NRC Staff has not satisfied its responsibilities under NEPA or the regulations implementing it. We address, in detail, the following issues:

- The DSEIS does not adequately address the storage of spent nuclear waste on-site;
- The DSEIS fails to adequately assess the impacts of cooling towers on transportation, aesthetics, and historic resources;
- The DSEIS fails to consider all feasible alternatives regarding Severe Accident Mitigation Alternatives (“SAMAs”);
- The DSEIS fails to take a “hard look” at releases of radiological contaminants into groundwater;
- The DSEIS unlawfully defers discussion and analysis of the potential replacement of reactor vessel heads and control rod drive mechanisms (“CRDMs”); and
- The DSEIS unlawfully defers discussion of decommissioning of Indian Point.

A. The DSEIS does not adequately address the storage of spent nuclear waste on-site

Entergy has not adequately addressed the facility’s capability to store spent nuclear waste on-site if Indian Point is re-licensed for an additional twenty years. Until July 2008, Entergy shipped a portion of its radioactive waste to facilities in Tennessee, Utah, and South Carolina. In July of last year, the State of South Carolina closed access to its radioactive waste generators to states that are not part of the Atlantic Low-Level Waste Compact, thus prohibiting Entergy from shipping any of its radioactive waste to facilities in South Carolina. Although Entergy claims that they will be able to safely store the additional low-level waste on site, they have not even completed their comprehensive plan to address these long-term storage needs. Neither Entergy nor NRC Staff explain how this extra waste will be safely stored on-site nor does the DSEIS discuss the environmental impacts of storing this extra waste. Under NEPA, an agency must take a “hard look” at the consequences of its proposed actions and provide important information to the public. Further, an EIS cannot rely on unsubstantiated assertions. By failing to provide the public with Entergy’s comprehensive plan to address its storage needs, NRC Staff has not provided important information to foster informed public participation, and therefore does not ensure that the public and the environment will be protected from the impacts of storing this additional waste.

## B. Closed-Cycle Cooling Tower

The New York State Department of Environmental Conservation has determined that it will most likely require a closed-cycle cooling system at Indian Point instead of the existing once-through cooling system if the facility is re-licensed. The DSEIS fails to adequately assess the impacts of a cooling tower system on transportation, land use, and historic resources and does not study the logistics for constructing the cooling towers.

The DSEIS states that although “some adverse transportation impacts are likely” such impacts would occur during site excavation and construction of the towers and “would return to current levels following construction” and states that “the closed-cycle cooling system would have little to no effect on transportation, and . . . [a]s noted previously, fogging and icing is not expected to be significant.” However, the DSEIS does not state that fogging and icing effects will be insignificant. Rather, it states that the towers will produce a visible fog. The DSEIS in one breath says that there will be no effect, and in the next states that there will be an effect. Such inconsistencies, without any justification, demonstrate NRC Staff’s failure to comply with the requirements of NEPA and the inadequacy of this EIS.

Additionally, the DSEIS fails to analyze the impacts of cooling towers on numerous historically and culturally significant resources in previously undisturbed areas. Even more egregious is the fact that Entergy admits that it must conduct such a survey but has not yet done so. An EIS may not defer assessment of impacts to historical and cultural resources until some point after the NEPA process is complete. Nor may an EIS allege that the impacts of an action are “SMALL” before conducting the necessary studies.

## C. Severe Accident Mitigation Alternatives (SAMAs)

The DSEIS states that areas exist “in which risk can be further reduced in a cost-beneficial manner through the implementation of . . . cost-beneficial SAMAs” and that “further evaluation . . . is warranted.” However, the DSEIS improperly defers further analysis of these SAMAs, claiming that because they do not “relate to adequately managing the effects of aging” during the re-licensing period, Entergy does not have to conduct such analysis now. An EIS must rigorously explore and objectively evaluate all reasonable alternatives, the heart of an EIS, and not defer their analysis to some undetermined point in the future. The cost-beneficial SAMAs are feasible alternatives which must be analyzed in this DSEIS.

## D. Radiological Releases

The DSEIS describes the radiological releases from Indian Point’s spent fuel pools as new but not significant information, thereby enabling Entergy to hide behind the GEIS and not conduct any site-specific analysis. Release of radiological contaminants into groundwater is both new and significant. By not sufficiently addressing radiological releases, NRC Staff has failed to take the requisite “hard look.”

Entergy admits that consumption of fish and invertebrates from the Hudson River is a “noteworthy dose pathway” for human exposure to radionuclides released from Indian Point’s spent fuel pools, but that the calculated dose to the public is below the federal limits. The DSEIS also states that no radioactivity above background levels was detected during NRC Staff’s “most recent sampling and analysis of fish and crabs taken from the affected portions of the Hudson River.” However, the sampling results are not included in the DSEIS, and thus, hidden from public scrutiny. Other than taking Entergy at its word, which Cortlandt is not willing to do, there is no way to justify this statement.

E. Potential replacement of reactor vessel heads and control rod drive mechanisms (CRDMs)

Entergy stated that it may replace the reactor vessel heads and CRDMs if Indian Point’s license is renewed. However, neither the Environmental Report nor the DSEIS discuss the impacts of replacing this equipment or any mitigation measures that may be necessary. It is settled law that an EIS cannot defer the identification and assessment of mitigation measures to some future date, thus denying the public the opportunity to review and comment on proposed mitigation. Nor can this DSEIS defer its discussion of the impacts of replacing the reactor vessel heads and CRDMs.

Because the NRC Staff refuses to analyze the impacts of replacing this equipment, the DSEIS does not provide a cost-benefit analysis for their replacement – information that is essential for the public to be able to adequately comment on this EIS. The DSEIS must include a cost-benefit analysis because it is essential for determining the alternatives considered and is relevant to mitigation.

F. Decommissioning

NRC Staff claims that decommissioning is not a site-specific issue, and therefore does not have to be addressed in this DSEIS. However, South Carolina’s recent legislation prohibiting Entergy from disposing Indian Point’s radioactive waste at its repositories is both new and significant information. As a result, Entergy will have to store more waste on-site, and thus manage a greater amount of waste during decommissioning.<sup>1</sup> However, the DSEIS fails to discuss the environmental impacts of this new and significant information. Impacts of this storage, alternatives to storing on-site, and mitigation measures to storing additional radioactive waste must be addressed in the DSEIS.

G. Conclusion

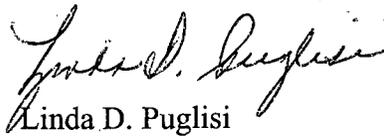
For the reasons stated above, both individually and in the aggregate, NRC Staff must address the following issues: (1) storage of additional radioactive nuclear waste on-site; (2) impacts of a closed-cycle cooling tower on transportation and historic resources; (3) feasible alternatives regarding SAMAs; (4) impacts of radiological releases from spent fuel pools into groundwater and the Hudson River; (5) impacts, alternatives, and mitigation measures for the

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<sup>1</sup> If NRC does not renew Indian Point’s license, the facility must still manage and store five (5) years additional waste for Indian Point Unit 2 and seven (7) years additional waste for Indian Point Unit 3.

potential replacement of reactor vessel heads and CRDMs; and (6) impacts of decommissioning on the surrounding environment.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Linda D. Puglisi".

Linda D. Puglisi  
Supervisor, Town of Cortlandt



LINDA D. PUGLISI  
TOWN SUPERVISOR

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## A PRACTICAL PLAN

for:

## Indian Points Entergy Nuclear Facility License Renewal

Recommendations by  
Town of Cortlandt Supervisor  
Linda D. Puglisi and Town Board  
To the NRC  
August 1, 2007

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1. Re-licensing decisions of Indian Point 2 and Indian Point 3 nuclear reactors should not be made or progressed in the time line schedule proposed until all of the environmental issues and problems have been adequately addressed, studied and corrected. (e.g.: recently discovered storage unit of radiological matters found due to the comprehensive baseline evaluation by the NRC; conclusive findings of the groundwater leaks discovered during the construction of dry cask storage units for the radioactive spent fuel rods; in-depth air and soil testing.)

*Note: The Town Board and I have supported Congressional bills for independent audits of these issues. Yes, we are aware that there are other tests underway by Entergy, NRC and the NYS DEC. However, we support a total independent audit be completed, as well.*

2. The sixty (60) days, with the clock ticking, is not sufficient amount of time for all interested parties, entities and individuals to prepare their comments and submit reports to be entered into the record. July and August, of which the sixty days include, are summer vacation months and therefore, many groups or individuals may not have ample time to put together their opinions and documents. An extension of the sixty (60) days is needed and necessary. A decision of this importance deserves more time for commentary.

3. If the NRC, after the three-year period and review of all comments decides to grant a re-licensing of Entergy Nuclear facilities, a twenty (20) year extension is too great. It would allow the owner, Entergy, even though they would state all good intentions, to relax to some degree. It's human nature. Therefore, I suggest consideration of a shorter interval for an extension, perhaps five years and then thorough baseline studies should again be completed due to the age of these plants before another five- year extension is considered and granted by the NRC. Also, an increase in betterments/benefits for the community.
4. If the NRC **decides not** to grant re-licensing of the Entergy Nuclear facilities at Indian Point then there has to be strong consideration given to address the economics, reclamation, security, and safety at this site.

The workers cannot lose their jobs. Many individuals have spent their entire professional careers working diligently at these plants. Tax revenue and now a P.I.L.O.T. agreement (payment in lieu of taxes) are distributed amongst three levels of government; a school district, a library system and a fire district. All entities depend on these monies to offset their annual budgets and therefore assist the local taxpayers.

Therefore, these critical issues must be resolved similar to what occurred with the closure of the General Motors Plant (3,000 jobs) in the Village of Sleepy Hollow, Westchester County in the late 1980's. Individuals were retrained and relocated to other General Motors plants and the revenue issue was also spread over several years in an agreement. Entergy would need to keep a workforce at this location for various current and future tasks. Security and safety of this facility would always be a factor, since the radiological spent fuel rods are and will remain for many years at this location, if not permanently.

5. Safety and security issues lead me to my ongoing request and plea to have a total **no-fly zone** over these nuclear plants. I've been publicly calling for this action since the tragedy of 9/11/01. I had a press release a few days after this terrible incident and sent it to our Federal and State officials. I have been told that there are fewer flights, however, this is not satisfactory, especially since we recently learned that re-routing of flights could increase activity in our area. This FAA decision is not acceptable and must be challenged. Once again, we need a no fly zone over Indian Point.
6. The Town of Cortlandt retained a consultant to assist the Town Board and I with local planning in case of an emergency at Indian Point. The recommendations can also be utilized for other emergencies (e.g. hurricane, tornado, earthquake, severe flooding etc.) This report will be submitted to the public in September 2007 and its goal is to partner with and enhance the existing Evacuation Plan with more specific recommendations for the local level

7. **Finally:** I have publicly stated many times that a Blue Ribbon Commission/task force needs to be appointed by the Governor once again similar to what was established with the General Motors Plant in the late 1980's. At the federal level, a Commission was put in place to evaluate 9/11 and the Iraq War. Findings and recommendations are results of these studies and commissions to benefit all parties involved. This Commission needs to begin immediately whether or not the NRC decides to grant a re-licensing or not so that there can be an ongoing dialogue implemented in an orderly and objective manner.

**Submitted by:**

**Supervisor Linda D. Puglisi  
and  
Cortlandt Town Board Members**

NRC

CASE NO.  
OFF. EXH. NO.  
ID'D/RECD

7 PM

2/12/09

**Statement by Fred Dacimo**  
**Public Meeting on Nuclear Regulatory Commission's DEIS for Indian Point:**  
**February 12, 2009**

**BACKGROUND:**

Good afternoon, my name is Fred Dacimo, and I am Entergy's Vice President for License Renewal. On behalf of Entergy, I appreciate the opportunity to make this brief statement.

- I would like to acknowledge the dedicated work of the Nuclear Regulatory Commission (or NRC) Staff in preparing the draft Supplemental Environmental Impact Statement (or DEIS) associated with Entergy's license renewal application for Units 2 and 3.
  
- Furthermore, Entergy agrees with the Staff's ultimate recommendation to the Commission, based on the analysis set forth in the DEIS [AND I QUOTE]: "that the adverse environmental impacts of license renewal for IP2 and IP3 are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable." [END OF QUOTE] In other words, according to the NRC Staff, there is no reason from an environmental perspective to not proceed with the license renewal process.
  
- In fact, license renewal will not result in significant adverse environmental impacts. As the DEIS recognizes, continued plant operation results in what NRC Staff have characterized as only [QUOTE] "SMALL" [END QUOTE] impacts on many aspects of the environment, including land use,

terrestrial ecology, water use and quality, air quality, human health, socioeconomics, historical and archeological resources and environmental justice.

- These conclusions reflect the important fact that Entergy has been, and will continue to be, a proactive and effective environmental steward, as reflected in its substantial contribution to reducing the serious and negative global impacts of Climate Change. For example, Entergy has received the EPA's Climate Protection Award and is one of thirty entities recognized by EPA for outstanding efforts to protect the earth's climate.
- Entergy also has demonstrated a longstanding commitment to fully evaluate its potential impacts on the Hudson River.
- However, we disagree with some of the underlying analyses in the DEIS. Specifically, we disagree with DEIS statements in three areas relating to: (1) impingement and entrainment, (2) thermal shock, and (3) the mitigation alternative involving closed cycle cooling, including the DEIS impact analysis associated with that mitigation alternative.
- We will be submitting timely written comments to the NRC, but let me summarize why we believe the DEIS warrants revision in these three areas (in the order I mentioned them).

### IMPINGEMENT AND ENTRAINMENT:

- As you may know, Entergy and its predecessors have been collecting and assessing information about fish species in the Hudson River, and the Stations' possible impacts on the early life stages – eggs and larvae – of fish species, for over thirty years. These are not minor studies, but major ongoing initiatives to comprehensively monitor aquatic conditions over the operating life of the Stations. These studies have been approved, directed and overseen by New York State Department of Environmental Conservation (or NYSDEC) Staff. Many of these study results have been published in peer- reviewed scientific journals. In addition, Entergy has retained leading fisheries biologists, including two fisheries biologists who represented the United States Environmental Protection Agency in the 1970s, to review and evaluate the monitoring program dataset.
- Along with the owners of two other power plants on the Hudson River (Bowline and Roseton Stations), Entergy has spent more than \$50 million on fisheries studies.
- NYSDEC Staff has testified that this dataset – the information compiled by Entergy and the owners of Bowline and Roseton Stations on the Hudson River – is [AND I QUOTE] “probably, the best data set on the planet.” [END QUOTE]
- While the NRC Staff's consultants are to be commended for their efforts to review this information in drafting the DEIS, given the scope of the

information available, it is hardly surprising that some of the conclusions reached are not fully reflective of the available and relevant information—and are therefore in error.

- To that end, Entergy strongly urges the NRC Staff to incorporate the necessary corrections (which will be fully discussed in our written comments) into the final EIS.
- One example of such an error that Entergy’s fisheries experts have identified concerns the Bluefish.
  - In Chapter 4, the DEIS concludes that impingement and entrainment during the license renewal period may have a [QUOTE] “LARGE” [END QUOTE] impact on the Bluefish population.
  - The DEIS does not mention that NYSDEC, the regulator charged with overseeing fish issues, has not – please, let me underscore – not identified a concern about Bluefish as a result of IPEC operation. In fact, no regulator has identified a concern with Bluefish as a result of IPEC operation.
  - Chapter 2 of the DEIS recognizes [AND I QUOTE] “Bluefish have not been found in entrainment samples from power plants along the Hudson River, which include Roseton Units 1 and 2, IP2 and IP3, or Bowline Units 1 and 2. Juvenile bluefish may be impinged,

but the numbers are estimated to be relatively small.” [END OF QUOTE] In other words, the DEIS acknowledges that IPEC does not entrain or impinge Bluefish in any meaningful numbers. It offers no other credible scientific basis for a “LARGE” impact finding.

- We conclude, therefore, that the impact should be categorized as “SMALL” in the final EIS.
- I would like to provide a second example as to why the DEIS requires a second look. Namely, in another error, the DEIS ignores that both plants have taken significant steps to address potential fish impacts, by only mildly noting such actions.
- As many in this room know, these Stations have taken significant steps to address potential fish impacts. In the 1980’s through the 1990’s, the Stations were retrofitted with variable and dual speed pumps that allow us to reduce water use at certain times. More importantly, the Stations were retrofitted with state-of-the-art fish-protective Ristroph screens and fish return systems that take fish that are caught in the fish baskets on the screens and quickly returns them to the River. This technology was designed, redesigned, pilot tested and installed under the oversight of Riverkeeper and NYSDEC staff – full-scale models were built and

full laboratory testing was conducted. The total cost of these retrofits is more than \$100 million in today's dollars.

- Not surprisingly given the extent of review and testing of the Indian Point screening and fish-recovery systems and the success of these added measures, the NYSDEC staff revised our biological monitoring plan to eliminate further impingement monitoring that NYSDEC staff determined was more harmful to fish than the benefit that could be gained by continuing to monitor.
- Yet, despite this history and contrary to that NYSDEC determination, the DEIS suggests Entergy continue impingement monitoring – the very sampling that kills fish. DEIS, p. 4-21. With all due respect to NRC Staff, the evidence is more than sufficient to confirm the significant benefits of the Station retrofits and that impingement should be classified, in the final SEIS, as a “SMALL” impact.

**THERMAL IMPACTS:**

- Turning next to thermal impacts, we appreciate the NRC Staff's conclusion that [QUOTE] “thermal impacts could range from SMALL TO MODERATE” [END QUOTE].
- However, the DEIS nonetheless reflects a misimpression about theoretical modeling studies done in the 1990's. Those analyses were performed, as

those scientists noted at the time, under tidal and temperature conditions which simply cannot exist in nature.

- Thus, we believe this part of the DEIS warrants modification. Thermal impacts should be categorized as “SMALL” in the final EIS.

**MITIGATION ALTERNATIVES:**

- Finally, the DEIS’ treatment of cooling system mitigation alternatives is flawed.
- Not surprisingly, given the complex NYSDEC-led permitting proceeding to address potential impingement and entrainment impacts that is ongoing (parallel with this proceeding), the DEIS inadvertently misstates the NYSDEC’s Staff’s position regarding what it calls its [AND I QUOTE] “tentative” [END QUOTE] draft water-discharge (or SPDES) permit—ignoring the NYSDEC Assistant Commissioner’s August 2008 decision and subsequent DEC action.
- Simply put, the NYSDEC Staff has not determined – even on a tentative basis – that closed-cycle cooling is feasible or the best alternative for Indian Point.
- Entergy has until December 2009 to submit a report on the technological feasibility of closed cycle cooling for the plants, on a site-specific basis, and what alternative technologies exist. After reviewing that technical report (among others), NYSDEC Staff must then re-issue or revise their

draft SPDES permit with the appropriate proposed conditions – which are unknown at this time. Therefore, any final determination as to the feasibility of closed cycle cooling at Indian Point is at least a year away.

- For these reasons, the DEIS is not correct in assuming, or suggesting, that closed-cycle cooling has been determined by NYSDEC staff to be feasible at or appropriate for the Stations.
- Our written comments also will explain why the DEIS assessment of the impacts of closed-cycle cooling in the DEIS, particularly with respect to electric-system impacts and Climate Change, reflect incorrect assumptions.
  - Those assumptions are contrary to the findings of the New York Independent System Operator, the authority charged with managing the electric system.
  - They also are contrary to the 2006 independent evaluation of Indian Point done by the National Academy of Science. The National Academy of Science said “Indian Point is the largest generating station close to the major load centers in New York City, Westchester County, and Long Island and south of congestion points in the NYCA transmission system that prevent more power from being sent south during periods of peak demand. Indian Point also produces the lowest cost power in the area. Thus,

Indian Point is a critical component of both the reliability and economics of power for the New York City area.”

- We would like to reiterate our thanks for the dedicated efforts of the NRC Staff and to all those participating here.
- We look forward to submitting written comments and working cooperatively with participants in the NEPA process as NRC prepares the final EIS. Thank you.

ARC

CASE NO.  
OFF. EXH. NO.  
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2/12/09

Testimony of Raging Grannies... And Their Friends of Westchester, NY, to be presented at the meeting to discuss the draft Supplemental Environmental Impact Statement regarding license renewal of Indian Point Nuclear Generating unit nos. 2 and 3, February 12, 2009

Our testimony will consist of two songs, preceded by remarks. The first song is on this page, the second on the overleaf.

The first song is called Anti-Nuke Environmentalists

lyrics by Sunny Armer with the Raging Grannies... And Their Friends of Westchester, NY (adapted from a song written by the Raging Grannies of Seattle)

Tune: "She'll Be Coming Round the Mountain"

Call us anti-nuke environmentalists.  
We are anti-nuke environmentalists.  
We protect our air and water,  
You can't lead us to the slaughter,  
'Cause we're anti-nuke environmentalists.

We know tons of facts regarding nuclear waste.  
When it leaks into our water there's no taste,  
But it's poison all the same,  
Entergy is who we blame,  
So we're anti-nuke environmentalists.

If you get yourself relicensed and still run,  
There'll be lots more dead fish lying in the sun,  
More strontium in our babies' teeth,  
More leaks that millions hate to breathe  
With no evacuation they can't run.

There are twenty tons of new waste every year,  
All created by the Indian Point plant here  
You can swear on our own Bibles  
That it's "safe, secure and vital,"  
But we're sure not gonna swallow what we hear.

When we think about Chernobyl, we have qualms.  
You're a target for those terrorists with bombs.  
There's no anti-nuke insurance,  
Which means there's no assurance  
That we will not all be blown to Kingdom Come.

Bring us solar, bring us hydro, bring us wind.  
Bring us energy from sources that won't end.  
Before we could trust uranium,  
We'd need holes in our cranium.  
Call us anti-nuke environmentalists.

The second song is called We Ask for a Clean World

lyrics by Sunny Armer with the Raging Grannies... And Their Friends of Westchester, NY  
Tune: "The Man on the Flying Trapeze"

We ask for a clean world, a world that is kind.  
We look for a good world but what do we find?  
Too many people who don't seem to care  
Who dies from so much tainted air.

So much nuclear waste is piled up,  
Underground in containers that leak.  
Those leaky containers were built by no-brainers.  
And what else becomes of that waste?

We send it in weapons to an impover'ished place  
To help in destroying powerless race:  
Palestinians in Gaza, Iraqis in Iraq—  
Let's stop making nuclear waste!

Oh, isn't it awful, oh, isn't it funny:  
Political power still follows the money.  
We hope those who don't care will learn to share  
The goods of the earth with the world

From the seats of great power many tumble,  
For the whole world belongs to the humble.  
Although critics mutter and grumble,  
We must have a clean source of power!

We ask for a kind world where everyone cares  
About clean, clear water and pure, sweet fresh air.  
And wind, sun, and water create energy  
And nuclear power's history.

Raging Grannies..and Their Friends of Westchester sing and work for peace, justice, the environment, and social and economic equality. We welcome new members. Our group is a blend of members of various talents and levels of ability.

Contact information: RagingGrannies63@aol.com  
General information is at <http://westchester.raginggrannies.org>

NRC  
CASE NO.  
OFF. EXH. NO. 1:30P  
ID./REC'D  
DATE  
2/12/09

# MOTHERS MILK PROJECT

[www.MothersMilkProject.org](http://www.MothersMilkProject.org)

February 12, 2009

130 p/m

U.S. Nuclear Regulatory Commission  
Washington DC

Re: Draft Supplemental Environmental Impact Statement Concerning Relicensing of the Indian Point Nuclear Power Station

Dear Ladies and Gentlemen:

Please accept these comments for inclusion in the public record of proceedings convened by the United States Nuclear Regulatory Commission ("NRC") today for receipt of public comment on the Draft Supplemental Environmental Impact Statement ("DSEIS") prepared by NRC staff with regard to Entergy's application for relicensing of the Indian Point Nuclear Power Station.

The Mothers Milk Project was launched in June 2008 as an all-volunteer effort to collect and analyze mothers' milk from humans and animals living within 50 miles of Indian Point in New York and Connecticut for levels of strontium-90 and strontium-89, both radioisotopes released into the air and water during routine operations of Indian Point.

Strontium-90 is a long-lived radioisotope with a half-life of 28 years. It is a potent carcinogen known to cause bone cancer, leukemia and diseases of the immune system. It is especially harmful to developing and young children as it mimics calcium and is ingested into their bones and teeth. As strontium-89 has a short half life - half its energy decays in 50 days - its presence in the milk of lactating mothers alongside strontium-90 provides strong evidence that the radioactivity was recently produced from a nearby source and is not a vestige of atmospheric nuclear weapons testing nor can it be attributed to "background radiation."

The Mothers Milk Project is believed to be the only citizen-initiated program to sample the milk of lactating human mothers, living near a nuclear power plant, for radioactivity.

The Mothers Milk Project was instituted in recognition of the fact that Entergy Nuclear Operations, Inc. does not sample milk from any source, human or animal, in the environment as part of its Indian Point sampling program for radiological effluent

releases.

The NRC does not sample milk near Indian Point for radioactivity, nor do the New York State or Connecticut Departments of Public Health nor their respective environmental protection agencies.

(In contrast, Entergy does sample milk from numerous dairy farms near its Vermont Yankee Nuclear Power Plant in Vernon, Vermont. At its Millstone Nuclear Power Station in Waterford, Connecticut, owner-operator Dominion Nuclear Connecticut, Inc. samples goat milk for radioactivity.)

It is well recognized that goat milk is a sensitive indicator of the presence of radiation in the environment. Grazing goats may ingest radioactivity from the air, the water and from pasture vegetation. It concentrates in their milk which they feed to their babies and which may enter the human food chain. Cow's milk is also a strong indicator of the presence of radioactivity in the environment.

To date, the Mothers Milk Project has collected 60 samples of milk from breastfeeding mothers and lactating goats, cows and sheep within the region surrounding Indian Point. The milk samples are being analyzed for the presence of strontium-90 and strontium-89 at a certified laboratory. The identity of the laboratory is being kept confidential until we have achieved a broad sampling of milk from many communities.

Today we share preliminary results of the first 30 samples analyzed.

At the outset, we advise you that we have pledged unqualified confidentiality to all of the mothers and animal caretakers who have shared samples of milk for our project. Their names and home addresses will not be publicly revealed unless they specifically request such disclosure. At the present time, we are unable for reasons of confidentiality to provide you with names or addresses or other identifying information with regard to specific donors.

The sole exception is the case of Cindy-Lu, a mixed-breed goat of Nubian and Saanan parentage, whose owner (the undersigned) has waived confidentiality. Cindy-Lu resides in Redding, Connecticut, which is located approximately 30 miles due east of Indian Point. To date, she has provided 7 milk samples for analysis. **A sample collected on July 11, 2008 had concentrations of both strontium-89 (3.7 picoCuries/liter or pCi/l) and strontium-90 (3.4 pCi/l).** Other samples have had concentrations of strontium-90 as high as 5.1 pCi/l (sample collected July 19, 2008) and 3.5 pCi/l (sample collected June 29, 2008). In each of the 7 milk samples Cindy-Lu provided for laboratory analysis, strontium-90 was detected. Strontium-89 levels were given as "zero" in all samples except the July 11, 2008 sample, but with margins of error as high as +/-5.5 pCi/l and +/-7.7 pCi/l. Cindy-Lu, who gave birth to two kids on

February 9, 2009, will continue to provide samples of her milk to the Mothers Milk Project.

Other goat milk from a location in Yorktown Heights, New York, was tested a full 15 months after it had been collected and frozen for future testing. The strontium-90 concentration was given as 2.3 pCi/l, with strontium-89 given as 0 +/-14.5 pCi/l.

A third goat milk sample taken from a location approximately 30 miles due north of Indian Point tested 3.0 pCi/l of strontium-90, with strontium-89 given as 0 +/- 3.7 pCi/l.

Cow milk sampled from the same location had a strontium-90 concentration of 1.0 pCi/l, with strontium-89 given as 0 +/-2.4 pCi/l.

Our first preliminary results from samples of human breastmilk showed a wide variation.

The highest concentration of strontium-90 was given as 7.1 pCi/l, with strontium-89 given as 0 +/- 3.7 pCi/l. The donor resides approximately 10 miles from Indian Point.

The second highest concentration of strontium-90 in human milk was 4.4 (strontium-89 0 +/-3.1). The donor resides near the Hudson River approximately 10 miles south of Indian Point.

**The breastmilk of a donor residing approximately 15 miles north of Indian Point had a concentration of 2.5 pCi/l (strontium-89 0.1 +/-8.7 pCi/l).**

The breastmilk of a donor residing approximately 10 miles north of Indian Point had a strontium-90 concentration of 0.3 pCi/l (strontium-89 0 +/-2.2 pCi/l).

The breastmilk of a donor residing in Hartsdale, New York, had a strontium-90 concentration of 1.1 pCi/l (strontium-89 0 +/-2.0 pCi/l).

The breastmilk of a donor residing in Cortlandt Manor had a strontium-90 concentration of 1.6 pCi/l (strontium-89 0 +/-1.7 pCi/l).

The breastmilk of a donor residing in Westport, Connecticut had a strontium-90 concentration of 0.7 pCi/l (strontium-89 0 +/-9.4 pCi/l).

The breastmilk of a donor residing in Easton, Connecticut had a strontium-90 concentration of 0.1 pCi/l. (strontium-89 0 +/-2.8 pCi/l).

The breastmilk of a donor residing in New York City had a strontium-90 concentration of 3.8 pCi/l. (strontium-89 0 +/-4.2 pCi/l).

Altogether, the breastmilk of 11 human mothers was analyzed.

Only two human donors had strontium-90 concentrations of "zero" in their milk, with a margin of error of 2.5 (Cortlandt Manor, strontium-89 0 +-7.2 pCi/l) and 1.2 (10 miles southwest of Indian Point, strontium-89 0+-4.5 pCi/l).

Once we have received results of 100 milk samples we will invite all donors to participate in a press conference to announce the results. Our pledge of confidentiality will continue to guarantee privacy to those who prefer to remain anonymous. We have asked all participants to provide us with completed questionnaires to assist our assessment of the results.

The results we share today are preliminary and represent only the first batch of samples collected. We recognize that it is difficult to draw a conclusion from a small sample such as this.

**However, we are very concerned to learn that all but two of 11 mothers who shared their breastmilk with us for this project had concentrations of strontium-90 in their milk.**

**We are very concerned as well to learn that all animals whose milk was tested had levels of strontium-90 in their milk. We are gravely concerned that two of our samples - one from a human mother, the other from a goat mother - had detectable levels of strontium-89 in their milk.**

We believe these results provide cause for belief that radiation releases from the Indian Point Nuclear Power Plant are responsible for contaminating the mothers' milk.

Further, we believe the information contained herein provides cause for suspension of the relicensing proceedings to allow for full investigation by the NRC and the health departments of New York and Connecticut as to strontium-90 and strontium-89 levels in the breastmilk of human mothers and lactating livestock within 50 miles of Indian Point.

Should such an investigation result in findings that the breastmilk of mothers and livestock contributing to the food chain and residing in the region surrounding Indian Point contains strontium-90 and/or strontium-89, we believe a cessation of Indian Point operations and denial of relicensing are called for.

Respectfully submitted,



Nancy Burton  
Co-Director  
Mothers Milk Project  
147 Cross Highway  
Redding Ridge CT 06876  
Tel. 203-938-3952

NRC

CASE NO.  
OFF. EXH. NO. 1:30P  
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2/12/09

Philip H. Likes II  
545-528-0957

I arrived late  
and had to leave early  
so was unable to hear  
my say.

130 p m

I have attended enough of these gatherings to have recognized the utter futility of the process for any but those entrenched in the current system. There are two groups, those who have something to gain or to lose and those who have nothing to gain except peace of mind. The gainers are armed with half truths, lies by means of omission, and often questionable experts with equally questionable statistics coldly devoid of human considerations and consequences; in essence spin and propaganda. They represent power, money, and influence; the status quo. The other group, the nothing to gainers, lacking these resources and advantages, nonetheless represent the people's interests and have demonstrated time and again many different ways and reasons, supported by facts and truth, why Indian Point should be closed. This group is not supported by the power elite, so needless to say they have made very little progress having been ignored, sidelined, stalled, undermined by technicalities, and changing of the playing field by the opposition. These legally necessary gatherings provide an opportunity for staged events for the gainers and little more than a forum for venting for everyone else, it does not take much to recognize who has the upper hand here and what will happen after this, yet again another charade, takes place. It is almost a foregone conclusion, perhaps even predetermined.

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Page 1

My name is Jill Davis, and I am the Director of the Hendrick Hudson Free Library, which for over 70 years, has supported – and continues to support – the needs of residents in the Hendrick Hudson School District.

Henry Ward Beecher once said, "A library is not a luxury, but one of the necessities of life." Beecher understood the lifeblood a library provides to a community – especially smaller communities – where the library stands as the repository of local history and knowledge, a cultural center, a meeting place, and a symbol of the local community's vitality as a suitable location for raising a family. The Hendrick Hudson Free Library is all of these things and more.

Without the annual voting support of the residents, the library would suffer greatly; however, also of significant importance is the generous support we receive from businesses throughout the area. One such major supporter is Entergy.

Entergy and its employees are an integral part of this community, many are area homeowners; their children attend the schools in the Hendrick Hudson School District and use the library for their academic enrichment, as well as for their reading pleasure.

Being the main contributor to our Cultural Enrichment Fund, has allowed our library to provide the community

130 P<sup>m</sup> page 2

with additional programs, events and concerts that our budget alone could not support. They are one funder of "Step Up For Literacy" our pre-school literacy program that supports parents and children in our community who are English Language Learner's to better prepare them for a lifetime of learning. We are also in the beginning stages of a joint venture which will provide the latest technology, "Go Library" a book vending machine, to be placed in a high traffic area in the community, allowing library services to reach the portion of our community that is on the go and finds it hard to visit the physical library building.

As you can see Entergy is a valuable supporter of the library, as well as the community we serve, and without it, there would be a significant loss of support.

Thank you.



# **African American Environmentalist Association**

Written Statement of

**Derry Bigby**

Vice President

African American Environmentalist Association

For the

**Nuclear Regulatory Commission Meeting To Discuss The Draft  
Supplemental Environmental Impact Statement**

For

**License Renewal**

For the

**Indian Point Nuclear Power Plant**

Presented to the

**U.S. Nuclear Regulatory Commission**

**Office of Nuclear Reactor Regulation**

February 12, 2009

## **AAEA Statement on Indian Point License Renewal Application**

### **Introduction**

My name is Derry Bigby and I am the Vice President of the African American Environmentalist Association (AAEA). AAEA, founded in 1985, is an organization dedicated to protecting the environment, enhancing human, animal and plant ecologies and promoting the efficient use of natural resources. AAEA includes an African American point of view in environmental policy decision-making and resolves environmental racism and injustice issues through the application of practical environmental solutions. The New York Office was established in 2003.

AAEA supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. AAEA expressed public support for nuclear power for the first time in 2001 after a two-year internal process of studying and debating the issue. AAEA was the first environmental organization in the United States to support nuclear power. My comments today address the Generic Environmental Impact Statement for the License Renewal of Nuclear Plants, Supplement 38, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3.

AAEA has members worldwide. New York members of AAEA live and work – and breathe the air in a Clean Air Act Nonattainment Area. Of particular import to AAEA is the promotion of clean air in African American communities. Because nuclear power is emission-free and has a demonstrated safety record, whereas fossil-fuel power contributes to numerous health issues, AAEA seeks to promote the safe use of nuclear power. AAEA specifically supports the Indian Point 2 and 3 nuclear power facilities because these facilities provide significant electrical capacity to the State of New York with minimal human, animal, air, water, and land impacts. My comments will address specific environmental justice, air pollution, and global warming issues.

## AAEA Statement on Indian Point License Renewal Application

AAEA agrees with the preliminary recommendation of the NRC staff:

"...that the Commission determine that the adverse environmental impacts of license renewals for IP2 and IP3 are not so great that not preserving the option of license renewals for energy planning decision makers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS, (2) the ER submitted by Entergy, (3) consultation with other Federal, State, and local agencies, (4) the staff's own independent review, and (5) the staff's consideration of public comments received during the scoping process."<sup>1</sup>

### Environmental Justice

Environmental justice is defined by AAEA as the fair treatment of all people regardless of race or income with respect to environmental issues. AAEA is deeply concerned with any policy or measure that impacts the air quality of the communities where it is based, or that affects the health of its members.

Although AAEA is concerned about air quality in all areas, we are particularly concerned with promoting clean air in African American communities because, in many instances, those communities suffer a disproportionate amount of total pollution.

We agree with the NRC conclusion in the GEIS on the environmental justice impacts if IP 2 and IP 3 are relicensed for another twenty years, which states:

"Based on the analysis on environmental health and safety impacts presented in this draft SEIS for other resource areas (contained in Chapters 2 and 4 of this SEIS), there would be no disproportionately high and adverse impacts to minority and low income populations from continued operation of IP2 and IP3 during the license renewal period."<sup>2</sup>

We totally disagree with the environmental justice conclusion that, "the overall environmental justice impacts of constructing and operating a closed-

<sup>1</sup> U.S. NRC GEIS for License Renewal of Nuclear Plants, Supplement 38, Regarding IP2 & 3, Draft Report For Comment, Main Report, Executive Summary, p. xvii.

<sup>2</sup> GEIS, 4.4.6 Environmental Justice, p 4/45-4-46.

## **AAEA Statement on Indian Point License Renewal Application**

cycle cooling system at the IP2 and IP3 site are likely to be SMALL.”<sup>3</sup> The impacts would be devastating because we believe Entergy would shut the facility down before building cooling towers and that would lead to significantly more air pollution in minority communities that are already inundated with a disproportionate amount of pollution sites. We support the alternative proposal that would combine the existing once-through cooling system with modified intake retrofits that would be equivalent to a new closed-cycle cooling system. Requiring a closed-cycle cooling system is essentially the No-Action Alternative (shut down).

### **Supercritical Coal-Fired Generation**

The GEIS concludes that even a more efficient supercritical four-unit coal-fired power plant could cause LARGE impacts depending on the site location.<sup>4</sup>

Although we approve of supercritical boilers, they cannot replace the emission free nature of IP2 and IP3. Emissions from these plants would still have large negatives impacts on already impacted communities in environmental justice areas.

### **Fossil-Fuel Power Causes Serious Adverse Health Effects**

In 1999, coal-fired power plants in the United States emitted into the environment 11.3 million tons of sulfur dioxide (“SO<sub>2</sub>”), a criteria air pollutant that is correlated to asthma and impaired lung functions, 6.5 million tons of nitrogen oxides (“NO<sub>x</sub>”) which, when combined with other pollutants and sunlight, forms ozone, another lung irritant linked to asthma, and 1.9 billion tons of carbon dioxide (“CO<sub>2</sub>”), yet another contributor to increased ozone levels and global

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<sup>3</sup> GEIS, Section 8.1.1.2 Environmental Impacts of the Closed-Cycle Cooling Alternative, Environmental Justice, p. 8-16.

<sup>4</sup> GEIS, 8.3.1 Supercritical Coal-Fired Generation, Environmental Justice, p 4-44.

## AAEA Statement on Indian Point License Renewal Application

climate change.<sup>5</sup> This equates to approximately 60% of all SO<sub>2</sub> emissions, 25% of all NO<sub>x</sub> emissions, and 32% of all CO<sub>2</sub> emissions nationwide.<sup>6</sup>

These and other airborne pollutants emitted by fossil-fuel power stations may have a direct and significant effect on human health. In a study by Abt Associates, one of the largest for-profit government and business research consulting firms in the world, it was found that over 30,000 deaths each year are attributable to air pollution from U.S. power plants.<sup>7</sup> Another study found that air pollution from power plants was a contributing factor to higher infant mortality rates and higher incidences of Sudden Infant Death Syndrome ("SIDS").<sup>8</sup>

Research has further shown that pollutants from fossil-fuel power plants form tiny particles (called fine particulate matter) that are linked to diseases of both the respiratory and cardiovascular systems.<sup>9</sup>

Not surprisingly, air pollution has been characterized as one of the largest threats to public health.<sup>10</sup>

### Negative Health Effects of Fossil-Fuel Power Borne Disproportionately by Blacks

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<sup>5</sup> Rachel H. Cease, ADVERSE HEALTH IMPACTS OF GRANDFATHERED POWER PLANTS AND THE CLEAN AIR ACT: TIME TO TEACH OLD POWER PLANTS NEW TECHNOLOGY, 17 J. Nat. Resources & Env'tl. L. 157, 158 (2002-2003); Martha H. Keating, AIR INJUSTICE, at 4 (October 2002) (attached hereto as Exhibit B).

<sup>6</sup> Nat. Resources & Env'tl. L. at 158.

<sup>7</sup> Nat Resources & Env'tl at 159.

<sup>8</sup> Martha H. Keating, AIR INJUSTICE, (October 2002).

<sup>9</sup> Air Quality in Queens County: Opportunities for Cleaning Up the Air in Queens County and Neighboring Regions, at S-6, Synapse Energy Economics, Inc. (May 2003) ("Air Quality in Queens County") ("Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die.") (available at <http://www.synapse-energy.com/Downloads/Synapse-report-queens-air-quality-excc-summary-05-29-2003.pdf>); Children at Risk: How Pollution from Power Plants Threatens the Health of America's Children, at 2, Clean Air Task Force (May 2002) ("Power plant emissions and their byproducts form particulate matter, ozone smog and air toxics. These pollutants are associated with respiratory hospitalizations, lost school days due to asthma attacks, low birth weight, stunted lung growth and tragically, even infant death.") (available at <http://cta.policy.net/fact/children/>).

<sup>10</sup> Allison L. Russell, URBAN POLLUTANTS: A REVIEW AND ANNOTATED BIBLIOGRAPHY, New York City Environmental Justice Alliance 2000 (<http://www.nyceja.org/pdf/Urban.pdf>).

## **AAEA Statement on Indian Point License Renewal Application**

Sadly, these serious health effects disproportionately fall on the shoulders of low-income and minority communities, including African American communities. For instance, the percentage of African Americans and Hispanics living in areas that do not meet national standards for air quality is considerably higher than that of whites.<sup>11</sup> Correspondingly, respiratory ailments affect African Americans at rates significantly higher than whites. Asthma attacks, for example, send African Americans to the emergency room at three times the rate of whites (174.3 visits per 10,000 people for African Americans versus 59.4 visits per 10,000 people for whites), and African Americans are hospitalized for asthma at more than three times the rate of whites (35.6 admissions per 10,000 people for African Americans versus 10.6 admissions for every 10,000 people for whites).<sup>12</sup> Similarly, the death rate from asthma for African Americans is almost three times that of whites (38.7 deaths per million versus 14.2 deaths per million).<sup>13</sup>

### **Conclusion**

AAEA supports the 20-year License Renewal (ESP) for the Indian Point nuclear power plant located in Buchanan, New York. We support this renewal because the facility is a positive structure for mitigating ground level air pollution, global warming and environmental injustice.

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<sup>11</sup> Urban Pollutants.

<sup>12</sup> Urban Pollutants.

<sup>13</sup> Urban Pollutants.

NRC

CASE NO.  
OFF. EXH. NO.  
ID'D/RECD  
DATE

1:30P

2/12/09

COMMENT ON ENVIRONMENTAL IMPACT STATEMENT CONCERNING  
LICENSE RENEWAL FOR IP-2 AND IP-3  
PUBLIC MEETING ON FEBRUARY 12, 2009

THE US SUPREME COURT IS REVIEWING THE APPLICABILITY OF COST BENEFIT ANALYSIS WHEN EVALUATING THE BEST AVAILABLE TECHNOLOGY FOR APPLICATION OF THE CLEAN WATER ACT TO INDUSTRIAL FACILITIES. THE DECISION OF THE COURT WHICH SHOULD BE MADE BY THE END OF THE CURRENT TERM WILL DETERMINE WHAT COOLING SYSTEM WILL BE REQUIRED FOR RELICENSING, I WILL NOT COMMENT ON THE PORTIONS OF THE EIS THAT ADDRESSED FISH POPULATIONS.

THE DETERIORATION OF AIR QUALITY IN THE LOWER HUDSON VALLEY THAT WOULD BE CAUSED BY SHUTDOWN OF THE INDIAN POINT PLANTS IS NOT ADEQUATELY ADDRESSED BY THE EIS. ON PAGE 2-29 OF THE EIS YOU NOTE THAT 22 COUNTIES WITH A TOTAL POPULATION OF MORE THAN 16 MILLION PEOPLE WITHIN 50 MILES OF IPEC ARE IN THE NON ATTAINMENT STATUS FOR COMPLIANCE WITH CLEAN AIR ACT REQUIREMENTS FOR OZONE, 19 OF THESE COUNTIES ARE ALSO IN NON COMPLIANCE FOR PM-2.5 PARTICULATES AND ONE OF THESE COUNTIES ALSO FOR PM-10 PARTICULATES.

ON PAGE 8-40 OF THE EIS YOU CONCLUDE THAT THE IMPACT ON AIR QUALITY OF IPEC SHUTDOWN AND REPLACEMENT WITH A STATE OF THE ART FOSSIL PLANT WOULD BE MODERATE. ON PAGE 8-42 YOU CONCLUDE THAT THE IMPACT ON HUMAN HEALTH WOULD BE MODERATE FROM THIS ADDITIONAL AIR POLLUTION. HOW MANY PEOPLE WOULD BE SICKENED AND DIE BECAUSE OF THIS "MODERATE" IMPACT ON HUMAN HEALTH OF CLOSING IPEC?

IN AN ANALYSIS PERFORMED IN 2002 AND PROVIDED TO YOU ON THE DOCKET,(I PROVIDE ANOTHER COPY OF IT TO YOU TODAY) , SHOWED THAT GENERATION OF REPLACEMENT POWER FOR A SHUTDOWN IPEC, COMING FROM EXISTING PLANTS RUNNING AT HIGHER CAPACITIES, PLANTS LIKE BOWLINE AND DANSKAMMER WOULD RESULT IN SUBSTANTIALLY MORE AIR POLLUTION. THIS IS MORE LIKELY TO HAPPEN THAN CONSTRUCTION OF NEW PLANTS. HOW MUCH MORE OF A HUMAN HEALTH IMPACT WOULD THIS HAVE?

YOUR EIS DOES NOT ADEQUATELY ADDRESS THE AIR QUALITY DETERIORATION AND NEGATIVE HUMAN HEALTH EFFECTS OF SHUTDOWN OF IPEC.

ON PAGE 8-42 THE EIS CONCLUDES THAT THE LONG TERM SOCIOECONOMIC IMPACT OF SHUTDOWN OF IPEC WOULD BE SMALL TO MODERATE.

NEI PUBLISHED A REPORT TITLED "ECONOMIC BENEFITS OF IPEC "USING INFORMATION FROM 2002. A COPY IS PROVIDED WITH THIS STATEMENT FOR YOUR INFORMATION. THIS REPORT NOTED THAT IPEC EMPLOYED MORE THAN 1500 PEOPLE AND WAS DIRECTLY RESPONSIBLE FOR 1200 MORE JOBS IN THE REGION RESULTING IN MORE THAN 200 MILLION DOLLARS IN SALARIES IN 2002. PLANT PURCHASES IN THAT YEAR EXCEEDED 280 MILLION DOLLARS AND 50 MILLION DOLLARS IN LOCAL AND STATE TAXES WERE DIRECTLY PAID IN 2002 AS A RESULT OF IPEC OPERATIONS AND THE TOTAL TAXES PAID AS THE RESULT OF ECONOMIC ACTIVITY INDUCED BY IPEC WAS 215 MILLION DOLLARS IN 2002. WITH A TOTAL ECONOMIC BENEFIT OF 1.5 BILLION DOLLARS FOR THAT YEAR. I THINK THIS IS MORE THAN SMALL TO MODERATE.

THIS NEI REPORT ALSO NOTES THAT SHUTDOWN OF IPEC WOULD INCREASE ELECTRIC COSTS IN THE REGION BY 13 TO 25 PERCENT. THIS WOULD RESULT IN AN ADDITIONAL COST OF \$800 MILLION TO \$1 BILLION PER YEAR FOR ELECTRICITY IN THE REGION.

YOUR EIS DOES NOT ADEQUATELY ADDRESS THE ENORMOUS ECONOMIC BENEFITS OF IPEC WHICH WOULD BE LOST UPON PLANT SHUTDOWN.

JOHN J KELLY  
JLEJSKELLY@VERIZON.NET

**Entergy Nuclear Indian Point 2, LLC and  
Entergy Nuclear Indian Point 3, LLC  
Village of Buchanan, New York**

**Emissions Avoidance Study**

*Prepared for*

**Entergy Nuclear Northeast**

*Prepared by*

**TRC Environmental Corporation  
Lyndhurst, New Jersey**

**Revised August 2002**

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Appendix A Emission Avoidance Calculations

## **EXECUTIVE SUMMARY**

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In evaluating the impact of decommissioning Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC, the potential emissions increases associated with replacement electricity generation sources need to be evaluated. TRC evaluated several different scenarios to determine the impact on the air quality in New York State and the local area. Replacement sources examined included existing fossil generating stations located in the entire state of New York, the Hudson Valley and New York City. To provide context for interpreting the projected emissions increases, the increases for each replacement scenario are expressed as percent increases relative to regional and statewide emissions, and the health and welfare effects associated with each pollutant and the groups most susceptible to them have been tabulated.

When evaluating the emission increase from sources located throughout the state, it was necessary to develop a "generation fuel mix." This consisted of the anticipated mix of coal, gas, oil etc. expected for the replacement generation sources during the years 2002 through 2005. Data from the current New York State Energy Plan, dated December 2001, serves as the basis for the existing and projected future generation fuel mix applied in the analysis

Indian Point Units 2 and 3 have an average net maximum capacity of 983.7 and 989 Megawatts (MW), respectively, based on information provided to the Independent System Operator (ISO). Based on a 90% capacity factor, the annual generating capacity of these two units is 15,552,767 Megawatt-hours (MWh), which represents approximately 10% of the state's total generation.

The first set of calculations presented assumes that the demand is met by increased operation of existing New York State fossil stations, so that a generation mix of coal, oil and natural gas in the years 2002 through 2005 replaces the generating capacity of Units 2 and 3. To establish a baseline, emissions estimates for the existing units are based on a combination of data from the US Environmental Protection Agency (EPA) utility Emissions & Generation Resource Integrated Database 2000 (EGRID2000), Version 2.0 and the US EPA Document AP-42 emission factors for stationary sources. When more than one emission factor was available, the lower emission factor was chosen. This approach represents a conservative estimate of the potential increase.

Since it is reasonable to assume that the majority of lost output would be made up by increased generation of units nearest to the New York City / Westchester load pocket, replacement by the four large fossil power stations in the Hudson Valley (Bowline Point, Lovett, Danskammer and Roseton) and the existing units in New York City was also studied. For each of these plants,

baseline emissions and generation were obtained from the EGRID2000 database. Data for the most recent year included in this database (1998) was utilized in this study.

The first task in this set of calculations assumed replacement by the four large plants in the Hudson Valley: Bowline Point, Lovett, Danskammer, and Roseton. These plants utilize boilers that are fired with coal, No. 6 residual oil and natural gas. These plants currently operate at capacity factors ranging from 32% to 58%. These four stations would need to operate at over 90% capacity factor in order to make up the lost generation from Indian Point 2 and 3. It has been determined that these plants are already operating more during the ozone season (May through September) based on the EGRID2000 data; thus the increased demand during the ozone season cannot be met by these four stations alone.

The next situation that was evaluated was the replacement by the 14 existing power plants in the five boroughs of New York City. The replacement demand is approximately 33% of the available generation from the New York City plants. In order to determine the generation and emissions increases, it was assumed that the total fuel and plant mix from these plants would remain constant, except for the plants that could not meet this increase. Since the current generation for all of these facilities combined is roughly equal to that of Indian Point 2 and 3, the emission rates in New York City would nearly double in order to make up the lost generation.

The final scenario of replacement by existing sources that was evaluated was the replacement by a combination of the four Hudson Valley plants and the plants located in New York City. For the purposes of this evaluation, it was assumed that half of the make-up generation would come from the four Hudson Valley Plants and the other half would come from the plants in New York City, with the increase determined by assuming that the total fuel and plant mix from these two sets of plants would remain constant, except for the plants that could not meet this increase.

The increases from each of the above-described scenarios were compared to the current emissions from the power generation industry in New York. The results are presented in the table below:

Replacement Generation Sources	CO <sub>2</sub>	SO <sub>2</sub>	NO <sub>x</sub>	PM-10	CO	VOC
New York State: 2002 Generation Mix	20.20%	23.81%	21.58%	22.69%	17.76%	17.28%
New York State: 2003 Generation Mix	20.12%	23.54%	21.42%	22.51%	17.80%	17.34%
New York State: 2004 Generation Mix	19.41%	21.10%	20.03%	21.11%	9.28%	18.36%
New York State: 2005 Generation Mix	21.05%	20.06%	20.66%	22.14%	11.66%	23.44%
Hudson Valley Power Plants	21.08%	18.77%	20.80%	52.59%	74.31%	56.97%
New York City Power Plants	18.10%	2.52%	15.02%	9.28%	17.24%	16.83%
Hudson Valley and New York City	19.83%	11.32%	18.89%	28.49%	42.02%	34.63%

Note: Total increase is compared to utility source emissions only in New York. Baseline data obtained from USEPA's EGRID2000 database (1998)

In addition to evaluating the increase in emissions, TRC prepared a matrix summarizing the potential effects and health hazards from these pollutants. Currently, Westchester County is classified as a non-attainment area for ozone. Ozone can cause lung irritation, permanent lung damage, aggravated asthma, reduced lung capacity, pneumonia and bronchitis. Persons that are most susceptible to the negative effects of ozone are those with respiratory illnesses, outdoor workers, and children. Ozone also increases the susceptibility of plants to disease, thus reducing crop and forest yields.

The entire state of New York is located in the Ozone Transport Region (OTR), which requires that new sources of NO<sub>x</sub> and VOC be subject to Lowest Achievable Emission Rates (LAER) and emissions offsets. In essence, this massive increase in generation by existing sources is comparable to constructing one large new source without subjecting it to these current applicable regulations since the majority of these existing sources were constructed prior to the new source review requirements and were not subject to LAER and offset requirements. The increase in NO<sub>x</sub> and VOC, the precursors to ozone, would constitute a significant setback in the area's efforts to meet progress goals toward ozone attainment status in the near future. In order to reach attainment, the area needs to further reduce emissions in the area as opposed to unnecessarily increasing these emission rates.

The attached matrix outlines the effects of all criteria pollutants and the groups that are most greatly impacted by them. As shown with carbon monoxide and ozone, these pollutants affect all people, regardless of age and current health, in addition to the vegetation in the area.

## Regulatory Impacts and Effects of Major Air Pollutants

Pollutant	NAAQS Attainment Status for New York State	Basis for NAAQS	Most Susceptible Population Groups	Additional Impacts
SO <sub>2</sub>	Attainment	Temporary breathing difficulty Respiratory illness Aggravates existing Heart Disease	Asthmatics, Children, Elderly, Persons with Heart or Lung Disease	Precursor to acid rain formation Visibility impairment from Sulfate Particles (PM-2.5) Aesthetics damage due to accelerated building decay Acidification of lakes due to Atmospheric Deposition Soil degradation due to Atmospheric Deposition
NO <sub>x</sub>	Attainment	Damage to lung tissue Respiratory illnesses – Bronchitis Reduction in lung function	Children, Asthmatics, Outdoor Workers	Precursor to ground-level Ozone (Smog) Precursor to acid rain formation Water quality deterioration (Oxygen depletion) Visibility impairment
PM-10	Attainment for all Counties with exception of New York County	Aggravated Asthma Chronic Bronchitis Decreased lung function Premature Death	Persons with Heart Disease or Influenza, Asthmatics, Children, Elderly	Major cause of reduced visibility (Haze) Aesthetics damage due to stains from soot Acidification of lakes due to Atmospheric Deposition Soil degradation due to Atmospheric Deposition
CO	Attainment with exception of Metropolitan New York City (recently redesignated as attainment by USEPA, but New York State redesignation pending)	Cardiovascular effects Vision problems Reduced ability to work and learn Death (extremely high levels)	Persons with Heart or Lung Disease	
Ozone	Attainment for all counties with exceptions of New York State Metropolitan Areas and Long Island, but entire state is located within northeast Ozone Transport Region	Lung irritation (wheezing, coughing) Permanent lung damage Aggravated Asthma Reduced lung capacity Pneumonia and Bronchitis	Persons with respiratory illnesses, Children, Outdoor workers	Increases susceptibility of plants to disease Reduces crop and forest yields Aesthetics damage due to damage to leaves and trees Damages rubber and fabrics Reduced visibility
VOC	Not Applicable	Not Applicable	Not Applicable	Precursor to ground-level Ozone (Smog) Damage to plants
CO <sub>2</sub>	Not Applicable	Not Applicable	Not Applicable	Contributes to Global Warming

## 1.0 INTRODUCTION

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TRC Environmental Corporation (TRC) was retained by Entergy Nuclear Operations, Inc. (Entergy Nuclear) to perform an assessment of the potential increase in emissions of criteria pollutants from non-nuclear generating assets within New York State in the event that the Indian Point 2 and 3 are decommissioned. The assessment assumed that additional non-nuclear generation would be required within the State of New York to replace the electric generating output of Indian Point Units 2 and 3 and evaluated increase in annual potential emissions for the period of 2002 through 2005.

The evaluation performed by TRC included the following activities:

- Development of a “generation fuel mix” (i.e., coal, gas, oil, etc.) assumption for use in developing the avoided emissions calculations. TRC utilized data from the current New York State Energy Plan, dated December 2001, as the basis for the existing and projected future generation fuel mix applied in the analysis.
- Estimation of projected criteria pollutant emissions for the non-nuclear generating assets which would be required to replace the electric generating output of Entergy Nuclear’s Indian Point Units 2 and 3 in the event that the Indian Point Nuclear Generating Station is decommissioned. The emission calculations are based on a projected 90% capacity factor for Units 2 and 3 through the study period of 2002 to 2005. Indian Point Units 2 and 3 have an average net maximum capacity, as reported to the Independent System Operator, of 983.7 Megawatts (MW) and 989 MW, respectively. The annual generating capacity of these two units is 15,548,036 Megawatt-hours (MWh) per year at a 90% capacity factor, representing approximately 10% of the state’s total generation. Calculations of replacement generation emissions were based upon the “generation fuel mix” discussed above, assuming that the lost generation would be made up by a mix of existing in-state fossil (coal/oil/gas) fired units. Emissions estimates for the existing units were based on a combination of data from a US Environmental Protection Agency (EPA) utility emissions database and the US EPA Document AP-42 emission factors for stationary sources. Replacement by the sources located in the Hudson Valley and New York City was also evaluated as an option.
- Preparation of a matrix of regulatory impacts and effects of major air pollutants.
- Evaluation of additional costs for NO<sub>x</sub> allowances.

TRC’s findings relative to the above activities are summarized on the following pages.

## 2.0 DEVELOPMENT OF GENERATION FUEL MIX

For the purpose of this study, the future fuel mix information was obtained from the New York State Energy Plan, dated December 2001. This plan provides future estimates of generation by fuel type for the years 2002 through 2020. The fuel types listed include natural gas, oil, coal, nuclear and hydro, as well as "other" and net imports. The projected Gigawatt-hours (GWh) listed in the plan for 2002 through 2005 were used in this study and are summarized below:

Generation Fuel	2002	2003	2004	2005
Natural Gas	24,706	25,628	34,115	54,902
Oil	24,774	24,509	19,212	9,384
Coal	29,380	29,295	28,030	17,934
Nuclear	32,563	32,559	32,662	32,558
Hydro	29,109	29,090	29,111	29,011
Other	2,866	3,004	3,150	3,283
Net Imports	18,799	19,463	18,747	19,731
<b>TOTAL</b>	<b>162,197</b>	<b>163,548</b>	<b>165,027</b>	<b>166,803</b>

Source: New York State Energy Plan, Table 9 – "Reference Resource Case – Generation by Fuel Type for the New York Electricity System," December 2001

Generation Fuel	2002	2003	2004	2005
Natural Gas	15.2%	15.7%	20.7%	33.0%
Oil	15.3%	15.0%	11.6%	5.6%
Coal	18.1%	17.9%	17.0%	10.8%
Nuclear	20.1%	19.9%	19.8%	19.6%
Hydro	17.9%	17.8%	17.6%	17.4%
Other	1.8%	1.8%	1.9%	2.0%
Net Imports	11.6%	11.9%	11.4%	11.6%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source: New York State Energy Plan, Table 9 – "Reference Resource Case – Generation by Fuel Type for the New York Electricity System," December 2001

### **3.0 EMISSION CALCULATIONS**

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Using the projected generation mix provided above, criteria emissions were calculated for non-nuclear electricity generation, which would be required in the event that Entergy's Indian Point Nuclear Generating Station is decommissioned. As stated, all calculations for Units 2 & 3 at Indian Point are based on a 90% capacity factor. As provided by Elise N. Zoli, Esq. of Goodwin Procter, LLP, Entergy's Counsel, Units 2 and 3 have an average net maximum capacity of 983.7 MW and 989 MW.

Operating at a 90% capacity factor, Units 2 and 3 are capable of generating 15,548,036 MWh annually. This accounts for approximately 10% of the state's total generation. If Indian Point Nuclear Generating Station were to be decommissioned, there are numerous ways that the lost generation from Units 2 and 3 could be replaced. The first possibility that was examined was the replacement of Units 2 and 3 by the existing generation mix. This case yields the highest increase in emissions since it assumes older fossil fuel fired facilities, approximately 40% of which are coal, are used to replace the generating capacity of Units 2 and 3. The existing sources that are in the generation fuel mix include natural gas, oil, coal, nuclear, hydro and "other". For the purpose of this study, it was assumed that Units 2 and 3 would be replaced by natural gas, oil and coal fired facilities only. This unit mix would likely be used to replace lost generation if Indian Point 2 and 3 were not available during a low- to moderate-demand period (during mild weather). Nuclear, hydro and "other" were not included in the calculations. Hydro was not included because it is not possible to increase the capacity of existing hydropower sources. Emissions were not calculated for "other" sources, which account for less than 2% of the state's total capacity. The type of "other" sources is unknown; therefore it was not possible to develop emission factors for these sources.

Replacement by the four large fossil fuel power stations in the Hudson Valley: Bowline Point, Lovett, Danskammer and Roseton, and replacement by existing units in New York City were also studied. It is likely that the majority of the replacement generation would come from these sources. Three combinations of these plants were examined. The first possible scenario assumed that the Hudson Valley plants were the sole replacement source. The second scenario assumed that the New York City plants would replace all the lost generation. Finally, it was assumed that the Hudson Valley plants would account for half of the required generation and the New York City plants would account for the other half.

## 4.0 REPLACEMENT BY EXISTING SOURCES

Emission factors were obtained from the U.S. EPA's Emissions & Generation Resource Integrated Database 2000 (EGRID2000), Version 2.0. The most recent year included in this database is 1998; therefore, this data was utilized in this study. Data provided included total net generation, total state electricity usage, net imports, total CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub> emissions, and emission factors in pounds of pollutant per MWh separated by fuel type. For the remaining criteria pollutants (CO, VOC, and PM-10), emission factors were obtained from the U.S. EPA's AP-42 document. For coal-fired units, emission factors for dry-bottom pulverized bituminous coal boilers equipped with electrostatic precipitators were used. PM-10 emissions include both filterable and condensable particulates, assuming that the coal has an ash content of 10%. The majority of emission factors for coal were given in pounds of pollutant per ton of coal. Based on an assumed heating value of 12,000 Btu/lb for the coal, these factors were then converted to pound per million Btu, which was then converted to pound per MWh based on the heat rate that was obtained from the data for the other pollutants listed in the EGRID2000 database.

For oil and natural gas, emission factors for external combustion (boilers) and internal combustion (i.e. engines and combustion turbines) were examined, since it is unknown what the breakdown of sources is. The lowest emission factor for each pollutant was chosen to yield a conservative (low) estimate of displaced emissions. It should be noted that the range in emission factors varied mostly with fuel type, as opposed to combustion source type. After evaluating the various emission factors, those for combustion turbines were used to yield a lower increase in annual emissions. These emission factors were given in pounds of pollutant per million Btu. Based on the data provided in EGRID2000, the emission factors were converted to pounds per MWh. A summary of the estimated additional emissions related to the replacement of Indian Point by existing sources applied to the projected future generation mix is presented in the following table:

**Additional Annual Emissions with Replacement Power from  
Generation Fuel Mix**

Pollutant	2002	2003	2004	2005
CO <sub>2</sub> (tons)	13,941,742	13,888,209	13,396,046	14,527,670
SO <sub>2</sub> (tons)	75,665	74,794	67,048	63,747
NO <sub>x</sub> (tons)	23,140	22,971	21,480	22,152
PM-10 (tons)	1,890	1,875	1,758	1,844
CO (tons)	1,145	1,148	1,201	1,508
VOC (tons)	145	146	155	197

## **5.0 REPLACEMENT BY EXISTING HUDSON VALLEY AND NEW YORK CITY SOURCES**

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The next section of the evaluation assumed that the four large plants in the Hudson Valley, and the plants in New York City would replace the generation from Indian Point, as opposed to statewide facility-type replacement. For each of these subgroups, baseline emissions were obtained from EGRID2000. The most recent year included in this database is 1998; therefore, this data was utilized in this study. Data provided included total net generation separated by fuel type, total CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub> emissions, and emission factors in pounds of pollutant per MWh separated by fuel type.

The first task assumed replacement by the four large plants in the Hudson Valley: Bowline Point, Lovett, Danskammer, and Roseton. These plants utilize boilers that are fired with No. 6 residual oil and natural gas. Lovett and Danskammer also have the ability to fire coal, and PM-10 emission factors while burning coal were obtained from the facilities' Title V permits. For the remaining criteria pollutants (CO, VOC, and PM-10), emission factors were obtained from the U.S. EPA's AP-42 document for external combustion sources. A combined emission factor for each of the pollutants was developed for each facility based on the source of generation (coal/oil/gas).

Based on the data provided in EGRID2000, it is known that these plants currently operate at capacity factors ranging from 32% to 58%. When evaluating the available generation, it was assumed that each of these plants could operate at a 90% capacity factor. Assuming a 100% capacity factor is not realistic and does not allow for necessary shutdowns required for maintenance to ensure the equipment is functioning properly. Based on the generation from 1998 provided in EGRID2000, and the total generation based on a 90% capacity factor, the combined available generation from these four plants is 15,374,598 MWh. This is only 99% of Indian Point's current generation of 15,552,767. Therefore, more than just these four plants would be required to meet the increased demand that would result from Indian Point Units 2 and 3 being decommissioned. The following tables summarize the total emission increases from increasing the operating capacity to 90% for each of these plants.

**Additional Annual Emissions with Replacement Power from Hudson Valley Plants**

Plant	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)	Annual Hg (pounds)
Bowline Point	5,266,203	3,919	7,619	1,114	2,699	217	0
Lovett	1,600,331	6,606	3,237	212	292	26	26
Danskammer	1,620,126	7,651	3,536	229	207	22	70
Roseton	6,062,113	41,468	7,913	2,825	1,596	215	0
<b>Total</b>	<b>14,548,772</b>	<b>59,644</b>	<b>22,305</b>	<b>4,380</b>	<b>4,794</b>	<b>480</b>	<b>96</b>

**Facility Specific Percent Emissions Increase from Replacement Power from Hudson Valley Plants**

Plant	Annual CO <sub>2</sub>	Annual SO <sub>2</sub>	Annual NO <sub>x</sub>	Annual PM-10	Annual CO	Annual VOC	Annual Hg
Bowline Point	178%	179%	178%	178%	178%	178%	0%
Lovett	71%	71%	71%	71%	71%	71%	71%
Danskammer	55%	55%	55%	55%	55%	55%	55%
Roseton	168%	168%	168%	168%	168%	168%	0%
<b>Total</b>	<b>123%</b>	<b>119%</b>	<b>112%</b>	<b>145%</b>	<b>147%</b>	<b>147%</b>	<b>58%</b>

As shown in the second table, the increase in the NO<sub>x</sub> emissions during the ozone season (May – September) is not as great as the annual increase. This shows that these plants are already operating more during this season. In addition to the annual average availability of these plants being only 99% of the Indian Point demand, the increased replacement demand during the ozone season will not be able to be met by these four plants alone.

The next situation that was evaluated was the replacement by the 14 existing power plants in the five boroughs of New York City. It should be noted that the recently installed NYPA peaker turbines have not been included in this analysis, since they were installed after the most recent version of EGRID2000 was updated (1998 emissions data).

Similar to the Hudson Valley plants, emissions data was obtained from EGRID2000 for CO<sub>2</sub>, SO<sub>2</sub> and NO<sub>x</sub>. Emission factors for PM, CO, and VOC were obtained from U.S. EPA's AP-42. Emission factors for external combustion (boilers) and internal combustion (i.e. engines and combustion turbines) were examined, since facility specific emission rates are not provided by EGRID2000. The lowest emission factor for each pollutant was chosen to yield a conservative (low) estimate of displaced emissions. It should be noted that the range in emission factors varied mostly with fuel type, as opposed to combustion source type. After evaluating the various emission factors, those for combustion turbines were used to yield a lower increase in annual

emissions. These emission factors were given in pounds of pollutant per million Btu. Based on the data provided in EGRID2000, the emission factors were converted to pounds per MWh.

The available generation from the New York City plants was again determined based on a capacity factor of 90%. The replacement demand, 15,552,767 MWh, is approximately 33% of the available generation from these plants. In order to determine how much each plant would need to increase its generation to meet the demand of Units 2 and 3 at Indian Point, it was assumed that the total fuel and plant mix from these plants would remain constant, except for the plants that could not meet this increase. The Bronx Zoo, Brooklyn Navy Yard and the JFK International Airport Cogeneration facilities were increased to their maximum generation at 90% capacity factor while the remainder of the facilities kept the same mix. The following table provides the increased emissions.

<b>Plant</b>	<b>Annual CO<sub>2</sub> (tons)</b>	<b>Annual SO<sub>2</sub> (tons)</b>	<b>Annual NO<sub>x</sub> (tons)</b>	<b>Annual PM-10 (tons)</b>	<b>Annual CO (tons)</b>	<b>Annual VOC (tons)</b>
Bronx Zoo	3,833	1	3	0.2	0.4	0.1
Ravenswood	3,290,850	1,204	3,808	195.5	340.2	46.2
Charles Poletti	2,467,169	4,069	3,650	178.1	80.0	10.5
JFK Cogen	173,088	0	114	9.9	22.4	3.0
Far Rockaway	256,091	2	232	14.2	32.3	4.4
Astoria	3,773,229	1,785	4,947	225.8	370.6	51.1
Arthur Kill	1,021,253	7	925	56.9	129.2	17.7
East River	436,741	508	783	29.0	27.1	3.8
Waterside	277,744	3	167	15.0	34.0	5.0
Hudson Ave	1,832	4	10	0.1	0.0	0.0
Brooklyn Navy Yard	437,418	4	34	24.1	54.1	7.1
Warbasse Cogen	69,560	10	45	4.1	8.0	1.1
Gowanus	176,550	344	976	13.3	3.6	0.5
Narrows	108,814	81	412	6.9	9.8	1.4
<b>Total</b>	<b>12,494,172</b>	<b>8,020</b>	<b>16,107</b>	<b>773</b>	<b>1,112</b>	<b>142</b>

Once the increase in emissions was calculated, the percent increase from current generation was also calculated. Since the current generation for all of these facilities combined is 16,887,894 MWh, just slightly over the generation of Indian Point's Units 2 and 3, all of the emission rates are nearly double what they are currently. The results are summarized in the tables below.

**Facility Specific Percent Emissions Increase from Replacement Power from New York City Plants**

<b>Plant</b>	<b>Annual CO<sub>2</sub></b>	<b>Annual SO<sub>2</sub></b>	<b>Annual NO<sub>x</sub></b>	<b>Annual PM-10</b>	<b>Annual CO</b>	<b>Annual VOC</b>
Bronx Zoo	39%	39%	39%	39%	39%	39%
Ravenswood	106%	106%	106%	106%	106%	106%
Charles Poletti	106%	106%	106%	106%	106%	106%
JFK Cogen	68%	0%	68%	68%	68%	68%
Far Rockaway	106%	159%	106%	106%	106%	106%
Astoria	106%	106%	106%	106%	106%	106%
Arthur Kill	106%	134%	106%	106%	106%	106%
East River	106%	106%	106%	106%	106%	106%
Waterside	106%	96%	106%	106%	106%	106%
Hudson Ave	105%	105%	105%	106%	106%	106%
Brooklyn Navy Yard	47%	64%	46%	47%	47%	47%
Warbasse Cogen	106%	107%	106%	106%	106%	106%
Gowanus	106%	106%	106%	106%	106%	106%
Narrows	106%	106%	106%	106%	106%	106%
<b>Total</b>	<b>101%</b>	<b>106%</b>	<b>105%</b>	<b>101%</b>	<b>99%</b>	<b>93%</b>

The final replacement scenario that was evaluated was the replacement by a combination of the four Hudson Valley plants and the plants located in New York City. For the purposes of this evaluation, it was assumed that half of the make-up generation, 7,776,383 MWh, would come from the four Hudson Valley Plants and the other half would come from the plants in New York City. As in the evaluation of the emission increase from the New York City plants only, the increase of each of the plants was determined by assuming that the total fuel and plant mix from these two sets of plants would remain constant, except for the plants that could not meet this increase. The Bronx Zoo, Brooklyn Navy Yard and Danskammer were increased to their maximum generation at 90% capacity factor while the remainder of the facilities kept the same mix. The following table provides the increased emissions:

**Additional Annual Emissions with Replacement Power from Hudson Valley and New York City Plants**

<b>Plant</b>	<b>Annual CO<sub>2</sub> (tons)</b>	<b>Annual SO<sub>2</sub> (tons)</b>	<b>Annual NO<sub>x</sub> (tons)</b>	<b>Annual PM-10 (tons)</b>	<b>Annual CO (tons)</b>	<b>Annual VOC (tons)</b>	<b>Annual Hg (pounds)</b>
Bowline Point	2,005,749	1,493	2,902	424	1,028	83	0
Lovett	1,532,411	6,326	3,100	203	279	25	25
Danskammer	1,620,126	7,651	3,536	229	207	22	70
Roseton	2,451,486	16,769	3,200	1,142	646	87	0
Bronx Zoo	3,833	1	3	0.2	0.4	0.1	--
Ravenswood	1,526,271	558	1,766	90.7	157.8	21.4	--
Charles Poletti	1,144,254	1,887	1,693	82.6	37.1	49	--
JFK Cogen	125,849	0	83	7.2	16.3	2.2	--
Far Rockaway	118,773	1	108	6.6	15.0	2.1	--
Astoria	1,749,995	828	2,294	104.7	171.9	23.7	--
Arthur Kill	473,649	3	429	26.4	59.9	8.2	--
East River	202,557	235	363	13.5	12.6	1.8	--
Waterside	128,816	1	78	7.0	15.8	2.3	--
Hudson Ave	850	2	5	0.1	0.0	0.0	--
Brooklyn Navy Yard	437,418	4	34	24.1	54.1	7.1	--
Warbasse Cogen	32,262	4	21	1.9	3.7	0.5	--
Gowanus	81,883	160	453	6.2	1.7	0.2	--
Narrows	50,467	38	191	3.2	4.5	0.6	--
<b>Total</b>	<b>13,686,648</b>	<b>35,961</b>	<b>20,258</b>	<b>2,373</b>	<b>2,710</b>	<b>292</b>	<b>94</b>

Again, once these emissions were calculated, the percent increase for each of these plants and the combined increase was calculated. The results are presented in the following table.

**Facility Specific Percent Emissions Increase from Replacement Power from Hudson Valley and New York City Plants**

<b>Plant</b>	<b>Annual CO<sub>2</sub> (tons)</b>	<b>Annual SO<sub>2</sub> (tons)</b>	<b>Annual NO<sub>x</sub> (tons)</b>	<b>Annual PM-10 (tons)</b>	<b>Annual CO (tons)</b>	<b>Annual VOC (tons)</b>	<b>Annual Hg (pounds)</b>
Bowline Point	68%	68%	68%	68%	68%	68%	0%
Lovett	68%	68%	68%	68%	68%	68%	68%
Danskammer	55%	55%	55%	55%	55%	55%	55%
Roseton	68%	68%	68%	68%	68%	68%	0%
Bronx Zoo	39%	39%	39%	39%	39%	39%	--
Ravenswood	49%	49%	49%	49%	49%	49%	--
Charles Poletti	49%	49%	49%	49%	49%	49%	--
JFK Cogen	50%	0%	50%	49%	49%	49%	--
Far Rockaway	49%	74%	49%	49%	49%	49%	--
Astoria	49%	49%	49%	49%	49%	49%	--
Arthur Kill	49%	62%	49%	49%	49%	49%	--
East River	49%	49%	49%	49%	49%	49%	--
Waterside	49%	44%	49%	49%	49%	49%	--
Hudson Ave	49%	49%	49%	49%	49%	49%	--
Brooklyn Navy Yard	47%	64%	46%	47%	47%	47%	--
Warbasse Cogen	49%	50%	49%	49%	49%	49%	--
Gowanus	49%	49%	49%	49%	49%	49%	--
Narrows	49%	49%	49%	49%	49%	49%	--
<b>Total</b>	<b>57%</b>	<b>62%</b>	<b>57%</b>	<b>58%</b>	<b>63%</b>	<b>62%</b>	<b>58%</b>

## 6.0 COSTS FOR NO<sub>x</sub> ALLOWANCES

Lastly, the increased costs for NO<sub>x</sub> allowances associated with additional ozone season (May – September) NO<sub>x</sub> emissions were evaluated. The March 2001 New York Independent System Operator report provided estimated costs for one ton of NO<sub>x</sub> in the years 2001, 2003 and 2005. Costs for the years 2002 and 2004 were graphically interpolated. Based on the scenarios presented above, the following table shows the additional ozone season emissions and total costs for the NO<sub>x</sub> emissions in the next four years.

It should be noted that it is likely that there is not enough generation available from the Hudson Valley plants during the ozone season to meet the lost generation of Indian Point Units 2 and 3. Data obtained from the EGRID database indicates that the ozone season NO<sub>x</sub> emissions are nearly half of the annual emissions in some cases. Some of the New York City plants may not be able to meet the demand either. However, a combination of these plants would be available during that time and the ozone season NO<sub>x</sub> emissions presented in the table below are based on a fraction of the annual emissions. These ozone season emissions are reasonable estimates provided the required generation was replaced by sources similar to those in the Hudson Valley and New York City.

**Projected NO<sub>x</sub> Allowance Costs**

Replacement Source	NO <sub>x</sub> tons	2002 Cost	2003 Cost	2004 Cost	2005 Cost
2002 Fuel Mix	9,725	\$21,881,250	--	--	--
2003 Fuel Mix	9,657	--	\$28,584,720	--	--
2004 Fuel Mix	9,062	--	--	\$28,001,580	--
2005 Fuel Mix	9,411	--	--	--	\$29,832,870
Hudson Valley	5,613	\$12,629,250	\$16,614,480	\$17,344,170	\$17,793,210
New York City	3,580	\$8,055,000	\$10,596,800	\$11,062,200	\$11,348,600
Hudson Valley & NYC	4,846	\$10,903,500	\$14,344,160	\$14,974,140	\$15,361,820

## **7.0 POTENTIAL EFFECTS AND HEALTH HAZARDS FROM STUDIED POLLUTANTS**

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In addition to evaluating the increase in emissions, TRC prepared a matrix summarizing the potential effects and health hazards from these pollutants. Currently, Westchester County is classified as a non-attainment area for ozone. High levels of ozone can cause lung irritation, permanent lung damage, aggravated asthma, reduced lung capacity, pneumonia and bronchitis. Persons that are most susceptible to the negative effects of ozone are those with respiratory illnesses, outdoor worker, and children. Ozone also increases the susceptibility of plants to disease, thus reducing crop and forest yields.

The entire state of New York is located in the Ozone Transport Region (OTR), which requires that new sources of  $\text{NO}_x$  and VOC be subject to Lowest Achievable Emission Rates (LAER) and emissions offsets. These regulations are subject to facilities constructed after August 9, 1984. In essence, this massive increase in generation by existing sources is comparable to constructing one large new source without subjecting it to these current applicable regulations. The increase in  $\text{NO}_x$  and VOC, the precursors to ozone, will likely mean that the area will not reach attainment status in the near future. In order to reach attainment, the area needs to further reduce emissions in the area as opposed to unnecessarily increasing these emission rates.

The matrix outlines the effects of all criteria pollutants and the groups that are most greatly impacted by them. As shown with carbon monoxide and ozone, these pollutants affect all people, regardless of age and current health, in addition to the vegetation in the area.

### Regulatory Impacts and Effects of Major Air Pollutants

Pollutant	NAAQS Attainment Status for New York State	Basis for NAAQS	Most Susceptible Population Groups	Additional Impacts
SO <sub>2</sub>	Attainment	Temporary breathing difficulty Respiratory illness Aggravates existing Heart Disease	Asthmatics, Children, Elderly, Persons with Heart or Lung Disease	Precursor to acid rain formation Visibility impairment from Sulfate Particles (PM-2.5) Aesthetics damage due to accelerated building decay Acidification of lakes due to Atmospheric Deposition Soil degradation due to Atmospheric Deposition
NO <sub>x</sub>	Attainment	Damage to lung tissue Respiratory illnesses – Bronchitis Reduction in lung function	Children, Asthmatics, Outdoor Workers	Precursor to ground-level Ozone (Smog) Precursor to acid rain formation Water quality deterioration (Oxygen depletion) Visibility impairment
PM-10	Attainment for all Counties with exception of New York County	Aggravated Asthma Chronic Bronchitis Decreased lung function Premature Death	Persons with Heart Disease or Influenza, Asthmatics, Children, Elderly	Major cause of reduced visibility (Haze) Aesthetics damage due to stains from soot Acidification of lakes due to Atmospheric Deposition Soil degradation due to Atmospheric Deposition
CO	Attainment with exception of Metropolitan New York City	Cardiovascular effects Vision problems Reduced ability to work and learn Death (extremely high levels)	Persons with Heart or Lung Disease	
Ozone	Attainment for all counties with exceptions of New York State Metropolitan Areas and Long Island	Lung irritation (wheezing, coughing) Permanent lung damage Aggravated Asthma Reduced lung capacity Pneumonia and Bronchitis	Persons with respiratory illnesses, Children, Outdoor workers	Increases susceptibility of plants to disease Reduces crop and forest yields Aesthetics damage due to damage to leaves and trees Damages rubber and fabrics Reduced visibility
VOC	Not Applicable	Not Applicable	Not Applicable	Precursor to ground-level Ozone (Smog) Damage to plants
CO <sub>2</sub>	Not Applicable	Not Applicable	Not Applicable	Contributes to Global Warming

**APPENDIX A**

**EMISSION AVOIDANCE CALCULATIONS**

**Entergy - Indian Point  
Emission Avoidance Study**

Emission Prices - \$/ton

2001	841
2002	<b><i>2250</i></b>
2003	2960
2004	<b><i>3090</i></b>
2005	3170

2001, 2003 and 2005 were obtained from NYISO document

Bold and Italic - graphically interpolated

<b>Replacement Source</b>	<b>Ozone NOx (tons)</b>	<b>2002 Cost</b>	<b>2003 Cost</b>	<b>2004 Cost</b>	<b>2005 Cost</b>
2002 Generation Fuel Mix	9,725	\$21,881,250	--	--	--
2003 Generation Fuel Mix	9,657	--	\$28,584,720	--	--
2004 Generation Fuel Mix	9,062	--	--	\$28,001,580	--
2005 Generation Fuel Mix	9,411	--	--	--	\$29,832,870
Hudson Valley Plants*	5,613	\$12,629,250	\$16,614,480	\$17,344,170	\$17,793,210
New York City Plants*	3,580	\$8,055,000	\$10,596,800	\$11,062,200	\$11,348,600
Hudson Valley & NYC Plants*	4,846	\$10,903,500	\$14,344,160	\$14,974,140	\$15,361,820

\* NOTE: It is unclear whether the necessary generation is available during the ozone season from these sources. These ozone season emissions are based on assuming that the generation is available, and the mix of the plants is the same on an annual basis.

**Entergy - Indian Point  
Emission Avoidance Study**

**1998 Data - E-Grid**

Capacity 38,519 MW  
Heat Input 933,615,646 MMBtu  
Generation 144,795,255 (MWh)

Fuel	Fuel Mix %	MWh
Coal	17.0%	24,401,936
Oil	10.4%	14,939,368
Gas	29.7%	42,689,444
Nuclear	21.8%	31,313,708
Other Fossil	0.4%	587,139
Biomass	1.3%	1,803,829
Hydro	19.5%	28,065,751
<b>TOTAL</b>	<b>100.0%</b>	<b>143,801,175</b>

Indian Point - Units 2 & 3	
MWh	15,552,767
% of Total	10.8%

Pollutant	tons	FOSSIL		COAL		OIL		GAS	
		output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu
Annual CO <sub>2</sub>	69,010,726	1658.57	151.68	2295.74	202.42	1753.03	150.88	1234.69	118.36
Annual SO <sub>2</sub>	317,766	7.57	0.69	19.06	1.68	7.94	0.68	0.43	0.04
Annual NO <sub>x</sub>	107,232	2.56	0.23	4.87	0.43	2.55	0.22	1.15	0.11
Ozone NO <sub>x</sub>	50,339	2.52	0.21	4.88	0.41	2.54	0.21	1.23	0.11
PM-10*				0.48	0.042	0.14	0.012	0.069	0.0066
CO*				0.23	0.020	0.038	0.0033	0.16	0.015
VOC*				0.028	0.0024	0.005	0.00041	0.022	0.0021
Annual Hg	1,156	0.014	0.0012	0.044	0.0039				

\* Emissions are based on AP-42 emission Factors. Particulate emissions include condensables and filterables. Output-based factors for PM-10, CO and VOC are calculated based on heat rate for each fuel type derived from the above data. Natural gas and oil factors based on comparing combustion turbine and boiler factors and selecting the lower factor.

**Entergy - Indian Point  
Emission Avoidance Study**

Emission Prices - \$/ton

2001	841
2002	<b>2250</b>
2003	2960
2004	<b>3090</b>
2005	3170

2001, 2003 and 2005 were obtained from NYISO document  
Bold and Italic - graphically interpolated

Replacement Source	Ozone NOx (tons)	2002 Cost	2003 Cost	2004 Cost	2005 Cost
2002 Generation Fuel Mix	9,725	\$21,881,250	--	--	--
2003 Generation Fuel Mix	9,657	--	\$28,584,720	--	--
2004 Generation Fuel Mix	9,062	--	--	\$28,001,580	--
2005 Generation Fuel Mix	9,411	--	--	--	\$29,832,870
Hudson Valley Plants*	5,613	\$12,629,250	\$16,614,480	\$17,344,170	\$17,793,210
New York City Plants*	3,580	\$8,055,000	\$10,596,800	\$11,062,200	\$11,348,600
Hudson Valley & NYC Plants*	4,846	\$10,903,500	\$14,344,160	\$14,974,140	\$15,361,820

\* NOTE: It is unclear whether the necessary generation is available during the ozone season from these sources. These ozone season emissions are based on assuming that the generation is available, and the mix of the plants is the same on an annual basis.

**Entergy - Indian Point  
Emission Avoidance Study**

Generation Fuel	In Percent of Total			
	2002	2003	2004	2005
Natural Gas	15.2%	15.7%	20.7%	32.9%
Oil	15.3%	15.0%	11.6%	5.6%
Coal	18.1%	17.9%	17.0%	10.8%
Nuclear	20.1%	19.9%	19.8%	19.5%
Hydro	17.9%	17.8%	17.6%	17.4%
Other	1.8%	1.8%	1.9%	2.0%
Net Imports	11.6%	11.9%	11.4%	11.8%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Note: Above Percentages Calculated from given Generation Fuel Mix

**Emission Factors Obtained from E-Grid - 1998 data (and AP-42 for PM-10, CO and VOC)**

Pollutant	tons	COAL		OIL		GAS	
		output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu	output lbs/MWh	input lbs/MMBtu
Annual CO <sub>2</sub>	69,010,726	2295.74	202.42	1753.03	150.88	1234.69	118.36
Annual SO <sub>2</sub>	317,766	19.06	1.68	7.94	0.68	0.43	0.040
Annual NO <sub>x</sub>	107,232	4.87	0.43	2.55	0.22	1.15	0.11
Ozone NO <sub>x</sub>	50,339	4.88	0.41	2.54	0.21	1.23	0.11
PM-10*	NA	0.48	0.042	0.14	0.012	0.069	0.0066
CO*	NA	0.23	0.020	0.038	0.003	0.16	0.015
VOC*	NA	0.028	0.0024	0.0048	0.00041	0.022	0.0021
Annual Hg	1,156	0.044	0.0039	0	0	0	0

Assume Replacement by existing Natural Gas, Oil and Coal fired sources.

**2002 Generation Fuel Mix**

	Unit #2	Unit #3	Total
Net Output (MW)	983.7	989	1972.7
Capacity Factor (%)	90%	90%	90%
12-month Net Generation (MWh)	7,755,491	7,797,276	15,552,767
Annual CO <sub>2</sub> (tons)	6,952,142	6,989,599	13,941,742
Annual SO <sub>2</sub> (tons)	37,731	37,934	75,665
Annual NO <sub>x</sub> (tons)	11,539	11,601	23,140
Ozone NO <sub>x</sub> (tons)	4,849	4,876	9,725
PM-10	942	947	1,890
CO	571	574	1,145
VOC	73	73	145
Annual Hg (tons)	64	64	128

**2003 Generation Fuel Mix**

	Unit #2	Unit #3	Total
Net Output (MW)	983.7	989	1972.7
Capacity Factor (%)	90%	90%	90%
12-month Net Generation (MWh)	7,755,491	7,797,276	15,552,767
Annual CO <sub>2</sub> (tons)	6,925,448	6,962,761	13,888,209
Annual SO <sub>2</sub> (tons)	37,297	37,497	74,794
Annual NO <sub>x</sub> (tons)	11,455	11,516	22,971
Ozone NO <sub>x</sub> (tons)	4,815	4,841	9,657
PM-10	935	940	1,875
CO	573	576	1,148
VOC	73	73	146
Annual Hg (tons)	63	63	126

**2004 Generation Fuel Mix**

	Unit #2	Unit #3	Total
Net Output (MW)	983.7	989	1972.7
Capacity Factor (%)	90%	90%	90%
12-month Net Generation (MWh)	7,755,491	7,797,276	15,552,767
Annual CO <sub>2</sub> (tons)	6,680,028	6,716,018	13,396,046
Annual SO <sub>2</sub> (tons)	33,434	33,614	67,048
Annual NO <sub>x</sub> (tons)	10,711	10,769	21,480
Ozone NO <sub>x</sub> (tons)	4,519	4,543	9,062
PM-10	877	881	1,758
CO	599	602	1,201
VOC	77	78	155
Annual Hg (tons)	59	59	118

**2005 Generation Fuel Mix**

	Unit #2	Unit #3	Total
Net Output (MW)	983.7	989	1972.7
Capacity Factor (%)	90%	90%	90%
12-month Net Generation (MWh)	7,755,491	7,797,276	15,552,767
Annual CO <sub>2</sub> (tons)	7,244,319	7,283,350	14,527,670
Annual SO <sub>2</sub> (tons)	31,788	31,959	63,747
Annual NO <sub>x</sub> (tons)	11,046	11,106	22,152
Ozone NO <sub>x</sub> (tons)	4,693	4,718	9,411
PM-10	919	924	1,844
CO	752	756	1,508
VOC	98	99	197
Annual Hg (tons)	63	63	126

**Entergy - Indian Point  
Emission Avoidance Study**

	Coal Generation (MWh)	Oil Generation (MWh)	Gas Generation (MWh)	Total Generation (MWh)	Capacity (MW)	Capacity Factor	Heat Rate (Btu/kWh)
Bowline Point	0	1,018,218	2,503,152	3,521,370	1,242	0.324	12,880
Lovett	1,618,392	86	454,188	2,072,666	449.1	0.527	11,745
Danskammer	2,514,449	264	220,461	2,735,174	537.4	0.581	10,891
Roseton	0	3,228,349	429,265	3,657,614	1,242	0.336	12,592

	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)
Bowline Point	2,957,361	2,193	4,273	2,358	0
Lovett	2,259,440	9,324	4,570	2,096	36.2
Danskammer	2,950,904	13,938	6,444	2,811	127.2
Roseton	3,614,561	24,729	4,714	2,181	0

	CO <sub>2</sub> Rate (lbs/MWh)	CO <sub>2</sub> Rate (lbs/MMBtu)	SO <sub>2</sub> Rate (lbs/MWh)	SO <sub>2</sub> Rate (lbs/MMBtu)	Annual NO <sub>x</sub> Rate (lbs/MWh)	Annual NO <sub>x</sub> Rate (lbs/MMBtu)	Ozone Season NO <sub>x</sub> Rate (lbs/MWh)	Ozone Season NO <sub>x</sub> Rate (lbs/MMBtu)	Hg Rate (lbs/GWh)	Hg Rate (lbs/Bbtu)
Bowline Point	1,679.66	130.41	1.25	0.10	2.43	0.19	2.48	0.19	0	0
Lovett	2,180.23	185.63	9.00	0.77	4.41	0.38	4.29	0.36	0.0175	0.0015
Danskammer	2,157.74	198.11	10.19	0.94	4.71	0.43	4.57	0.42	0.0465	0.0043
Roseton	1,976.46	156.96	13.52	1.07	2.58	0.20	2.58	0.20	0	0

	PM Rate (lbs/MWh)	PM Rate (lbs/MMBtu)	CO Rate (lbs/MWh)	CO Rate (lbs/MMBtu)	VOC Rate (lbs/MWh)	VOC Rate (lbs/MMBtu)
Bowline Point	0.36	0.028	0.86	0.069	0.069	0.0054
Lovett	0.289	0.025	0.40	0.034	0.036	0.0031
Danskammer	0.31	0.028	0.28	0.025	0.029	0.0027
Roseton	0.92	0.073	0.520	0.0412	0.0700	0.00542

Pollutant	COAL	NO. 6 OIL	GAS
	input lbs/MMBtu	input lbs/MMBtu	input lbs/MMBtu
PM-10*	0.042	0.082	0.0054
CO*	0.020	0.036	0.082
VOC*	0.0024	0.0054	0.0054
Annual Hg	0.0039	--	--

\* Emissions are based on AP-42 emission Factors. Particulate emissions include condensables and filterables. Output-based factors for PM-10,

**Entergy - Indian Point  
Emission Avoidance Study**

Indian Point Generating Capacity	
Unit 2 (MW)	983.7
Unit 3 (MW)	989
Total (MW)	1972.7
Capacity Factor	90%
12-month Net Generation (MWh)	15,552,767

Current Emissions

	Current Generation (MWh)	Available Generation (MWh)*	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	3,521,370	6,270,558	2,957,361	2,193	4,273	2,358	0	626	1,516	122
Lovett	2,072,666	1,468,038	2,259,440	9,324	4,570	2,096	36	300	412	37
Danskammer	2,735,174	1,501,688	2,950,904	13,938	6,444	2,811	127	417	377	40
Roseton	3,657,614	6,134,314	3,614,561	24,729	4,714	2,181	0	1,684	952	128
<b>TOTAL</b>	<b>11,986,824</b>	<b>15,374,598</b>	<b>11,782,266</b>	<b>50,184</b>	<b>20,002</b>	<b>9,447</b>	<b>163</b>	<b>3,027</b>	<b>3,256</b>	<b>327</b>

\* Assuming a 90% capacity factor for necessary shutdowns.

Replace Emissions - Scenario 1

	Percent Replaced	Increased Generation (MWh)	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	40.3%	6,270,558	5,266,203	3,919	7,619	1,960	0	1,114	2,699	217
Lovett	9.4%	1,468,038	1,600,331	6,606	3,237	794	26	212	292	26
Danskammer	9.7%	1,501,688	1,620,126	7,651	3,536	865	70	229	207	22
Roseton	39.4%	6,134,314	6,062,113	41,468	7,913	1,995	0	2,825	1,596	215
<b>TOTAL</b>	<b>99%</b>	<b>15,374,598</b>	<b>14,548,772</b>	<b>59,644</b>	<b>22,305</b>	<b>5,613</b>	<b>96</b>	<b>4,380</b>	<b>4,794</b>	<b>480</b>

Increased Emissions - Scenario 1

	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	178%	179%	178%	83%	0%	178%	178%	178%
Lovett	71%	71%	71%	38%	71%	71%	71%	71%
Danskammer	55%	55%	55%	31%	55%	55%	55%	55%
Roseton	168%	168%	168%	91%	0%	168%	168%	168%
<b>TOTAL</b>	<b>123%</b>	<b>119%</b>	<b>112%</b>	<b>59%</b>	<b>58%</b>	<b>145%</b>	<b>147%</b>	<b>147%</b>

**Entergy - Indian Point  
Emission Avoidance Study**

	Oil Generation (MWh)	Gas Generation (MWh)	Total Generation (MWh)	Capacity (MW)	Capacity Factor	Heat Rate (Btu/kWh)
Bronx Zoo	1,957	19,529	21,486	3.80	0.648	7,553
Ravenswood	620,133	3,102,402	3,722,535	2,310	0.184	13,210
Charles Poletti	2,247,830	390,380	2,638,210	883.0	0.341	11,373.
JFK Cogen	0	569,591	569,591	121.1	0.537	7,684
Far Rockaway	0	359,190	359,190	100.0	0.410	11,317
Astoria	863,747	3,398,031	4,261,778	1,150.6	0.423	12,991
Arthur Kill	0	1,237,781	1,237,781	928.0	0.152	13,129
East River	259,283	231,769	491,052	356.3	0.157	11,795
Waterside	1,074	507,733	508,807	199.8	0.291	8,427
Hudson Ave	2,547	0	2,547	48.9	0.006	8,590
Brooklyn Navy Yard	12,742	1,788,404	1,801,146	336.6	0.611	8,500
Warbasse Cogen	6,868	60,780	67,648	37.8	0.204	16,064
Gowanus	114,743	0	114,743	688.0	0.019	18,182
Narrows	26,377	65,003	91,380	393.1	0.027	17,404

	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)
Bronx Zoo	9,720	2	8	3	0
Ravenswood	3,104,337	1,140	3,586	2,602	0
Charles Poletti	2,327,340	3,835	3,446	1,695	0.0
JFK Cogen	253,407	0	167	69	0.0
Far Rockaway	241,576	1	220	97	0.0
Astoria	3,559,363	1,676	4,676	2,191	0.0
Arthur Kill	963,372	5	874	829	0.0
East River	411,987	480	738	334	0.0
Waterside	262,004	3	158	62	0.0
Hudson Ave	1,747	3	10	4	0.0
Brooklyn Navy Yard	924,051	7	73	26	0.0
Warbasse Cogen	65,618	9	42	18	0.0
Gowanus	166,544	324	921	384	0.0
Narrows	102,647	77	388	162	0.0

	CO <sub>2</sub> Rate (lbs/MWh)	CO <sub>2</sub> Rate (lbs/MMBtu)	SO <sub>2</sub> Rate (lbs/MWh)	SO <sub>2</sub> Rate (lbs/MMBtu)	Annual NO <sub>x</sub> Rate (lbs/MWh)	Annual NO <sub>x</sub> Rate (lbs/MMBtu)	Ozone Season NO <sub>x</sub> Rate (lbs/MWh)	Ozone Season NO <sub>x</sub> Rate (lbs/MMBtu)
Bronx Zoo	904.75	119.79	0.17	0.02	0.76	0.10	0.76	0.10
Ravenswood	1,667.86	126.26	0.61	0.05	1.93	0.15	1.97	0.15
Charles Poletti	1,764.33	155.13	2.91	0.26	2.61	0.23	2.59	0.23
JFK Cogen	898.78	115.80	0.00	0.00	0.59	0.08	0.59	0.08
Far Rockaway	1,345.12	118.86	0.01	0.00	1.22	0.11	1.11	0.10
Astoria	1,670.37	128.58	0.79	0.06	2.19	0.17	2.04	0.16
Arthur Kill	1,556.61	118.56	0.01	0.00	1.41	0.11	1.51	0.11
East River	1,677.98	142.26	1.95	0.17	3.01	0.25	2.29	0.26
Waterside	1,029.87	122.22	0.01	0.00	0.62	0.07	0.61	0.07
Hudson Ave	1,357.06	159.65	2.64	0.31	7.50	0.88	3.75	0.88
Brooklyn Navy Yard	1,026.07	120.71	0.01	0.00	0.08	0.01	0.07	0.01
Warbasse Cogen	1,939.98	120.76	0.27	0.02	1.25	0.08	1.25	0.08
Gowanus	2,902.90	159.65	5.66	0.31	16.05	0.88	8.87	0.88
Narrows	2,246.60	129.08	1.68	0.10	8.50	0.49	4.44	0.49

	PM Rate (lbs/MWh)	PM Rate (lbs/MMBtu)	CO Rate (lbs/MWh)	CO Rate (lbs/MMBtu)	VOC Rate (lbs/MWh)	VOC Rate (lbs/MMBtu)
Bronx Zoo	0.05	0.007	0.11	0.014	0.015	0.0019
Ravenswood	0.10	0.007	0.17	0.013	0.023	0.0018
Charles Poletti	0.13	0.011	0.06	0.005	0.007	0.0007
JFK Cogen	0.05	0.007	0.12	0.015	0.015	0.0021
Far Rockaway	0.07	0.007	0.17	0.015	0.023	0.0021
Astoria	0.10	0.008	0.16	0.013	0.023	0.0018
Arthur Kill	0.09	0.007	0.20	0.015	0.027	0.0021
East River	0.11	0.009	0.10	0.009	0.015	0.0012
Waterside	0.06	0.007	0.13	0.015	0.019	0.0021
Hudson Ave	0.10	0.012	0.03	0.003	0.003	0.0004
Brooklyn Navy Yard	0.06	0.007	0.13	0.015	0.017	0.0021
Warbasse Cogen	0.11	0.007	0.22	0.014	0.030	0.0019
Gowanus	0.22	0.012	0.06	0.003	0.007	0.0004
Narrows	0.14	0.008	0.20	0.012	0.028	0.0016

Pollutant	NO. 2 OIL	GAS
	input lbs/MMBtu	input lbs/MMBtu
PM-10*	0.012	0.0066
CO*	0.0033	0.015
VOC*	0.00041	0.0021

\* Emissions are based on AP-42 emission Factors. Particulate emissions include condensables and filterables. Output-based factors for PM-

**Entergy - Indian Point  
Emission Avoidance Study**

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Unit 2 (MW)	983.7
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12-month Net Generation (MWh)	15,552,767

Current Emissions

	Current Generation (MWh)	Available Generation (MWh)	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	21,486	8,473	9,720	2	8	3	0.6	1.1	0.2
Ravenswood	3,722,535	14,485,563	3,104,337	1,140	3,586	2,602	184.4	320.9	43.5
Charles Poletti	2,638,210	4,323,362	2,327,340	3,835	3,446	1,695	168.0	75.5	9.9
JFK Cogen	569,591	385,161	253,407	0	167	69	14.6	33.2	4.4
Far Rockaway	359,190	429,210	241,576	1	220	97	13.4	30.5	4.2
Astoria	4,261,778	4,809,552	3,559,363	1,676	4,676	2,191	213.0	349.6	48.2
Arthur Kill	1,237,781	6,078,571	963,372	5	874	829	53.6	121.9	16.7
East River	491,052	2,318,017	411,987	480	738	334	27.4	25.5	3.6
Waterside	508,807	1,066,416	262,004	3	158	62	14.2	32.1	4.7
Hudson Ave	2,547	382,981	1,747	3	10	4	0.1	0.0	0.0
Brooklyn Navy Yard	1,801,146	852,608	924,051	7	73	26	50.8	114.2	15.0
Warbasse Cogen	67,648	230,367	65,618	9	42	18	3.9	7.5	1.0
Gowanus	114,743	5,309,449	166,544	324	921	384	12.5	3.4	0.4
Narrows	91,380	3,007,820	102,647	77	388	162	6.5	9.2	1.3
<b>TOTAL</b>	<b>15,887,894</b>	<b>43,687,552</b>	<b>12,393,712</b>	<b>7,561</b>	<b>15,307</b>	<b>8,476</b>	<b>763</b>	<b>1,125</b>	<b>153</b>

Replaced Emissions

	Percent Replaced	Increased Generation (MWh)	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	0.054%	8,473	3,833	1	3	1	0.2	0.4	0.1
Ravenswood	25.4%	3,946,194	3,290,850	1,204	3,808	980	195.5	340.2	46.2
Charles Poletti	18.0%	2,796,720	2,467,169	4,069	3,650	913	178.1	80.0	10.5
JFK Cogen	2.5%	385,161	173,088	0	114	29	9.9	22.4	3.0
Far Rockaway	2.4%	380,771	256,091	2	232	53	14.2	32.3	4.4
Astoria	29.0%	4,517,836	3,773,229	1,785	4,947	1,162	225.8	370.6	51.1
Arthur Kill	8.4%	1,312,150	1,021,253	7	925	250	56.9	129.2	17.7
East River	3.3%	520,556	436,741	508	783	150	29.0	27.1	3.8
Waterside	3.5%	539,377	277,744	3	167	41	15.0	34.0	5.0
Hudson Ave	0.017%	2,700	1,832	4	10	1	0.1	0.0	0.0
Brooklyn Navy Yard	5.5%	852,608	437,418	4	34	8	24.1	54.1	7.1
Warbasse Cogen	0.46%	71,712	69,560	10	45	11	4.1	8.0	1.1
Gowanus	0.78%	121,637	176,550	344	976	136	13.3	3.6	0.5
Narrows	0.62%	96,870	108,814	81	412	54	6.9	9.8	1.4
<b>TOTAL</b>	<b>100%</b>	<b>15,552,767</b>	<b>12,494,172</b>	<b>8,020</b>	<b>16,107</b>	<b>3,580</b>	<b>773</b>	<b>1,112</b>	<b>142</b>

Increased Emissions

	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	39%	39%	39%	24%	39%	39%	39%
Ravenswood	106%	106%	106%	38%	106%	106%	106%
Charles Poletti	106%	106%	106%	54%	106%	106%	106%
JFK Cogen	68%	0%	68%	41%	68%	68%	68%
Far Rockaway	106%	159%	106%	55%	106%	106%	106%
Astoria	106%	106%	106%	53%	106%	106%	106%
Arthur Kill	106%	134%	106%	30%	106%	106%	106%
East River	106%	106%	106%	45%	106%	106%	106%
Waterside	106%	96%	106%	67%	106%	106%	106%
Hudson Ave	105%	105%	105%	32%	106%	106%	106%
Brooklyn Navy Yard	47%	64%	46%	29%	47%	47%	47%
Warbasse Cogen	106%	107%	106%	64%	106%	106%	106%
Gowanus	106%	106%	106%	35%	106%	106%	106%
Narrows	106%	106%	106%	33%	106%	106%	106%
<b>TOTAL</b>	<b>101%</b>	<b>106%</b>	<b>105%</b>	<b>42%</b>	<b>101%</b>	<b>99%</b>	<b>93%</b>

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Emission Avoidance Study**

Indian Point Generating Capacity	
Unit 2 (MW)	983.7
Unit 3 (MW)	989
Total (MW)	1972.7
Capacity Factor	90%
17-month Net Generation (MWh)	15,552,767

Current Emissions

	Current Generation (MWh)	Available Generation (MWh)*	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	3,521,370	6,270,558	2,957,361	2,193	4,273	2,358	0	626	1,516	122
Lovett	2,072,666	1,468,038	2,259,440	9,324	4,570	2,096	36	300	412	37
Danskammer	2,735,174	1,501,688	2,950,904	13,938	6,444	2,811	127	417	377	40
Roseton	3,657,614	6,134,314	3,614,561	24,729	4,714	2,181	0	1,684	952	128
<b>TOTAL</b>	<b>11,986,824</b>	<b>15,374,598</b>	<b>11,782,266</b>	<b>50,184</b>	<b>20,002</b>	<b>9,447</b>	<b>163</b>	<b>3,027</b>	<b>3,256</b>	<b>327</b>

	Current Generation (MWh)	Available Generation (MWh)*	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	21,486	8,473	9,720	2	8	3	0.6	1.1	0.2
Ravenswood	3,722,535	14,485,563	3,104,337	1,140	3,586	2,602	184.4	320.9	43.5
Charles Poletti	2,638,210	4,323,362	2,327,340	3,835	3,446	1,695	168.0	75.5	9.9
JFK Cogen	569,591	385,161	253,407	0	167	69	14.6	33.2	4.4
Far Rockaway	359,190	429,210	241,576	1	220	97	13.4	30.5	4.2
Astoria	4,261,778	4,809,552	3,559,363	1,676	4,676	2,191	213.0	349.6	48.2
Arthur Kill	1,237,781	6,078,571	963,372	5	874	829	53.6	121.9	16.7
East River	491,052	2,318,017	411,987	480	738	334	27.4	25.5	3.6
Waterside	508,807	1,066,416	262,004	3	158	62	14.2	32.1	4.7
Hudson Ave	2,547	382,981	1,747	3	10	4	0.1	0.0	0.0
Brooklyn Navy Yard	1,801,146	852,608	924,051	7	73	26	50.8	114.2	15.0
Warbasse Cogen	67,648	230,367	65,618	9	42	18	3.9	7.5	1.0
Gowanus	114,743	5,309,449	166,544	324	921	384	12.5	3.4	0.4
Narrows	91,380	3,007,820	102,647	77	388	162	6.5	9.2	1.3
<b>TOTAL</b>	<b>15,887,894</b>	<b>43,687,552</b>	<b>12,393,712</b>	<b>7,561</b>	<b>15,307</b>	<b>8,476</b>	<b>763</b>	<b>1,125</b>	<b>153</b>

	Current Generation (MWh)	Available Generation (MWh)*	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
<b>TOTAL</b>	<b>27,874,718</b>	<b>59,062,150</b>	<b>24,175,978</b>	<b>57,745</b>	<b>35,309</b>	<b>17,922</b>	<b>163</b>	<b>3,790</b>	<b>4,380</b>	<b>480</b>

Replaced Emissions - half replacement by Hudson Valley Plants, half from NYC plants

	Percent Replaced	Increased Generation (MWh)	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	15.4%	2,388,279	2,005,749	1,493	2,902	746	0	424	1,028	83
Lovett	9.0%	1,405,733	1,532,411	6,326	3,100	760	25	203	279	25
Danskammer	9.7%	1,501,688	1,620,126	7,651	3,536	865	70	229	207	22
Roseton	16.0%	2,480,683	2,451,486	16,769	3,200	807	0	1,142	646	87
<b>TOTAL</b>	<b>50.0%</b>	<b>7,776,383</b>	<b>7,609,771</b>	<b>32,239</b>	<b>12,738</b>	<b>3,178</b>	<b>94</b>	<b>1,999</b>	<b>2,159</b>	<b>217</b>

	Percent Replaced	Increased Generation (MWh)	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bronx Zoo	0.054%	8,473	3,833	1	3	1	0.2	0.4	0.1
Ravenswood	11.8%	1,830,215	1,326,271	558	1,766	454	90.7	157.8	21.4
Charles Poletti	8.3%	1,297,098	1,144,254	1,887	1,693	423	82.6	37.1	4.9
JFK Cogen	1.8%	280,044	125,849	0	83	21	7.2	16.3	2.2
Far Rockaway	1.1%	176,599	118,773	1	108	25	6.6	15.0	2.1
Astoria	13.5%	2,095,338	1,749,995	828	2,294	539	104.7	171.9	23.7
Arthur Kill	3.9%	608,565	473,649	3	429	116	26.4	59.9	8.2
East River	1.6%	241,430	202,557	235	363	70	13.5	12.6	1.8
Waterside	1.6%	250,159	128,816	1	78	19	7.0	15.8	2.3
Hudson Ave	0.008%	1,252	850	2	5	1	0.1	0.0	0.0
Brooklyn Navy Yard	5.5%	852,608	437,418	4	34	8	24.1	54.1	7.1
Warbasse Cogen	0.21%	33,260	32,262	4	21	5	1.9	3.7	0.5
Gowanus	0.36%	56,414	81,883	160	453	63	6.2	1.7	0.2
Narrows	0.29%	44,928	50,467	38	191	25	3.2	4.5	0.6
<b>TOTAL</b>	<b>50%</b>	<b>7,776,383</b>	<b>6,076,877</b>	<b>3,722</b>	<b>7,520</b>	<b>1,668</b>	<b>374</b>	<b>551</b>	<b>75</b>

	Percent Replaced	Increased Generation (MWh)	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
<b>TOTAL</b>	<b>100%</b>	<b>15,552,767</b>	<b>13,686,648</b>	<b>35,961</b>	<b>20,258</b>	<b>4,846</b>	<b>94</b>	<b>2,373</b>	<b>2,710</b>	<b>292</b>

Increased Emissions

	Annual CO <sub>2</sub> (tons)	Annual SO <sub>2</sub> (tons)	Annual NO <sub>x</sub> (tons)	Ozone Season NO <sub>x</sub> (tons)	Annual Hg (lbs)	Annual PM-10 (tons)	Annual CO (tons)	Annual VOC (tons)
Bowline Point	68%	68%	68%	32%	0%	68%	68%	68%
Lovett	68%	68%	68%	36%	68%	68%	68%	68%
Danskammer	55%	55%	55%	31%	55%	55%	55%	55%
Roseton	68%	68%	68%	37%	0%	68%	68%	68%
Bronx Zoo	39%	39%	39%	24%	--	39%	39%	39%
Ravenswood	49%	49%	49%	17%	--	49%	49%	49%
Charles Poletti	49%	49%	49%	25%	--	49%	49%	49%
JFK Cogen	50%	0%	50%	30%	--	49%	49%	49%
Far Rockaway	49%	74%	49%	26%	--	49%	49%	49%
Astoria	49%	49%	49%	25%	--	49%	49%	49%
Arthur Kill	49%	62%	49%	14%	--	49%	49%	49%
East River	49%	49%	49%	21%	--	49%	49%	49%
Waterside	49%	44%	49%	31%	--	49%	49%	49%
Hudson Ave	49%	49%	49%	15%	--	49%	49%	49%
Brooklyn Navy Yard	47%	64%	46%	29%	--	47%	47%	47%
Warbasse Cogen	49%	50%	49%	30%	--	49%	49%	49%
Gowanus	49%	49%	49%	16%	--	49%	49%	49%
Narrows	49%	49%	49%	16%	--	49%	49%	49%
<b>TOTAL</b>	<b>57%</b>	<b>62%</b>	<b>57%</b>	<b>27%</b>	<b>58%</b>	<b>63%</b>	<b>62%</b>	<b>62%</b>

## Entergy - Indian Point Emission Avoidance Study

Baseline Statewide Emissions and Calculated Increases Under Different Generation Replacement Source Assumptions

Source	CO <sub>2</sub>	SO <sub>2</sub>	NO <sub>x</sub>	PM-10	CO	VOC
NY Statewide - All Sources <sup>(a)</sup>	248,241,000	688,000	723,000	767,000	3,337,000	753,000
NY Statewide - Utilities Only <sup>(b)</sup>	69,010,726	317,766	107,232	8,328	6,450	842
2002 Generation Mix	13,941,742	75,665	23,140	1,890	1,145	145
2003 Generation Mix	13,888,209	74,794	22,971	1,875	1,148	146
2004 Generation Mix	13,396,046	67,048	21,480	1,758	599	155
2005 Generation Mix	14,527,670	63,747	22,152	1,844	752	197
Hudson Valley	14,548,772	59,644	22,305	4,380	4,794	480
New York City	12,494,172	8,020	16,107	773	1,112	142
Hudson Valley and New York City	13,686,648	35,961	20,258	2,373	2,710	292

(a) based on USEPA Emission Trends Report (baseline year = 1998)

(b) based on USEPA's E-GRID database (baseline year = 1998)

Percent Increase in NY Statewide Emissions from All Sources

Source	CO <sub>2</sub>	SO <sub>2</sub>	NO <sub>x</sub>	PM-10	CO	VOC
2002 Generation Mix	5.62%	11.00%	3.20%	0.25%	0.03%	0.02%
2003 Generation Mix	5.59%	10.87%	3.18%	0.24%	0.03%	0.02%
2004 Generation Mix	5.40%	9.75%	2.97%	0.23%	0.02%	0.02%
2005 Generation Mix	5.85%	9.27%	3.06%	0.24%	0.02%	0.03%
Hudson Valley	5.86%	8.67%	3.09%	0.57%	0.14%	0.06%
New York City	5.03%	1.17%	2.23%	0.10%	0.03%	0.02%
Hudson Valley and New York City	5.51%	5.23%	2.80%	0.31%	0.08%	0.04%

Percent Increase in NY Statewide Utility Emissions

Source	CO <sub>2</sub>	SO <sub>2</sub>	NO <sub>x</sub>	PM-10	CO	VOC
2002 Generation Mix	20.20%	23.81%	21.58%	22.69%	17.76%	17.28%
2003 Generation Mix	20.12%	23.54%	21.42%	22.51%	17.80%	17.34%
2004 Generation Mix	19.41%	21.10%	20.03%	21.11%	9.28%	18.36%
2005 Generation Mix	21.05%	20.06%	20.66%	22.14%	11.66%	23.44%
Hudson Valley	21.08%	18.77%	20.80%	52.59%	74.31%	56.97%
New York City	18.10%	2.52%	15.02%	9.28%	17.24%	16.83%
Hudson Valley and New York City	19.83%	11.32%	18.89%	28.49%	42.02%	34.63%

**Entergy - Indian Point  
Emission Avoidance Study**

Emission Prices - \$/ton

2001	841
2002	<b><i>2250</i></b>
2003	2960
2004	<b><i>3090</i></b>
2005	3170

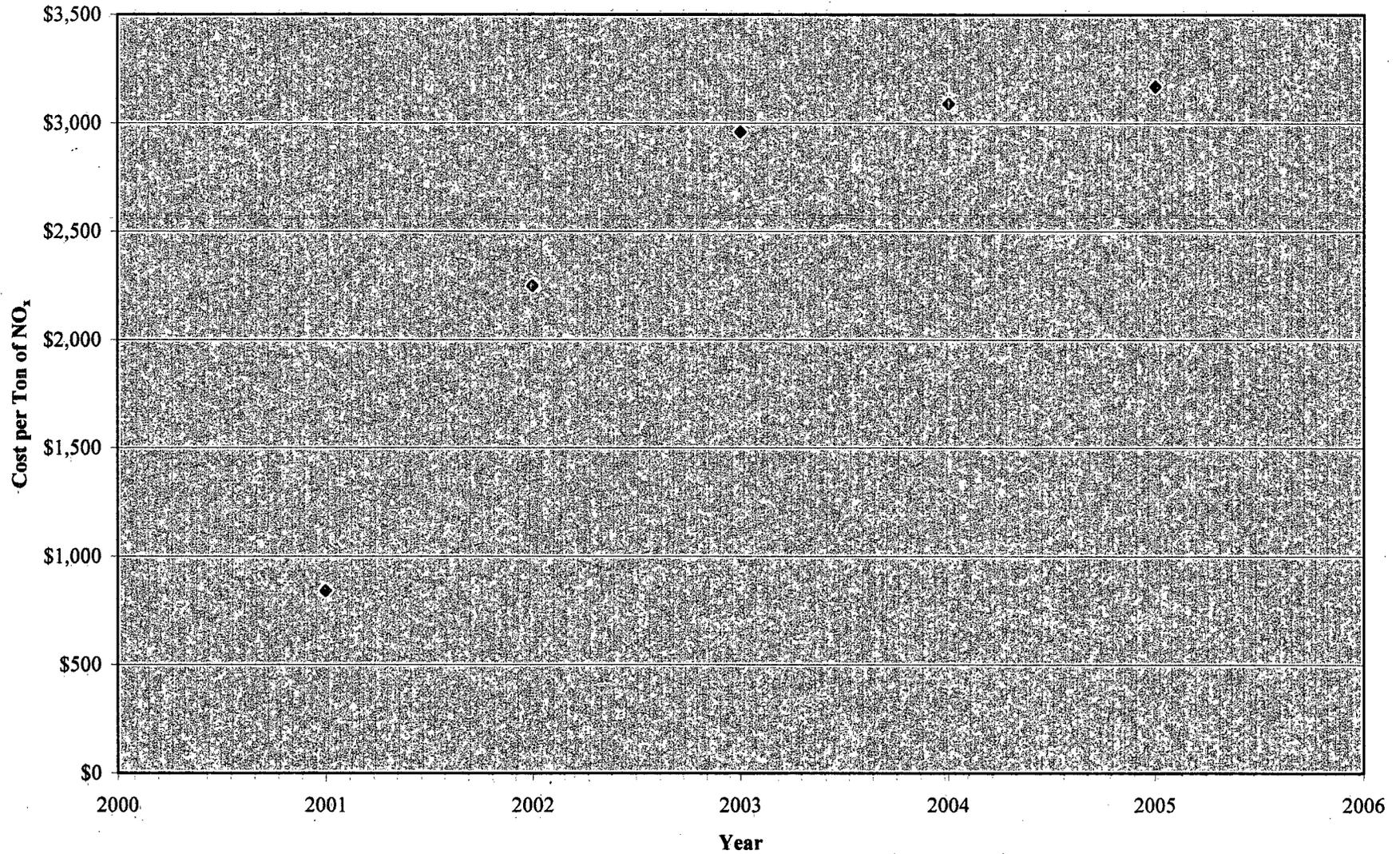
2001, 2003 and 2005 were obtained from NYISO document  
**Bold and Italic** - graphically interpolated

<b>Replacement Source</b>	<b>Ozone NOx (tons)</b>	<b>2002 Cost</b>	<b>2003 Cost</b>	<b>2004 Cost</b>	<b>2005 Cost</b>
2002 Generation Fuel Mix	9,725	\$21,881,250	--	--	--
2003 Generation Fuel Mix	9,657	--	\$28,584,720	--	--
2004 Generation Fuel Mix	9,062	--	--	\$28,001,580	--
2005 Generation Fuel Mix	9,411	--	--	--	\$29,832,870
Hudson Valley Plants*	5,613	\$12,629,250	\$16,614,480	\$17,344,170	\$17,793,210
New York City Plants*	3,580	\$8,055,000	\$10,596,800	\$11,062,200	\$11,348,600
Hudson Valley & NYC Plants*	4,846	\$10,903,500	\$14,344,160	\$14,974,140	\$15,361,820

\* NOTE: It is unclear whether the necessary generation is available during the ozone season from these sources. These ozone season emissions are based on assuming that the generation is available, and the mix of the plants is the same on an annual basis.

**Entergy - Indian Point  
Emissions Avoidance Study**

**NO<sub>x</sub> Allowance Cost Estimation**



**Final Draft**

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Economic  
Benefits of  
Indian Point  
Energy Center

A Study by the Nuclear Energy Institute



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## Executive Summary

The Indian Point Energy Center in Buchanan, N.Y., is an integral part of the local economy. The plant provides jobs and makes purchases that stimulate the local economy directly and indirectly. Among the tangible benefits that the plant provides to the area are jobs, taxes, economic output and labor income, together with contributions to the local community. And there are other intangible benefits to the region, such as clean air and low, stable electricity prices. Indian Point's economic impact reaches beyond the local community to the state and even the national level.

The total economic impact of the Indian Point plant on Westchester, Orange, Rockland, Putnam and Dutchess counties for 2002 was \$763.3 million. Indian Point's total impact on New York state's economy for the same period was \$811.7 million and \$1.5 billion for the U.S. economy. The plant's total economic impact includes direct effects, which comprise the value of plant output, as well as secondary effects resulting from plant operation.

In 2002, the Indian Point Energy Center employed 1,683 people (including Entergy Nuclear Northeast's headquarters in White Plains). Eighty percent live in the five-county area surrounding the plant, including an estimated 302 employees in Westchester County, 646 in Dutchess County and 249 in Orange County. In addition, these jobs pay salaries that are on par with the high average salaries of Westchester County and are on average 12 percent higher than salaries in Rockland and Putnam counties, and 45 percent higher than average salaries in Orange and Dutchess counties.

The economic activity generated by Indian Point creates another 1,200 jobs in the five-county region. Given the combination of employees at the plant and secondary jobs created by Indian Point's economic activity, the plant is responsible for 2,500 jobs in Westchester, Orange, Rockland, Putnam and Dutchess counties.

The main expenditure of the Indian Point plant in the local area is employee compensation. During the study period, Indian Point paid \$126.6 million in compensation to employees living in the five counties near the plant and an additional \$19.3 million to employees in New York state who reside outside these counties. Additionally, the economic activity created by the Indian Point plant accounted for \$44.8 million in employee compensation in the surrounding five counties and an additional \$65.2 million in other areas of the state. Together, the direct and indirect compensation from the plant accounts for \$171.4 million in labor income in the five counties and an additional \$39.7 million in other areas of New York state.

The Indian Point plant makes substantial purchases in the region. In 2002, the plant made \$287.7 million in purchases, including \$54.9 million in New York state and \$16.8 million in Westchester, Orange, Rockland, Putnam and Dutchess counties. Economic activity generated by the Indian Point plant also led to \$113.3 million in increased economic production in the five counties and \$48.4 million throughout the rest of New York state.

In 2002, the Indian Point plant paid \$25.3 million in taxes to entities within Westchester County. This represented approximately 87.6 percent of total tax revenues in the village of Buchanan and 93 percent of the total tax revenues of the Hendrick Hudson Central School District. Further, the economic activity generated by Indian Point contributed another \$24.4 million in state and local taxes, through increased income, property and sales taxes. By combining the direct and indirect taxes, the Indian Point plant accounts for \$49.7 million in state and local tax payments.

In addition to the direct economic benefits provided by Indian Point, the plant generated 15.7 billion kilowatt-hours (kWh) of electricity in 2002, approximately 11 percent of New York state's electricity needs. This low-cost electricity helped keep energy prices in New York state

affordable. A 2002 study, *Electricity System Impacts of Nuclear Shutdown Alternatives*, estimates that if Indian Point were shut down, wholesale electricity prices in the downstate New York area would increase between 13 percent and 25 percent. The report was prepared by General Electric Systems Energy Consulting and National Economic Research Associates.

Indian Point also plays a vital role in maintaining regional air quality. Estimates indicate that in the absence of Indian Point, the state's nitrous oxide emissions would be 19 percent higher and sulfur dioxide emissions would be 11 percent higher because fossil-fueled power plants would offset Indian Point's electricity production. Additionally, carbon dioxide emissions, which have been linked to global warming, would be 20 percent higher.

Indian Point also is an integral part of the community, with civic involvement that ranges from participating in numerous charitable organizations to investing in the area's infrastructure through major donations to government, hospitals and schools. Without Indian Point, many smaller charities and local organizations would suffer disproportionately, given their dependence on the company and plant employees for both volunteers and financial resources.

## Section I: Introduction

This economic study, conducted by the Nuclear Energy Institute<sup>1</sup> (NEI), examines the economic, fiscal and community benefits—together with other benefits—provided by the Indian Point plant, which is owned by Entergy<sup>2</sup>. Benefits analyzed include those to the five counties within the plant community: Westchester, Orange, Rockland, Putnam and Dutchess. Impacts throughout both New York state and the United States are also reviewed. The study draws on detailed data from the plant to assess these benefits.

Although this study focuses primarily on the benefits to the local community, state and national impacts also are calculated. These include direct impacts—such as people employed by the plant, plant expenditures within the community, and corporate tax payments—and indirect impacts, such as jobs created indirectly by plant expenditures in the local economy. The study also includes other benefits provided by the plant, such as reliable, low-cost electricity, the benefits of a clean-air source of electricity and other contributions to the local community.

Entergy and NEI cooperated in developing this study. Entergy provided data on Indian Point employment, operating expenditures and tax payments, as well as guidance on particular details specific to the local area and the plant. NEI coordinated the project and applied Impact Analysis for Planning (IMPLAN), a nationally recognized economic model to estimate the direct and indirect impacts of the plant on the local community. The methodology employed in this study was developed by RTI International, a nonprofit research organization in Research Triangle Park, N.C. This is the third such study that NEI has undertaken with a member company.

This report includes the following sections:

- Section 2 provides background on the Indian Point plant, including plant history, performance, cost, employment, taxes and local area details, such as total employment and earnings.
- Section 3 examines the economic and fiscal impacts of the plant on the local, state and national levels.
- Section 4 provides data on benefits not captured by the model.
- Section 5 outlines recent trends in the nuclear industry as a whole, especially in cost, performance and safety.
- The final section discusses the methodology used in the study, including the economic modeling software employed as part of this effort.

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<sup>1</sup> The Nuclear Energy Institute is the nuclear energy industry's policy organization. Additional information about nuclear energy is available on NEI's Web site at <http://www.nei.org>.

<sup>2</sup> Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC are the respective owners of Indian Point 2 and Indian Point 3. Entergy Nuclear Operations Inc. is the operator of both units.



## Section 2: The Indian Point Energy Center

This section provides background information on the Indian Point plant and the surrounding counties of Westchester, Orange, Putnam, Rockland and Dutchess, including a brief history of the plant, as well as information on its performance, employment and taxes. This section also includes local area details, such as total employment, earnings, local tax collections and regional electricity costs for the village of Buchanan, the five counties surrounding the plant and New York state.

### 2.1 History and Information

Indian Point Energy Center is on the east bank of the Hudson River, about 25 miles north of New York City. The plant lies within Buchanan, a village of more than 2,000 residents. Buchanan is in the town of Cortlandt, which is inhabited by about 29,000 people. Cortlandt is part of Westchester County, home to roughly 920,000.

Indian Point was built by Consolidated Edison Co., the New York City metropolitan area's primary utility. Indian Point 1, a 275-megawatt pressurized water reactor, began producing electricity in 1962.

Two more reactors were added at Indian Point in 1974 and 1976. Indian Point 1 was permanently shut down in 1974 because revised Nuclear Regulatory Commission requirements for upgrading the emergency core cooling system and the price of fuel oil for the oil-fired system heaters made continued operation no longer cost effective. The Unit 1 technology differed from reactors built in the 1970s, such as Indian Point 2 and 3. Unit 1 is currently in decommissioning and is being kept in long-term, safe storage until Units 2 and 3 cease to operate. At that time, the three reactors will be dismantled concurrently.

Today, all three of the Indian Point reactors are owned by Entergy, which bought Indian Point 3 from the New York Power Authority in 2000, and purchased Units 1 and 2 from Con Edison in 2001. Today, Entergy operates 10 reactors in six states.

Indian Point 2's license allows it to operate until 2013, while Indian Point 3 can continue to operate until 2015. Entergy has announced that it plans to submit license renewal applications for some of its Northeast plants starting in 2005.

**Table 2-1. The Indian Point Energy Center at a Glance**

Unit	Capacity (MW)	Commercial Operation Year	Year of License Expiration	Reactor Type
Unit 1	275	1962	In Decommissioning	PWR
Unit 2	984	1974	2013	PWR
Unit 3	994	1976	2015	PWR

*PWR = pressurized water reactor; MW = megawatts*



In 2000, Indian Point 3 had its best year of operations, with a capacity factor of 100 percent. Capacity factor measures the amount of electricity produced vs. the maximum amount achievable if the plant generates power around the clock. Indian Point 2 had its best year in 2001, with a capacity factor of 94 percent.

Indian Point benefits the people of Buchanan, the surrounding counties and New York state in several ways. It is a major source of inexpensive, reliable electricity for the state and the New York Power Pool (NYPP), and it provides hundreds of jobs and significant economic benefits to the cities and towns of the surrounding counties.

## **2.2 Generation**

The Indian Point Energy Center generated 15.7 million megawatt-hours (MWh) in 2001 and 16 million MWh in 2002. This was roughly 11 percent of the electricity generated in the state of New York, enough for 1.5 million homes. Efficient electricity production at the plant was driven by a high capacity factor for each reactor. Indian Point 2's capacity factor averaged 92 percent in 2001 and 2002; Indian Point 3 averaged 96 percent for those two years.

These levels of performance have made Indian Point an integral part of the New York power system. Without the low-cost electricity provided by the Indian Point plant, power prices in the state would increase significantly, and electricity reliability would decrease substantially.

A study conducted by General Electric Power Systems Energy Consulting and National Economic Research Associates concluded that the reliability of the New York electric system would be degraded and power prices would increase, if Indian Point were to shut down. The study used a model called GE-MAPS, designed to estimate local reliability and cost.

The study found that a shutdown of the Indian Point plant would reduce the reserve margin on the New York electric system from 14.5 percent, already a low reserve level, to 8.4 percent. The New York State Reliability Council estimates that an 18 percent reserve requirement is necessary to ensure adequate electricity supply. Low reserve margins substantially increase the probability of periods of high prices, emergency operating procedures by system operators and power curtailments.

The study also found that a shutdown of the Indian Point plant would result in higher electricity prices for customers in New York. This effect would be the greatest for customers in the downstate region. On-peak wholesale electricity prices could increase between 13 percent and 25 percent, with prices for Con Edison customers increasing 20 percent. These price increases would lead to increased consumer expenditures on electricity of \$800 million to \$1 billion per year during the next three to four years. This increase in expenditures would put a drain on the economy, in addition to the economic loss associated with the plant's closure.

**Table 2-2. New York Power Pool Generation (2001)**

Generation Source	Generation Million MWh	Percentage of Generation
Natural Gas	42.27	30%
Other Nuclear	22.67	16%
Coal	22.60	16%
Hydro	20.02	14%
<b>Indian Point</b>	<b>15.70</b>	<b>11%</b>
Oil	15.84	11%
<b>NYPP Total</b>	<b>139.10</b>	<b>100%</b>

Source: Platts

### 2.3 Employment

In addition to providing reliable electricity to New York, Indian Point is also a major source of employment for the residents of Buchanan and the surrounding area. In 2002, the Indian Point plant and Entergy's White Plains office employed 1,683 people, of which 1,355 reside within the five surrounding counties of Westchester, Orange, Putnam, Rockland and Dutchess. The plant employs 302 people from Westchester County, of which 22 reside in the village of Buchanan. Indian Point employees from Buchanan represent one of every 50 working people from the village. Of the four remaining counties, the plant employs 646 people from Dutchess County, 249 people from Orange County, 113 people from Putnam County, and 45 people from Rockland County.

**Table 2-3. Employment by County**

County	Indian Point/White Plains Office		City/County Total*	
	Employees	Average Earnings	Employed Work Force	Average Earnings
Westchester	302	\$95,783	432,600	\$100,776
Dutchess	646	\$93,691	130,793	\$64,805
Orange	249	\$94,764	151,744	\$63,175
Putnam	113	\$94,964	48,932	\$83,620
Rockland	45	\$90,644	135,262	\$84,456
Other Metro Area <sup>†</sup>	322	\$103,345	5,491,406	\$71,442

\* Census 2000

<sup>†</sup> This area encompasses New York City, Northern New Jersey and Long Island, N.Y, part of the New York-New Jersey-Connecticut-Pennsylvania Consolidated Metropolitan Statistical Area as defined by the U.S. Census Bureau. This chart does not reflect employees who reside outside the five-county local area and Other Metro Area.

Jobs provided by the Indian Point plant also are typically higher paying than most jobs in the area. Employees at Indian Point earned on average about \$95,000 in 2002, including salary and overtime. This is almost 50 percent higher than the average salary in New York state, which is about \$64,000 a year. Plant employees residing in the village of Buchanan had average earnings of \$84,574, about 5 percent higher than average earnings in the village. Indian Point employees from four of the five counties surrounding the plant had higher average earnings than the average salaries in the counties in which they reside.

In addition to the jobs provided by Indian Point, the plant also spends a large amount of money in the local community. In the one-year period of this study, the Indian Point plant made \$11.1 million worth of purchases in Westchester County and an additional \$6 million in Dutchess, Orange, Putnam and Rockland counties.

**Table 2-4. Top Ten Cities/Towns by Total Employees**

City/Town	County	Indian Point/ White Plains Office		City/County Total*	
		Employees	Average Earnings	Employed Work Force	Average Earnings
Wappingers Falls	Dutchess	183	\$94,871	2,534	\$48,599
Poughkeepsie	Dutchess	109	\$93,784	20,105	\$63,440
Hopewell Junction	Dutchess	99	\$100,651	1,430	\$68,394
Fishkill	Dutchess	71	\$98,795	8,055	\$64,145
Beacon	Dutchess	69	\$79,123	6,089	\$53,593
Peekskill	Westchester	63	\$88,913	10,963	\$58,838
Newburgh	Orange	57	\$81,047	13,731	\$67,739
Cortlandt Manor	Westchester	36	\$95,875	19,052	\$94,147
Middletown	Orange	24	\$94,690	10,852	\$51,708
Buchanan	Westchester	22	\$84,574	1,112	\$80,473

\* Census 2000

**Table 2-5. Top Ten Cities/Towns by Percent of Employed Work Force**

City/Town	County	Percentage of Employed Work Force	Indian Point/ White Plains Office		City/County Total*	
			Employees	Average Earnings	Employed Work Force	Average Earnings
Wappingers Falls	Dutchess	7%	183	\$94,871	2,534	\$48,599
Verplanck	Westchester	5%	16	\$82,607	308	\$54,551
Hopewell Junction	Dutchess	4%	99	\$100,651	2,610	\$68,394
Cold Spring	Putnam	2%	22	\$82,311	983	\$80,058
Buchanan	Westchester	2%	22	\$84,574	1,112	\$80,473
Beacon	Dutchess	1%	69	\$79,123	6,089	\$53,593
Brewster	Putnam	1%	14	\$101,028	1,263	\$53,740
Fishkill	Dutchess	1%	71	\$98,795	8,055	\$64,145
Peekskill	Westchester	1%	63	\$88,913	10,963	\$58,838
Walden	Orange	1%	16	\$98,581	2,876	\$52,825

\* Census 2000

## 2.4 Plant and Local Area Taxes

Indian Point also makes substantial tax payments to local jurisdictions, in addition to benefits derived from employment and direct purchases. In 2002, Indian Point paid approximately \$25 million in local property tax payments. The largest taxes paid by Indian Point were to the local school district. The plant paid more than \$20 million in taxes to Hendrick Hudson Central School District, accounting for approximately 93 percent of tax payments to the district. The plant also paid \$2.7 million to the village of Buchanan, 88 percent of taxes paid to the village; and \$569,000 to the Verplanck Fire District, 31 percent of taxes paid to the district.

**Table 2-6. Property Taxes Paid by Entergy for Indian Point**

Location	Property Tax Paid by Entergy	Total Property Tax Collected*	Percent Paid by Entergy
Westchester County	\$1,963,000	\$351,138,011	0.6%
Town of Cortlandt	\$378,000	\$38,252,876	1%
Village of Buchanan	\$2,665,000	\$3,041,628	88%
Verplanck Fire District	\$175,000	\$569,288	31%
Hendrick Hudson Central Schools	\$20,154,000	\$21,667,759	93%
<b>Total Taxes Paid</b>	<b>\$25,335,000</b>	<b>\$414,669,562</b>	<b>6%</b>

\* Source: Westchester County Tax Commissioner

## **2.5 Summary**

The performance of the Indian Point plant mirrors the performance of the nuclear industry as a whole. Indian Point provides reliable electricity generation and keeps power prices affordable in downstate New York. The plant also offers well-paid employment to Westchester and surrounding counties and a large tax base to Westchester County and the local jurisdictions around the plant. However, these are only the direct economic benefits of the plant. As illustrated in the next section, the secondary effects on the local and regional economies are as large as the direct benefits.



## **Section 3: Economic and Fiscal Impacts**

The economic and fiscal effects of Indian Point go well beyond employee benefits, purchases of goods and services, salaries, taxes, and wages. They also reflect the strong stimulus that Indian Point's large wage and salary payments provide to key measures of economic activity—the value of electricity production, employment and labor income—in the local and state economies.

Indian Point's spending lifts economic activity throughout the local and state economies, as well as tax payments related to economic activity. This multiplier effect is felt throughout the local and state economies—by the private sector in the form of increased sales and employment and by the public sector through increased tax revenues to support public services.

Estimates of these effects were developed by applying the IMPLAN model to expenditure data provided by Entergy, owner of the Indian Point plants. (For more information on IMPLAN, see Section 6.)

### **3.1 Plant Expenditures in Westchester, Rockland, Orange, Putnam and Dutchess Counties**

Indian Point and White Plains office expenditures for products and services (including labor) in Westchester, Rockland, Putnam, Orange and Dutchess counties totaled \$143.4 million for 2002. Spending within the local area represents approximately 30 percent of Indian Point's total spending of \$448.8 million and approximately three-quarters of the \$200.8 million of spending in New York state.

The expenditure totals for the local area were provided by Entergy and are shown in Table 3-1. The 10 sectors receiving the largest amount of Entergy spending are listed in the table according to the amount spent in the local area. The categories are chosen from among 528 IMPLAN sectors and are listed largely according to the IMPLAN description for each. Total compensation, which includes benefits, salaries and wages, is listed separately.

Similar expenditure totals for New York state and the United States are presented in Tables 3-2 and 3-3, respectively. Expenditure totals for the local area are included in the totals for New York state in Table 3-2, and for the United States in Table 3-3.

By far, the largest expenditures made by Entergy in the local area were for labor. Total compensation for labor services was \$126.6 million—approximately 90 percent of Entergy's expenditures in the study area. This reflects the fact that most of Indian Point's expenditures for labor services (wages, salaries and employee benefits) are made locally. Naturally, this share for the five counties surrounding Indian Point is much larger than that of New York state and the United States.

Building services represented the largest non-labor expenditures in the local area at \$3.7 million. This sector includes all of the maintenance activities performed at the plant by outside contractors. Most of these services relate to the maintenance of plant facilities, such as janitorial services, landscaping, pest control and plumbing. Although these are non-labor expenses, the activities are typically labor intensive and thus mainly represent personnel costs and local jobs.

The next largest non-labor expenditures in the local area were for water supply and sewerage. This sector includes the payments to local utilities for the use of water by the plant. Payments for water supply represented \$1.8 million in expenditures during the study period.

Most local expenditures in Table 3-1 were for services. The prevalence of the service sectors reflects the outsourcing of jobs by the plant in the local area. Seven of the top-10 plant expenditure categories are for services.

**Table 3-1. Entergy Expenditures in Westchester, Putnam, Orange, Rockland and Dutchess Counties (2002)**

Description	Amount
Services to Buildings	\$3,671,485
Water Supply and Sewerage Systems	\$1,891,035
Business Services	\$1,397,407
Equipment Rental and Leasing	\$1,247,140
Communications Equipment	\$953,571
Management and Consulting Services	\$700,440
Electrical Equipment	\$582,643
Maintenance and Repair of Facilities	\$562,843
Computer and Data Processing Services	\$494,230
Hotels and Lodging Places	\$430,813
Other	\$4,900,312
Subtotal	\$16,831,919
Total Compensation <sup>a</sup>	\$126,582,858
<b>TOTAL</b>	<b>\$143,414,778</b>

<sup>a</sup> Total compensation includes wages, salaries and fringe benefits based on data provided by Indian Point. Employees at Entergy Nuclear Northeast's White Plains office are also included.

### 3.2 Plant Expenditures in New York

In 2002, Entergy expenditures for products and services (including labor) in New York state totaled \$200.8 million. This total includes \$143.4 million spent in the local area and \$57.4 million spent in other New York counties. Spending within the state represents approximately 45 percent of Entergy's total spending of \$448 million.

Entergy's total spending in New York state is presented in Table 3-2. Total compensation is the largest category at \$145.9 million and represents about 70 percent of the total. This is slightly lower than the share of total compensation for spending in the local area, indicating relatively more spending on products and services in other New York counties, compared to the five-county region surrounding the plant.

The largest non-labor expenditure was for state and local electric utilities. This expenditure represents payments for electric services from the New York Independent System Operator. These are largely services relating to the transmission of Indian Point's electricity onto the electricity grid and the plant's usage of electricity.

The next largest category—motors and generators—represents the purchase of components and services related to maintaining the plant's electric power generators. Entergy spent \$8.8 million on this category.

Building services remains an important category in the state. Building services was the third-highest category in the New York top-10 list. Service industries continue to make up a large portion of the expenditures in the state.

**Table 3-2. Entergy Expenditures in New York State (2002)**

Description	Amount
State and Local Electric Utilities	\$12,717,135
Motors and Generators	\$8,849,534
Services to Buildings	\$4,276,761
Management and Consulting Services	\$3,657,723
Other Business Services	\$2,794,127
Communications Equipment-NEC <sup>a</sup>	\$2,698,937
Water Supply and Sewerage Systems	\$2,086,842
Computer and Data Processing Services	\$1,500,439
Equipment Rental and Leasing	\$1,375,224
Electrical Equipment-NEC	\$1,060,884
Other	\$13,888,903
Subtotal	\$54,906,510
Total Compensation <sup>b</sup>	\$145,933,436
<b>TOTAL</b>	<b>\$200,839,946</b>

<sup>a</sup> NEC = Not Elsewhere Classified

<sup>b</sup> Total compensation includes wages, salaries and fringe benefits based on data provided by Indian Point. Employees at Entergy Nuclear Northeast's White Plains office are also included.

### 3.3 Plant Expenditures in the United States

In 2002, Entergy expenditures for products and services (including labor) purchased in the United States totaled \$357.1 million. Apart from expenditures of \$159.4 million in New York state, \$197.7 million was spent elsewhere in the United States. Much of that amount was for specialized products and services unique to the nuclear industry.

U.S. expenditures are detailed in Table 3-3. Total compensation (\$161.2 million) is the largest category, representing about one-third of the total. Total compensation as a share of the U.S. total

is much lower because plant employees live mostly in New York state (and particularly in the local area), whereas spending on products and non-labor services is concentrated outside the state.

The largest spending for products and non-labor services was for maintenance and repair of facilities (\$57.5 million). This result is not unique to Indian Point, since specialized maintenance and repair spending is typically the largest component of expenditures at other nuclear plants, reflecting the strong emphasis on these activities to maintain plants properly and ensure high availability rates and capacity factors.

The second largest non-labor spending category was management and consulting services. As is typical in the nuclear industry, Indian Point relies on highly specialized contractors and consultants to analyze the plant and its operations to ensure consistent performance. The third largest sector—uranium, radium and vanadium ores—represents fuel expenses for the plant. Indian Point’s fuel is purchased outside New York state. At the national level, services are an important part of Entergy’s expenditures. Six of the top 10 expenditures made nationally are for services.

**Table 3-3. Indian Point Expenditures in the United States (2002)**

<b>Description</b>	<b>Amount</b>
Maintenance and Repair of Other Facilities	\$57,532,646
Management and Consulting Services	\$35,390,076
Uranium-Radium-Vanadium Ores	\$30,224,443
Engineering-Architectural Services	\$15,951,100
State and Local Electric Utilities	\$12,720,334
Federal Government Enterprises	\$10,606,775
Computer and Data Processing Services	\$10,380,878
Motors and Generators	\$10,159,757
Services to Buildings	\$9,666,271
Insurance Agents and Brokers	\$8,894,087
Other	\$86,169,119
Subtotal	\$287,695,487
Total Compensation <sup>a</sup>	\$161,202,683
<b>TOTAL</b>	<b>\$448,898,170</b>

<sup>a</sup> Total compensation includes wages, salaries and fringe benefits based on data provided by Indian Point and includes employees at Entergy Nuclear Northeast’s White Plains office.

### 3.4 Taxes Paid and Accrued

A summary of taxes paid by Entergy on behalf of Indian Point in 2002 is presented in Table 3-4. Corporate income taxes were not included in the data because those taxes are paid at the corporate level and not explicitly by the Indian Point plant.

Local taxes in this table refer to the towns and districts in the study area. Property taxes paid in the local area (\$25.3 million) represent almost 70 percent of the taxes paid by the plant. These include payments to local school districts and fire districts. Property taxes are paid to Westchester County, the town of Cortlandt, the village of Buchanan, the Hendrick Hudson Central School District and the Verplank Fire District. By far, the largest payments are made to the Hendrick Hudson School District, which accounts for approximately 80 percent of the property tax payments.

In addition to property taxes, Indian Point also paid payroll taxes to the state and federal governments totaling nearly \$10 million. The plant also contributes to the profits of Entergy, which pays state and federal corporate income taxes. However, these taxes are not quantified in this study.

**Table 3-4. Taxes Paid by Indian Point (2002)**

<b>Federal Payroll Tax<sup>a</sup></b>	<b>\$9,794,398</b>
<b>State and Local Taxes</b>	<b>\$25,479,732</b>
Property Tax	\$25,335,000
Payroll Tax <sup>a</sup>	\$144,732
<b>Total Taxes Paid</b>	<b>\$35,274,130<sup>b</sup></b>

<sup>a</sup> The division of payroll taxes between federal and state is based on the average distribution from IMPLAN data.

<sup>b</sup> Excludes federal income taxes paid by Indian Point.

**Table 3-5. Impact of Indian Point Energy Center on Local, State and National Economies**

	Direct	Indirect <sup>a</sup>	Induced <sup>b</sup>	Total
<b>Local Area</b>				
Output	\$650,000,000	\$26,523,396	\$86,764,515	\$763,287,899
Labor Income	\$126,583,000	\$10,913,021	\$33,942,648	\$171,438,669
Employment	1,355	280	918	2,553
<b>New York State</b>				
Output	\$650,000,000	\$54,621,790	\$107,125,921	\$811,747,691
Labor Income	\$145,933,008	\$22,632,196	\$42,535,089	\$211,100,309
Employment	1,559	488	1,132	3,179
<b>United States</b>				
Output	\$650,000,000	\$382,945,230	\$491,311,999	\$1,524,257,225
Labor Income	\$161,202,704	\$175,593,811	\$173,867,555	\$510,664,071
Employment	1,683	4,190	5,125	10,998

<sup>a</sup> Indirect impacts measure the effects on input suppliers of expenditures by Indian Point.

<sup>b</sup> Induced impacts measure the effects produced by the change in household income that results from Indian Point expenditures.

### 3.5 Economic Impacts by Geographic Area

Summary economic impacts for each of the three geographic areas—the local area, New York state and the United States—are presented in Table 3-5. The three economic impact variables are:

- output—the value of production of goods and services, measured in 2002 dollars
- labor income—the earnings of labor, measured in 2002 dollars
- employment—measured in jobs provided.

These economic impacts are divided into their direct and secondary effects. The direct effects reflect the industry sector and geographical distribution of Entergy spending without any subsequent spending effects. The secondary, or “ripple,” effects include subsequent spending effects, which can be further divided into indirect and induced. Indirect effects reflect how Indian Point spending patterns alter subsequent spending patterns among suppliers. Induced effects reflect how changes in labor income influence the final demand for goods and services, which then has an impact on all sectors producing basic, intermediate and final goods and services.

The direct effects are based on the estimated value of Indian Point revenues of \$650 million for 2002. Revenues were estimated using generation figures from Indian Point and the average price of power from Entergy’s nuclear reactors in the Northeast. The average price of power was obtained from Entergy’s annual report.

These revenues, which are spent, distributed, invested or paid as taxes, reflect the total output of products and services associated directly with Indian Point and the White Plains office. This total includes the expenditures for products and services (including labor) itemized in Tables 3-1, 3-2 and 3-3.

Nationwide, the direct employment (1,683 jobs) is the average Indian Point employment level over this period. Eighty-one percent of these jobs are filled by workers residing in the local area. Of the remaining 328 jobs, 204 are filled by residents of New York state outside the local area, and the remainder are filled by residents of other states. As Table 3-5 indicates, direct effects are typically the largest contributor to total effects for each of the measures of economic impact and for local area and New York. State ripple effects are the largest contributor to total effects in the United States.

Induced effects are larger than indirect effects for the state and local economies, because there is more spending on labor income, which causes induced effects, than on goods and services, which causes indirect effects. Indirect effects are more important as a share of the total at the national level.

A helpful way of measuring the ripple effects is by using multipliers. Multipliers show the ratio of the plant's "total economic impact" to its "direct economic impact" and can be measured for each geographic region. Multipliers essentially measure how many dollars are created in the economy for every dollar spent by the plant.

In terms of output, Indian Point's direct impact for the local area is \$650 million, while its total impact is \$763.3 million (*see Table 3-5*). Thus, the multiplier for Indian Point's output for the local area is 1.17. This indicates that for every dollar of output from the Indian Point plant, the local area economy produces \$1.17. Using the same formula, the output multiplier is 1.25 for the state and 2.35 for the United States. This means for every dollar of Indian Point output, the state economy produces \$1.25 and the U.S. economy produces \$2.35.

**Table 3-6. Indian Point's Impact on the Most Affected Industries in Westchester, Rockland, Orange, Putnam and Dutchess Counties**

Industry Description	Output	Labor Income	Employment
Electric Services	\$650,931,840	\$126,764,472	1,357
Owner-Occupied Dwellings	\$9,180,758	-	0
Wholesale Trade	\$5,997,007	\$2,528,002	39
Doctors and Dentists	\$5,638,043	\$3,317,516	57
Services to Buildings	\$4,704,194	\$1,969,959	99
Real Estate	\$4,536,372	\$615,432	19
Hospitals	\$4,324,430	\$2,614,840	61
Banking	\$4,087,369	\$789,038	16
Eating and Drinking	\$3,367,526	\$1,366,463	79
Insurance Carriers	\$3,083,332	\$1,117,537	17
Other	\$67,437,028	\$30,355,410	809
<b>TOTAL</b>	<b>\$763,287,899</b>	<b>\$171,438,669</b>	<b>2,553</b>

### 3.6 Economic Impacts by Local Industry

Indian Point impacts virtually every sector of the economy. The direct effects are concentrated in a few sectors, but the ripple effects—especially the induced effects—increase the dispersion of total effects across other sectors. The largest ripple effects in the local region are in service industries used by plant employees. The sectors most affected vary by geographic area. Table 3-6 presents the 10 sectors most affected by the plant in the local area, based on total output.

The sector most affected in terms of total output is the electric services sector because this includes electricity produced by the plant. Thus, all direct effects are included in this sector. It is the largest sector based on total output in the New York and U.S. economies, as shown in Tables 3-7 and 3-8, respectively.

The most affected sectors based on total output are not always the most affected sectors based on other impact measures (i.e., labor income and employment). A striking example of this is the second most affected sector, the real-estate values sector, also known as the owner-occupied dwellings sector.

This is not a traditional business-industry sector, and thus there are no impacts on labor income or employment. Instead, it is a special sector developed by the U.S. Department of Commerce's Bureau of Economic Analysis that estimates what homeowners would pay in rent if they rented rather than owned their homes. In essence, it creates an industry based on home ownership.

The sole product (or output) of this industry is home ownership, purchased entirely by personal consumption expenditures out of household income. In effect, this sector captures increases in

housing values due to increased labor resulting from the plant. Rental costs are included in the real estate category in Table 3-6.

The owner-occupied dwellings sector is influenced by the large number of employees at the plant. These employees require housing and this additional demand leads to increased output from the housing sector. This affect also leads indirectly to increased local tax revenues, since increases in housing raise local property tax revenues.

The third most affected sector is wholesale trade, which represents the intermediate buying and selling of goods purchased by the plant and its employees. This section is large because purchased goods are typically distributed through a wholesaler, so this category is involved in most of the expenditures by Entergy, its employees and its suppliers.

As Table 3-6 indicates, many of the most affected local industries are related to services required by the plant's workers, such as doctors and dentists, real estate, hospitals, banking, and restaurants, in addition to the owner-occupied dwellings category. Further, building services, a large direct expenditure of the plant, remains an important component of the plant's local impacts.

Overall, the IMPLAN model estimates that 1,196 people are employed in the local area as a result of spending by Entergy and its employees.

**Table 3-7. Impact of Indian Point Energy Center on the Most Affected Industries In New York**

Industry Description	Output	Labor Income	Employment
Electric Services	\$650,115,648	\$145,958,992	1,559
Owner-Occupied Dwellings	\$10,401,062	\$0	0
Wholesale Trade	\$8,240,323	\$3,467,725	58
Management and Consulting Services	\$7,861,060	\$4,310,168	69
Real Estate	\$6,062,534	\$822,511	25
Hospitals	\$5,925,414	\$3,687,267	77
Doctors and Dentists	\$5,819,619	\$3,397,659	61
Eating and Drinking	\$5,401,403	\$2,204,015	125
Banking	\$5,225,686	\$1,008,842	11
Services to Buildings	\$4,854,570	\$2,213,714	83
Other	\$101,840,372	\$44,029,416	1,111
<b>TOTAL</b>	<b>\$811,747,691</b>	<b>\$211,100,309</b>	<b>3,179</b>

### 3.7 Economic Impacts by State Industry

Table 3-7 uses the same sectors as Table 3-6 to illustrate effects of the plant on New York state. Again, electric services and owner-occupied dwellings are the most affected sectors in terms of total output.

The entries in Table 3-7 for the most affected industries in New York are similar to those in the five counties surrounding the plant. The primary exception is the inclusion of management and consulting services among the top-10 sectors affected in the state. These services, which are highly specialized, tend to have offices located outside the study area or outside the state.

As with local impacts, the most affected state categories are primarily related to purchases by plant employees for services. Many of these services, such as restaurants, doctors and dentists, and real estate, are owned and operated by local small business owners.

The IMPLAN model estimates that 1,620 jobs (in addition to those at the plant) are created in the state of New York as a result of Indian Point. In other words, for every person employed at the Indian Point plant, another person is employed in the state.

**Table 3-8. Impact of Indian Point Energy Center on the Most Affected U.S. Industries**

Industry Description	Output	Labor Income	Employment
Electric Services	\$650,026,176	\$161,209,200	1,683
Management and Consulting Services	\$73,699,360	\$36,913,264	772
Maintenance and Repair Other Facilities	\$43,311,992	\$27,672,752	646
Owner-Occupied Dwellings	\$38,156,280	\$0	0
Wholesale Trade	\$32,882,724	\$13,798,861	259
Real Estate	\$32,344,150	\$4,384,204	169
Computer and Data Processing Services	\$30,098,628	\$22,451,376	257
Banking	\$25,652,060	\$4,952,178	102
Engineering-Architectural Services	\$24,950,872	\$11,228,860	247
Communications-Except Radio and TV	\$22,292,954	\$5,518,133	69
Other	\$550,842,029	\$222,535,243	6,793
<b>TOTAL</b>	<b>\$1,524,257,225</b>	<b>\$510,664,071</b>	<b>10,998</b>

### 3.8 Economic Impacts by U.S. Industry

Table 3-8 illustrates the plant's economic impact on the United States. Electric services, maintenance and management and consulting services are the most affected sectors in terms of total output nationwide.

The 10 most affected sectors (on the basis of output) in the United States are similar to the 10 most affected sectors in the local area and in New York state. The main difference is the appearance of specialized engineering and computer services. These services are often highly specialized to the nuclear industry and are performed by a limited number of firms in the country. Consequently, the services are typically purchased from out-of-state contractors.

### 3.9 Tax Impacts

Entergy spending has effects on tax payments that extend beyond the taxes paid directly on the plant. This spending has direct impacts on income and value creation, which in turn affects taxes paid on that income and value. Similarly, the ripple effects of Indian Point spending on other spending and economic activity leads to additional income and value creation, which leads to additional taxes paid. These additional or “induced” effects on tax payments, presented in Table 3-9, are much larger than the taxes paid directly.

Given its expenditures and tax payments, Indian Point is responsible for an estimated \$49.6 million in state and local tax expenditures. Most of these tax impacts result from local property taxes paid by the plant and induced by its spending, and state income taxes paid by its employees. Additionally, the plant and its indirect and induced effects account for an estimated \$165.9 million in federal tax revenue.

These results can be used to compute tax multipliers, but not for each line item. Line-item tax multipliers cannot be computed because some taxes are not paid by Entergy. Table 3-9 does not include taxes accrued by Indian Point.

**Table 3-9. Tax Impacts of Economic Activity Induced by Indian Point**

	<b>Total Tax Impact<sup>a</sup></b>
<b>Federal Government</b>	<b>\$165,885,884</b>
Payroll Tax	\$56,174,168
Personal Taxes	\$55,963,509
Corporate/Business Taxes	\$53,748,207
<b>State and Local Government</b>	<b>\$49,696,707</b>
Payroll Tax	\$327,951
Personal Taxes	\$11,063,126
Corporate/Business Taxes	\$38,305,630
<b>Total Taxes</b>	<b>\$215,582,591</b>

<sup>a</sup> The total tax impact includes taxes directly paid by Indian Point and the taxes paid by other entities as a result of the economic activity created by Indian Point expenditures.

### **3.10 Summary**

The Indian Point Energy Center has substantial economic and fiscal impacts locally and in New York. When compared with their respective economies, the relative impacts of Indian Point are highest for the local area and next highest for New York state. The plant's job-creation impact (direct and indirect) of 2,553 is a significant number of jobs deriving from a single establishment. These impacts are greater in absolute terms at the national level than at the state level, and similarly are greater at the state level than at the county level.

As is the case with other nuclear plants, Indian Point buys specialized products and services from national and international markets. The state and local economic and fiscal effects are great, in large part because of the buying power created by Indian Point's high wages, salaries and benefits, which are spent on goods and services provided locally and in nearby areas.

## **Section 4: Additional Benefits Provided by Indian Point**

Since buying the Indian Point Energy Center in 2001, Entergy has continued the plant's long-standing tradition of playing an integral role in the community. This involvement ranges from participating in numerous charitable organizations to investing in community infrastructure through major donations to governments, hospitals and schools. Without Entergy and its employees, many smaller charities and local organizations would suffer disproportionately, because of their dependence on the site for both volunteers and financial resources. In addition, Entergy provides direct financial aid, equipment and training to local jurisdictions, counties and the state for emergency planning purposes.

### **4.1 Introduction**

Indian Point and Entergy have a long tradition of community involvement. Company leaders support volunteerism and promote the sharing of financial and intellectual talent in the local area. Civic involvement is an integral part of Entergy's corporate mission, which the company views as an investment in its communities.

Entergy's community investments take many forms, such as grants to community organizations, employee gift matches and volunteerism. Because local problems are best solved through local solutions, Entergy relies on employees who are part of the community and are knowledgeable about their area's unique needs. These employees serve on local contributions committees that make funding decisions.

The mission of the Indian Point local contributions committee is to participate in community events, support local schools and charities, and encourage volunteerism among employees and their families. In addition, the Indian Point local contributions committee helps identify community problems and mobilizes site resources to help solve them.

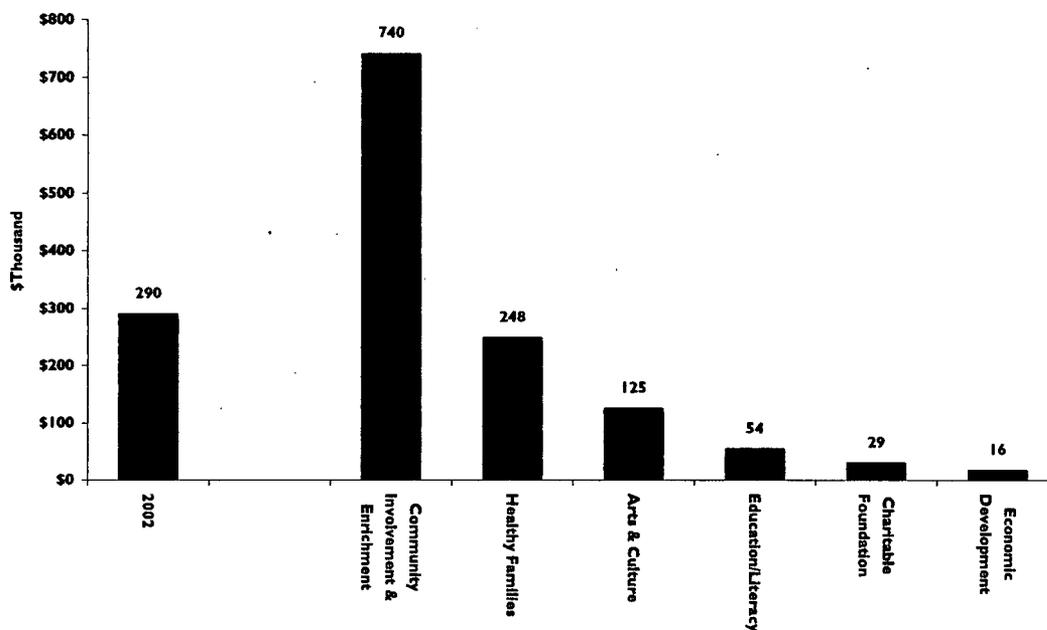
The committee has approved contributions to such groups as the Brooklyn Children's Museum, Orange County Amateur Radio Club, Haldane Central School District, Careers for People With Disabilities, the Blue Mountain Middle School and town of Fishkill Volunteer Cadet Program. Hillcrest School, African American Men of Westchester, Association for Pupil Transportation, McQuade Children's Services, Westchester Youth Dance Ensemble and the American Cancer Society have also received support from the committee.

Entergy's corporate giving programs include a variety of open, community partnership, employee matching and environmental stewardship grants. The Entergy Charitable Foundation is a private foundation dedicated to building stronger communities through a special focus on low-income initiatives, as well as educational and literacy programs.

In 2002, Entergy and the Entergy Charitable Foundation on a national basis funded more than 3,000 grant requests totaling approximately \$10 million in cash contributions. In New York state, Indian Point and Entergy donated \$290,000 in 2002 and \$1.2 million in 2003. The beneficiaries included educational institutions, social services agencies, charitable organizations, and environmental, civic and governmental organizations. Among the groups receiving donations were the Juvenile Diabetes Research Foundation, the Alzheimer's Disease and Related Disorder Association of Central New York, Hendrick Hudson Free Library and the Research Foundation on Behalf of the State University of New York. Other recipients included Apropos Housing Opportunities and Management, Hudson Valley Hospital Center, American Red Cross,

Westchester Arts Council and the city of White Plains, N.Y., Public Safety Division. Entergy's donations provide valuable benefits to the residents of southeastern New York.

**Figure 4-1.**  
**2003 Contributions by Entergy to Local Organizations by Program**



**Description of Contributions:**

**Open Grants**

Entergy Open Grants focus on improving communities as a whole through the support of health and social service agencies, the arts and culture, and community improvement/enrichment programs. Typical grant awards range from \$500 to \$5,000.

**Community Partnership Grants**

Entergy partners with community leaders to identify and support local nonprofit organizations that are working to build stronger, more productive communities. Entergy's Community Partnership grants assist churches, schools and other nonprofit groups in their grassroots efforts to improve or support education and literacy, community enrichment, healthy families, arts, and cultural activities. The maximum award is \$1,000.

#### **Entergy Charitable Foundation**

The Entergy Charitable Foundation supports programs that provide innovative and measurable ways to positively affect low-income families and help them break the cycle of poverty. Typical grants range from \$2,500 to \$5,000.

#### **United Way Campaigns**

In 2002, Entergy matched employee gifts to the United Way campaign dollar-for-dollar. Entergy's employee, retiree and corporate gifts to the United Way in 2002 totaled almost \$4 million. Indian Point and White Plains employees contributed \$35,000 to local United Way agencies, with a \$55,000 corporate match.

#### **Matching Educational Gifts**

Education is the key to the future—both for individuals and for society as a whole. That's why Entergy provides dollar-for-dollar matches to employee, board member and retiree contributions to high schools, colleges and universities.

#### **Community Connectors Grants**

When the needs are great and resources scarce, volunteerism is essential to help fill the gap. Entergy's Community Connectors program is designed to celebrate and honor its employees' commitment to volunteerism. Through Community Connectors, Entergy employees log and redeem their volunteer hours for grants to the nonprofit organization of their choice. An individual can earn up to \$250, and a team can earn \$500 per year.

#### **Community Power Scholarships**

With the cost of higher education skyrocketing, Entergy established the Community Power Scholarship program for children of employees. Although academic performance is a consideration, the scholarship program is unique because it focuses on the applicant's community involvement. In 2003, a total of 20 scholarships, for \$5,000 each, were awarded.

#### **Power of America Scholarships**

In the aftermath of Sept. 11, 2001, Entergy helped lead an industrywide effort to provide scholarships for the children of the victims. Entergy contributed \$500,000 as seed money to start the fund, which currently stands at more than \$3.1 million. In 2003, 35 scholarships, for \$1,000 each, were awarded.

## **4.2 Social Services**

Entergy is one of the largest charitable contributors in the region. The company's charitable efforts include offering multiyear grants to Hudson Valley Hospital to substantially increase the facility's emergency room and emergency preparedness capabilities, as well as providing significant funding for the Westchester Arts Council. Entergy contributions helped the Westchester County Chapter of the American Red Cross launch the Emergency Planning and Preparedness Academy for training first-responders in the region. Entergy is a recognizable force in charitable giving.

In 2003, Entergy copied its successful fuel fund program from its southern region and initiated the Heartshare Energy Assistance Program in the Northeast—an employee-sponsored subsidy that supports elderly or disabled persons in their efforts to pay the ever-increasing cost of cooling and heating their homes.

### **4.3 Education**

Public education is an important part of Indian Point's commitment to the communities surrounding the site. One of the most successful programs in the plant's history has been the Energy Institute—a two-week continuing education seminar for local high school teachers run by the State University of New York at Oswego. This annual, multidimensional course covers a wide range of energy options and issues beyond just learning about nuclear energy. Teachers learn new techniques for instructing students on the latest alternative forms of energy by using hands-on experimentation and exploring the subject through the use of active debate.

Started as a sponsorship under the prior ownership of Indian Point 3, the Energy Institute has grown into a partnership of equals under Entergy's direction. This interactive learning experience presents attendees with a comprehensive overview of energy issues, including (but not limited to) nuclear power. Although Entergy takes a hands-off approach to the development of course content by the college, the company takes an active role in providing nuclear engineers, who present the science of nuclear energy in an informative and relaxed forum.

Many Indian Point employees also use their knowledge of nuclear engineering, occupational safety and radiation as invited speakers at various educational forums.

### **4.4 Environmental Protection**

In addition to the economic benefits that Indian Point provides to the local area, the plant also plays a vital role in preserving air quality in New York, particularly the Hudson Valley and New York City. Nuclear power does not produce any air pollution in the process of generating electricity. If Indian Point no longer operated, its electricity production would need to be replaced by existing fossil-fired power plants in the region, which would increase the region's air pollution.

A 2002 study by TRC Environmental Corp. found that if Indian Point were closed, the state's carbon dioxide emissions would increase by 20 percent. Carbon dioxide has been identified by many scientists as a contributor to global climate change. The study also estimates that without Indian Point, nitrous oxide emissions would be 19 percent higher in the state. Nitrous oxide has been linked to respiratory illness and is a precursor to ozone depletion and acid rain.

Westchester County is designated as a non-attainment area for ozone by the U.S. Environmental Protection Agency. Without the Indian Point plant, Westchester County would have severe difficulty meeting its ozone goals. Ozone has been linked to lung illness and leads to smog and reduced visibility.

In the absence of Indian Point, sulfur dioxide levels would be 11 percent higher in New York state. Sulfur dioxide is a precursor to acid rain and has been linked to respiratory illness.

The study also estimates that in the absence of Indian Point, carbon monoxide levels would be 42 percent higher, particulate matter emissions would be 28 percent greater, and emissions of volatile organic compounds would be 35 percent higher. These emissions have similar health and environmental impacts as nitrogen oxide and sulfur dioxide.

## **4.5 Civic/Government**

Indian Point employees represent a cross-section of civic participation and volunteer positions within government agencies, law enforcement, emergency medical services, hazardous material squads and fire departments. Following the Sept. 11 attacks, Indian Point personnel were called upon to assist regional fire, police and emergency services departments in responding to the event. Some employees went immediately to join fellow volunteers in assisting with rescue efforts, others helped with coordination of relief plans. When breathing apparatus for rescue workers ran out, emergency workers turned to Indian Point, because the site had one of the largest inventories of breathing equipment in the region. In addition to the loan of equipment, several Indian Point workers provided training on the equipment to rescue workers, who were using assisted breathing gear for the first time.

### **Local Celebrations**

Besides charitable contributions, Entergy is a supporter of two premier local celebrations. The New York Power Authority has a longstanding tradition of supporting Peekskill Celebration, and when Entergy purchased Indian Point 3 from the authority in 2000, the company continued as a major sponsor of this important event. The company also supports the highlight of the multi-day event—the Saturday night fireworks show. Additionally, Entergy provides volunteers to help guide the development and execution of the celebration.

Likewise, Harborfest is the crowning jewel of Oswego County's yearlong community event calendar. As one of the largest employers in the county, Entergy provides financial and volunteer resources to event coordinators when planning this celebration. Hundreds of local businesses depend on this multi-day event for revenue, and Entergy is proud to assist those businesses through its sponsorship of Harborfest.



## Section 5: Nuclear Industry Trends

U.S. nuclear power plant performance reached an all-time high in 2002, the fifth consecutive record-setting year. The nuclear energy industry has steadily improved performance and cost, while also improving plant safety. The nuclear energy industry is a model of industrial safety. Power plant performance is commonly measured by capacity factor, which expresses the amount of electricity actually produced by a plant, compared with the maximum achievable. U.S. nuclear power plants achieved a capacity factor of 91.9 percent in 2002. Total electricity production for U.S. nuclear power plants reached new heights in 2002. At the same time, production costs for those plants have been among the lowest of any baseload fuel source.

### 5.1 Nuclear Industry Performance

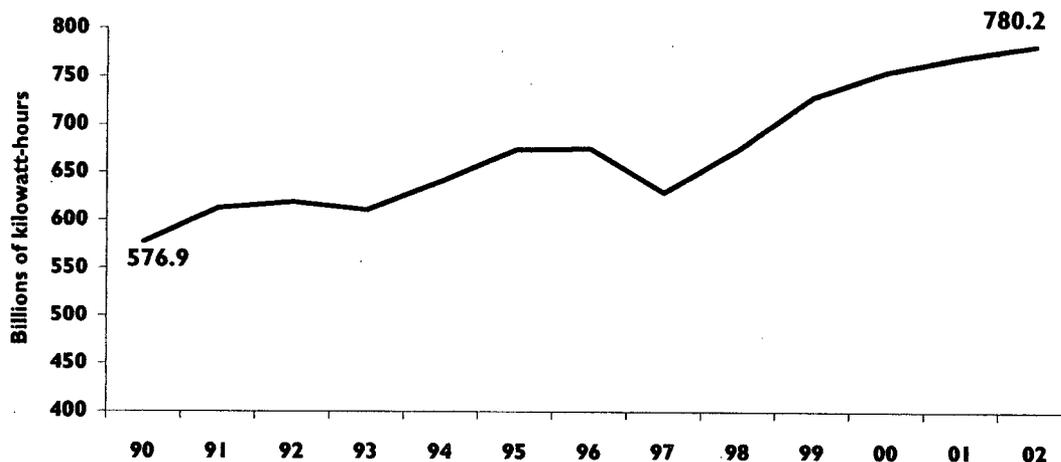
U.S. nuclear power plants have increased their output and improved their performance significantly over the past 10 years. Nuclear energy represents about 20 percent of all electricity generated in the United States. In 2002, nuclear power generated 780 billion kilowatt-hours (kWh) of electricity. Since 1990, the industry has increased total output equivalent to 26 new, large nuclear plants. The increase in output has been achieved without building any new plants.

In 2002, U.S. nuclear plants operated at an average capacity factor of 91.9 percent. Overall capacity factors for U.S. nuclear power plants increased dramatically over the past decade. By contrast, the average industry capacity factor was 60 percent in the late 1980s.

One of the key reasons for these increased capacity factors has been the shortening of refueling outage times.

**Figure 5-1. U.S. Nuclear Industry Net Electricity Generation**

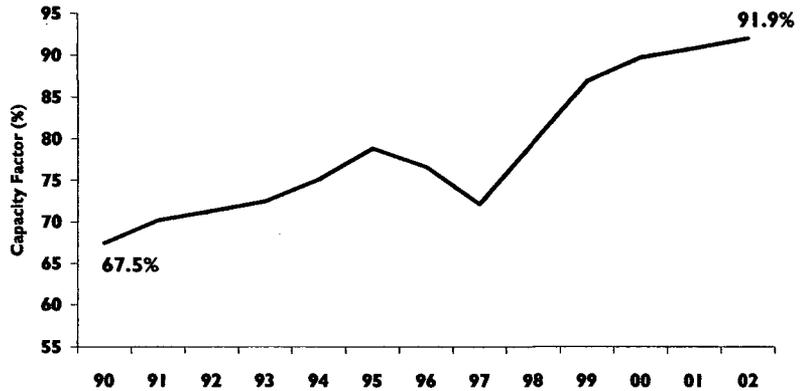
(35% increase from 1990 to 2002)



Source: Energy Information Administration

Nuclear plants need to shut down to refuel approximately every 18 to 24 months. Refueling represents one of the major determinants of nuclear plant availability. In the past 10 years, the durations of refueling outages have been declining. In 1990, the average refueling outage took 105 days to complete. By 2001, this number declined to an average of 37 days, and companies continue to apply best practices to reduce this average length of refueling. The record for the shortest refueling outage is 14.67 days for boiling water reactors and 15.63 days for pressurized water reactors.

**Figure 5-2. Nuclear Industry Average Capacity Factors (1990-2002)**



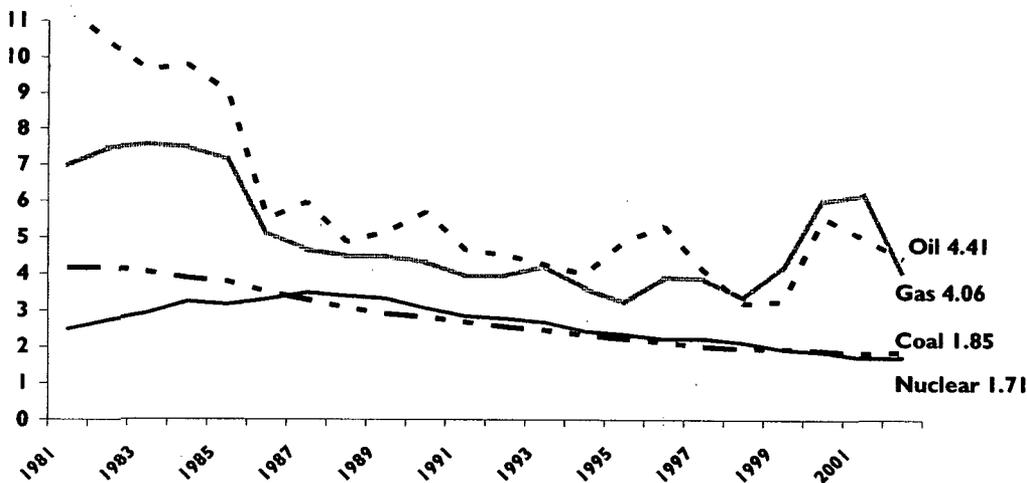
Source: Energy Information Administration

### 5.2 Cost Competitiveness

Along with increasing output, the U.S. nuclear industry has continued to decrease the cost of producing electricity. In 2002, nuclear power had a production cost of 1.71 cents/kWh, significantly lower than the production costs of electricity generated by oil and natural gas and slightly lower than coal. In the past decade, nuclear power production costs have dropped by about one-third, as a result of the increased efficiency of U.S. plants. Since most of a nuclear plant's costs are fixed, greater electricity production creates lower cost. However, nuclear plants have also taken steps to reduce their total costs through improved work processes.

**Figure 5-3. U.S. Electricity Production Costs**

(1981-2002 in constant 2002 cents/kWh)



Source: Pre-1995: Utility Data Institute (UDI), Post-1995: Resource Data International (RDI) Modeled Production Cost

**Table 5-1. Regional Wholesale Electricity Prices (cents/kWh)**

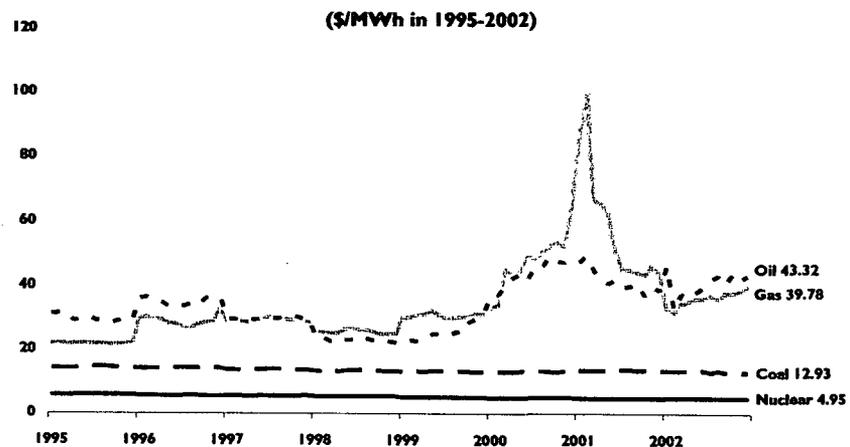
Region	2001 Average On-Peak Prices	2003 On-Peak Futures Prices
New England	4.99	3.58
New York	4.97	4.38
Mid-Atlantic	3.93	3.63
Tennessee Valley	3.58	3.03
Gulf States	3.60	3.05
Midwest	3.39	3.00
Texas	3.46	3.30
Northwest	13.00	3.48
Southwest	11.30	3.73

Source: *Megawatt Daily*

Because of low production costs and excellent safety performance, today's nuclear plants are very competitive in today's energy markets. Ultimately, the primary test of nuclear energy's competitiveness is how well it performs against market prices. In this respect, nuclear energy is highly competitive. Average production costs at 103 reactors were 1.71 cents/kWh in 2002, lower than the average price of electricity in all regional markets. Nuclear power is also competitive with futures market prices, one of the best ways to judge what prices will be in the year ahead.

Nuclear plants also provide a unique degree of price stability for two reasons. First, production costs for nuclear plants are comprised of costs not associated with fuel. Many fuel markets tend to be volatile, so the production costs of generation sources tied to fuel expenses are highly volatile, as they swing with variations in fuel markets. Fuel represents only 20 percent of the production cost of nuclear power, but it makes up between 60 percent and 80 percent of the cost of natural gas, coal and petroleum-fired electricity. Second, nuclear fuel prices are much more stable than that of natural gas and petroleum. Because of its stable, low production cost, nuclear power can help mitigate large electricity price swings.

**Figure 5-4. Monthly Fuel Cost to Electric Generators**



Source: Resource Data International (RDI) and Utility Data Institute (UDI).

### 5.3 Industry Safety

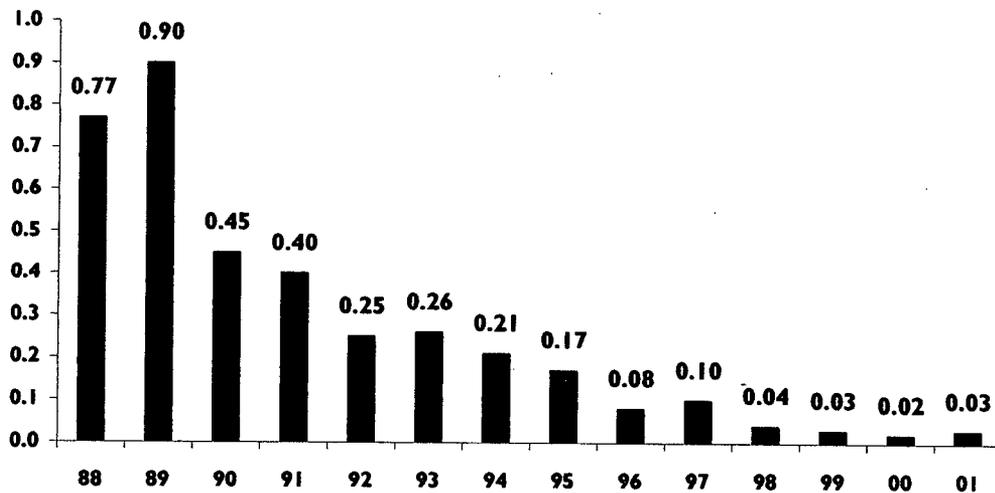
The nuclear industry's recent performance and cost achievements have been accomplished in an era of outstanding safety at U.S. nuclear plants. In 2002, the nuclear power industry met or exceeded all safety goals set by the Institute of Nuclear Power Operations (INPO) and the World Association of Nuclear Operators (WANO). These entities track safety and performance data in 10 key areas.

One key indicator tracked by INPO and WANO is the number of unplanned automatic plant shutdowns. The U.S. industry has made dramatic improvements in the number of unplanned automatic shutdowns, dropping from 7.3 shutdowns per reactor in 1980 to a median of zero per reactor since 1997.

Other safety and performance indicators tracked by the Nuclear Regulatory Commission confirm the excellent safety performance of U.S. nuclear plants. The NRC tracks data on the number of "significant events" at each nuclear plant. (A significant event is broadly defined as any occurrence that challenges a plant's safety system.) The average number of significant events per reactor has declined from 0.77 per year in 1988 to 0.03 in 2001.

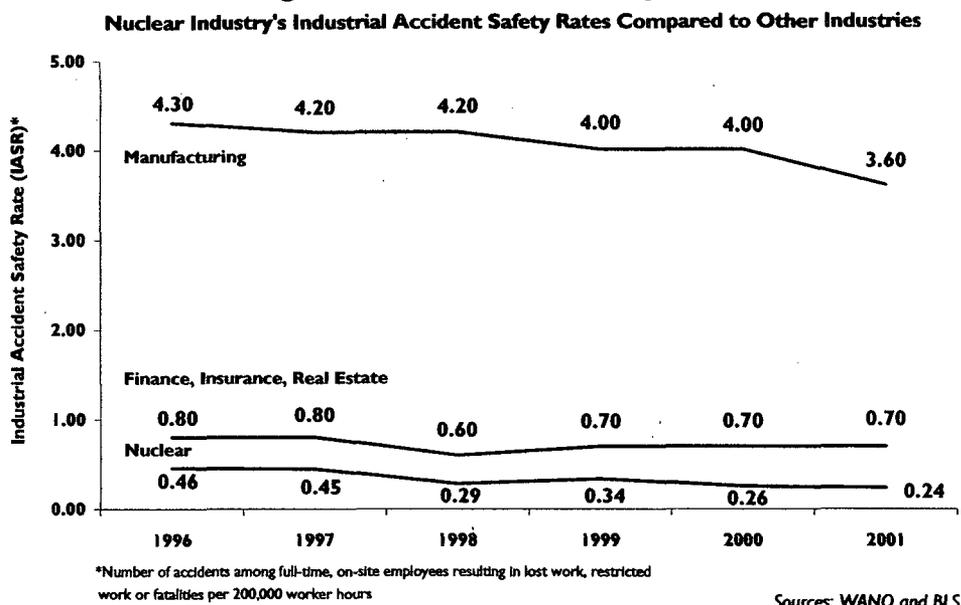
In addition to safe operations, U.S. nuclear plants continue to improve the already high levels of worker safety. According to NRC data, radiation exposure to workers (measured in rem) decreased from an average of about 1 rem per year in 1973 to 0.16 rem per year in 2001. Both the historical and current doses per employee are far below the regulatory limit of 5 rem per year.

**Figure 5-5. Significant Events: Annual Industry Average**  
(Number of events per reactor 1988-2001)



Source: Nuclear Utility Service

**Figure 5-6. Nuclear's Safety Record**



General worker safety also is excellent at U.S. nuclear power plants—far safer than the U.S. manufacturing sector. WANO and the Bureau of Labor Statistics provide information on the industrial accident safety rate. This statistic measures the lost workday accidents or fatalities per 200,000 worker hours. The nuclear industry has improved its industrial accident safety rate from 0.46 in 1996 to 0.24 in 2001. By comparison, the U.S. manufacturing industry had an industrial accident safety rate of 3.6 in 2001 and the U.S. finance, insurance and real estate industries had an industrial accident safety rate of 0.7—both trailing the nuclear industry.

### 5.4 Current Industry Events

The excellent economic and safety performance of U.S. nuclear plants has increased interest in nuclear power by the electric utility industry, the financial community and policymakers. This is evidenced by the increasing number of plants seeking license renewals from the NRC.

Nuclear plants were originally licensed to operate for 40 years, but can safely operate for longer periods of time. The NRC granted the first 20-year license renewal to two reactors at the Calvert Cliffs plant in Maryland in 2000. As of January 2004, 23 reactors have received license extensions, and 17 reactors have submitted an application for a license extension. License renewal is an attractive alternative to building new electric capacity because of nuclear power's low production costs and the return on investment for renewal.

Besides relicensing current plants, interest has recently increased in building new nuclear plants. Several companies are exploring building new plants, including three companies—Entergy, Dominion Energy and Exelon—that have submitted applications with the NRC to test the agency's new permitting process for new reactor sites. In addition, President Bush included construction of new nuclear plants as an essential part of the administration's National Energy Strategy announced in May 2001.

## **Section 6: Economic Impact Analysis Methodology**

The methodology used to estimate the economic and fiscal impacts of the Indian Point power plant is commonly referred to as input/output methodology. Several operational input/output models are available in the marketplace—the market leaders are Impact Analysis for Planning (IMPLAN), REMI and RIMS-II. The IMPLAN model was selected for use in this study, primarily because the model and many of the data sets were already on hand, the relevance of IMPLAN to the particular application, as well as its transparency and ease of use.

This report section presents typical applications of input/output methodology and explains the methodology and its underpinnings. It also describes how Indian Point data and the IMPLAN model were used to estimate local, state and national economic and fiscal impacts of plant operation.

### **6.1 Use of Input/Output Models**

Input/output models capture input—or demand—and output—or supply—interrelationships for detailed business, government and industry sectors in a geographic region. They also capture the consumption of goods and services for final demand by these sectors and by the household sector. The basic geographic region is a county, and model results can be developed at the county, multi-county, state, multi-state and national levels. They are particularly useful in examining the total effects of an economic activity or of a change in the level of that activity.

These models are typically used when the following key questions need to be addressed:

- How much spending does an economic activity (such as a power plant) bring to a region or local area?
- How much of this spending results in sales growth by local businesses?
- How much income is generated for local businesses and households?
- How many jobs does this activity support?
- How much tax revenue is generated by this activity?

These models are also useful in addressing related questions, such as the geographic and industry distribution of economic and fiscal impacts. Typical applications of these models include facility or military base openings and closings, transport or other public infrastructure investments, industrial recruitment and relocation, and tourism.

### **6.2 Overview of the Input/Output Methodology**

Input/output models link various sectors of the economy—agriculture, construction, government, households, manufacturing, services and trade—through their respective spending flows in a reference year. These linkages include geographic linkages, primarily at national, state and county levels.

As a result of these linkages, the impact of an economic activity in any sector or geographic area on other sectors and areas can be modeled. These impacts can extend well beyond the sector and area in which the original economic activity is located. They include not only the direct, or initial, effects of the economic activity, but also the subsequent, or “ripple,” effects that flow from this activity. Direct effects are analogous to the initial “splash” made by the economic activity,

and ripple effects are analogous to the subsequent “waves” of economic activity (employment, new income, production and spending) that are triggered by this splash. A full accounting of the splash’s effect also must include the waves emanating from the splash itself.

The sum of the direct and ripple effects is called the total effect, and the ratio of the total effect to the direct effect is called the “total effect multiplier,” or simply the multiplier effect. Multipliers can be developed for any of the model outputs, such as earned income, employment, industry output and total income (which includes the effect of transfers between institutions).

Multipliers can also be developed for any industry or business sector or geographic area in the model. Multipliers for a county are smaller than for a larger area (the state in which the county is located) because some of the spending associated with an economic activity “leaks” from the small area into the larger area. At the local area level, multipliers are larger if the local area economy is more diversified and if the economic activity being modeled is a good “fit” within that economic base.

Ripple effects include two components—indirect and induced effects—that are separately modeled within input/output models. Indirect, or “upstream,” effects are the effects on the supply chain that feeds into the business-industry sector in which the economic activity is located. For example, when Indian Point buys a hammer for \$5, it contributes directly to the economy by this purchase, but the company that makes the hammer also has to increase its purchases of steel and wood to maintain its inventory, and this will increase output in the steel and wood industries. The steel and wood industries will then have to purchase more inputs for their production processes, and so on. The result will be an economic impact that is greater than the \$5 initially spent by Indian Point for the hammer.

Induced effects are the impacts on all sectors that result from changes in final demand of commodities and services that are associated with changes in income from the economic activity. They are primarily associated with changes in household spending on goods and services for final demand. These are the result of changes in labor income.

To illustrate, when Indian Point pays \$5 for a hammer, a portion of the \$5 goes to pay the wages of employees at the company that makes the hammer. This portion contributes to labor income, which provides an additional contribution to the economy through its effects on household spending for goods and services. There also will be a contribution from the effect of this purchase on labor income in the wood and steel industries, and on the resulting household spending for goods and services. Indian Point’s own wage and salary expenditures create induced effects as well, and they occur primarily in the local area economy.

As with any model, input/output models incorporate some simplifying assumptions to make them tractable. There are several key simplifying assumptions in input/output models.

Input/output models assume a fixed commodity input structure. In essence, the “recipe” for producing a product or service is fixed, and there is no substitution of inputs, either new inputs (which weren’t in the mix before) for old inputs, or among inputs within the mix. Input substitution does not occur if technical improvements in some inputs make them relatively more productive. Nor does substitution occur if there are relative price changes among inputs. Were any of these types of substitutions allowed, they might dampen the multiplier effects, especially for larger geographic areas.

Another key simplifying assumption is constant returns to scale. A doubling of commodity or service output requires a doubling of inputs, and a halving of commodity or service output requires a halving of inputs. There is no opportunity for input use relative to commodity or service production levels to change, as those levels expand or contract, so there are no opportunities for either economies or diseconomies of scale. This will not dramatically alter the overall results as long as the economic activity whose effects are being modeled isn't large relative to the rest of the sectors.

In other words, the models assume that for every dollar of output, the same dollar amounts are required for the various input categories. Returning to the hammer example, if a \$5 hammer requires \$3 of steel, then two hammers would require \$6 of steel. Although that works for steel and hammers, some inputs do not vary directly with output. For instance, if an oil refinery's efficiency and output increases, a corresponding increase in personnel operating the plant is unlikely. The return to scale assumption, which takes such differences into account, is necessary for modeling.

Input/output models assume no input supply or commodity/service production capability constraints. This simplifying assumption is related in part to the constant returns to scale assumption, for if there were supply constraints, there likely would be diseconomies of scale. As in the case of the constant returns to scale assumption, this "no supply constraints" assumption is not a major concern as long as the economic activity of interest isn't large relative to the rest of the sectors.

To illustrate, the no-supply-constraints assumption assumes that a hammer manufacturer would purchase all the steel for the same price. If not, doubling the number of hammers sold could mean that the dollar value of the steel might more than double if the manufacturer had to buy more steel at a higher price. This would violate the constant returns to scale assumption, which simplifies modeling.

Homogeneity is also a key simplifying assumption. Basically, firms within sectors and technologies within sectors are characterized as very similar. There is some ability to edit sector files to characterize specialized firms, but there is no ability to reflect full diversity of firms within sectors.

### **6.3 The IMPLAN Model and Its Application to Indian Point**

IMPLAN was originally developed by the U.S. Department of Agriculture's Forest Service in cooperation with the Federal Emergency Management Agency and the U.S. Department of the Interior's Bureau of Land Management to assist in land and resource management planning. IMPLAN, which has been used since 1979, is supported by the Minnesota IMPLAN Group Inc.

There are two components of the IMPLAN system: the software and the database. The software performs the necessary calculations, using study area data, to create the models. It also provides an interface for the user to change the region's economic description, create impact scenarios and introduce changes into the local model. The software is described in a user's guide provided by the Minnesota IMPLAN Group.

The software was designed to serve three functions: data retrieval, data reduction and model development, and impact analyses.

The IMPLAN database consists of two major parts: national-level technology matrices and estimates of regional data for institutional demand and transfers, value added, industry output and employment for each county in the United States, as well as state and national totals.

The model's data and account structure closely follow the accounting conventions used in the input/output studies of the U.S. economy by the Department of Commerce's Bureau of Economic Analysis. The comprehensive and detailed data coverage of the entire United States by county and the ability to incorporate user-supplied data at each stage of the model-building process provide a high degree of flexibility, both in terms of geographic coverage and model formulation.

In applying the IMPLAN model to Indian Point, three basic types of data were provided by Entergy: purchase order expenditures by Indian Point purchase order code, employee compensation expenditures and tax payment data.

Purchase order expenditures were provided for 2002 by Entergy. Employee compensation (salary data and an estimate of the value of benefits) was provided for the same period. Tax payment data were provided for 2002. For each of these data types, the location of the expenditure was identified.

The purchase order data were mapped to IMPLAN's 528 codes by comparing the descriptions of the purchase orders with the Standard Industrial Classification codes used in IMPLAN sector codes.

The purchase order and compensation data were then augmented by an estimate of revenues from Indian Point sales into the wholesale market over this period. This augmentation was necessary because purchase orders and compensation do not reflect all Indian Point expenditures, and total expenditures (approximated by total revenues) better reflect the full economic impacts of Indian Point. This estimate was obtained from reported data by Entergy.

In tailoring the model to Indian Point, the underlying data sets provided by IMPLAN were reviewed to see if any IMPLAN coefficient could be edited to better reflect local conditions. These coefficients are based on national relationships, and in some cases may not reflect local conditions. In this report, the coefficients within the electric services sector were edited to more accurately reflect a nuclear power plant rather than a "national average power plant of all types." This constituted the majority of the coefficient editing.

IMPLAN was then used to develop the economic and impact estimates contained in this report.



Good afternoon. My name is Andrea Sherman and I am a resident of the City of White Plains, Westchester County, New York. Since moving to the county in 2001, I have kept a watchful eye on news stories of the Indian Point nuclear power plant and am here today to lend my comments as a citizen to the discussion of its relicensing. To be brief, the issue at hand seems to be one of risks, benefits and alternatives. Undeniably, Indian Point brings benefit to the region. It provides a source of energy to fuel our consumption, which is a precious commodity, as we know. It also brings economic benefits—to its parent company, Entergy, to the employees who depend on it for their livelihood, and to the surrounding local towns who enjoy lower taxes and other economic benefits from having the plant in their midst. These benefits are all positive, and no one is disputing that. However, when one looks at the risk column, suddenly these economic benefits of the relative few begin to pale in comparison to the overwhelming risks to health and safety imposed on an entire region of millions by the close proximity of such a potentially toxic entity as the Indian Point nuclear power plant. Whether through unfortunate technical accident, all-too-common human error, terrifying attack, or the aftermath of the parent company's decision someday to divest itself of this asset, the devastation to both life and habitat in our region would be catastrophic and largely irreversible certainly for this generation and possibly for generations to come. Since the long term risks to health and safety outweigh the shorter term and mutable economic consideration, I urge—no, I plead—with Entergy and with our government officials to seek similar economic benefits by means of reasonable alternatives to the operation of a hazardous nuclear power plant in NY. Speaking as a citizen, my vote will follow those who recognize and act on this imperative. Thank you for allowing me to speak today.

NRC

CASE NO.  
OFF. EXH. NO. 1:30P  
ID'D/RECD  
DATE

2/12/09

# Center for Environment, Commerce & Energy

Written Statement of

**John McCormick**

Volunteer Consultant

Center for Environment, Commerce & Energy

For the

**Generic Environmental Impact Statement**

For

**License Renewal**

For the

**Indian Point Nuclear Power Plant**

Presented to the

**U.S. Nuclear Regulatory Commission**

**Office of Nuclear Reactor Regulation**

February 12, 2009

## **Center Statement on Indian Point License Renewal Application**

### **Introduction**

My name is John McCormick and I am a volunteer consultant for the Center for Environment, Commerce & Energy (Center). The Center, founded in 1985, is an organization dedicated to protecting the environment, enhancing human, animal and plant ecologies and promoting the efficient use of natural resources. The Center supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. My comments today address the General Environmental Impact Statement (GEIS) of the License Renewal Application (LRA) and other environmental issues of concern to the Center regarding this proposed action.

Because nuclear power is emission-free and has a demonstrated safety record, whereas fossil-fuel power contributes to numerous health issues, The Center seeks to promote the safe use of nuclear power. The Center specifically supports the Indian Point 2 and 3 nuclear power facilities because these facilities provide significant electrical capacity to the State of New York with minimal human, animal, air, water, and land impacts.

### **Fossil-Fuel Power Causes Serious Adverse Health Effects**

The Center is deeply concerned with any policy or measure that impacts the air quality of the communities where it is based, or that affects the health of American citizens. The license renewal of Indian Point is vitally needed because if units two and three are not producing emission free electricity then the air pollution will increase throughout the region. Closure of Indian Point would result in compliance issues for the State with respect to the federal Clean Air Act State

## Center Statement on Indian Point License Renewal Application

Implementation Plan ("SIP"). Additionally, Indian Point provides reliable energy without contributing pollutants that exacerbate asthma.

In 1999, coal-fired power plants in the United States emitted into the environment 1.3 million tons of sulfur dioxide ("SO<sub>2</sub>"), a criteria air pollutant that is correlated to asthma and impaired lung functions, 6.5 million tons of nitrogen oxides ("NO<sub>x</sub>") which, when combined with other pollutants and sunlight, forms ozone, another lung irritant linked to asthma, and 1.9 billion tons of carbon dioxide ("CO<sub>2</sub>"), yet another contributor to increased ozone levels and global climate change.<sup>1</sup> This equates to approximately 60% of all SO<sub>2</sub> emissions, 25% of all NO<sub>x</sub> emissions, and 32% of all CO<sub>2</sub> emissions nationwide.<sup>2</sup>

These and other airborne pollutants emitted by fossil-fuel power stations may have a direct and significant effect on human health. In a study by Abt Associates, one of the largest for-profit government and business research consulting firms in the world, it was found that over 30,000 deaths each year are attributable to air pollution from U.S. power plants.<sup>3</sup> Another study found that air pollution from power plants was a contributing factor to higher infant mortality rates and higher incidences of Sudden Infant Death Syndrome ("SIDS").<sup>4</sup> Research has further shown that pollutants from fossil-fuel power plants form tiny

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<sup>1</sup> See Rachel H. Cease, ADVERSE HEALTH IMPACTS OF GRANDFATHERED POWER PLANTS AND THE CLEAN AIR ACT: TIME TO TEACH OLD POWER PLANTS NEW TECHNOLOGY, 17 J. Nat. Resources & Env'tl. L. 157, 158 (2002-2003); Martha H. Keating, AIR INJUSTICE, at 4 (October 2002) (attached hereto as Exhibit B).

<sup>2</sup> 17 J. Nat. Resources & Env'tl. L. at 158.

<sup>3</sup> *Id.* at 159.

<sup>4</sup> See Martha H. Keating, AIR INJUSTICE, at 3 (October 2002).

## Center Statement on Indian Point License Renewal Application

particles (called fine particulate matter) that are linked to diseases of both the respiratory and cardiovascular systems.<sup>5</sup>

Not surprisingly, air pollution has been characterized as one of the largest threats to public health.<sup>6</sup> In New York City, it is estimated that there are 2,290 deaths, 1,580 hospitalizations, 546 asthma-related emergency room visits, 1,490 cases of chronic bronchitis, and 46,200 asthma attacks yearly attributable to power plant pollution.<sup>7</sup> The New York City area has also been ranked as one of the top five U.S. metropolitan areas for particulate air pollution.<sup>8</sup> And again, these adverse effects disproportionately affect minority communities. In one study, nonwhites in New York City were found to be hospitalized twice as many times as whites on days when ozone levels were high.<sup>9</sup> Another study found that, of the 23 counties in New York State that fail to meet Federal air pollution standards, 37.7% of them are populated by people of color.<sup>10</sup>

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<sup>5</sup> See *id.* at 4. See also *Air Quality in Queens County: Opportunities for Cleaning Up the Air in Queens County and Neighboring Regions*, at S-6, Synapse Energy Economics, Inc. (May 2003) (“Air Quality in Queens County”) (“Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die.”) (available at <http://www.synapse-energy.com/Downloads/Synapse-report-queens-air-quality-exec-summary-05-29-2003.pdf>); *Children at Risk: How Pollution from Power Plants Threatens the Health of America’s Children*, at 2, Clean Air Task Force (May 2002) (“Power plant emissions and their byproducts form particulate matter, ozone smog and air toxics. These pollutants are associated with respiratory hospitalizations, lost school days due to asthma attacks, low birth weight, stunted lung growth and tragically, even infant death.”) (available at <http://cta.policy.net/fact/children/>).

<sup>6</sup> Allison L. Russell, *URBAN POLLUTANTS: A REVIEW AND ANNOTATED BIBLIOGRAPHY*, at 3, New York City Environmental Justice Alliance 2000 (available at <http://www.nyceja.org/pdf/Urban.pdf>).

<sup>7</sup> See *Death, Disease & Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants*, at 24, Clean Air Task Force (October 2000) (“Death, Disease & Dirty Power”) (Exhibit C) (available at <http://cta.policy.net/fact/mortality/mortalitylowres.pdf>).

<sup>8</sup> See *New York’s Dirty Power Plants, Clear the Air – the National Campaign Against Dirty Power* (available at <http://cta.policy.net/relatives/17841.pdf>). The *Air Quality in Queens County Report* states that “New York City ... [is] burdened with significant air quality problems” and “[t]he US EPA has determined that the NY metropolitan area ... is in ‘severe nonattainment’ for ozone.” *Id.* at S-5.

<sup>9</sup> See Martha H. Keating, *AIR INJUSTICE*, at 4 (October 2002).

<sup>10</sup> See *Clear the Air: People of Color in Non-Attainment Counties* (available at [http://cta.policy.net/fact/injustice/injustice\\_non\\_attainment.pdf](http://cta.policy.net/fact/injustice/injustice_non_attainment.pdf)).

## **Center Statement on Indian Point License Renewal Application**

would increase by 105% (or 16,107 tons). Even if replacement electricity were spread out more broadly, to include all of the Hudson Valley and New York City plants, CO<sub>2</sub> plant emissions would still increase by 57% (to 13,686,648 tons), SO<sub>2</sub> plant emissions would increase by 62% (to 35,961 tons), and NO<sub>x</sub> emissions would increase by 57% (to 20,258 tons).

And as the level of air pollution increases, so do the incidences of death and respiratory and cardiovascular ailments. For instance, in the National Morbidity and Mortality Air Pollution Study ("NMMAPS"), a team of investigators from Johns Hopkins University and the Harvard School of Public Health found, among other things, strong evidence linking daily increases in particle pollution to increases in death in the largest U.S. cities.<sup>11</sup> Links have also been found between fine particle levels and increased hospital admissions for asthma, cardiovascular disease, pneumonia, and chronic obstructive pulmonary disease.<sup>12</sup> Stated bluntly in the Air Quality in Queens County Report, "Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die

### **The Benefits of Indian Point 2 and 3**

The Indian Point facilities, located in the affluent and predominantly white Westchester County, have a combined generating capacity of approximately 2000 megawatts (MW). The facilities provide approximately 20-30% of the electricity for New York City and its northern suburbs. And, unlike New York's fossil-fuel burning facilities, Indian Point 2 and 3 do not pollute the air.

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<sup>11</sup> Cited in *Death Disease & Dirty Power*, at 14.

<sup>12</sup> *Id.*

### **Attempts To Replace Indian Point Will Increase Air Pollution**

If generation at Indian Point 2 and 3 were to be significantly limited or were to cease altogether, the lost electricity would most likely be replaced by nearby facilities, including the above-referenced in-city facilities and the Lovett coal-burning facility. For instance, in a study by Synapse Energy Economics, Inc., dated November 3, 2003 and entitled, *The Impact of converting the Cooling systems at Indian Point Units 2 and 3 on Electrical System Reliability* (attached hereto as Exhibit D), Synapse finds that New York electricity generators, particularly in-city generators, have excess capacity which would supplant capacity losses at Indian Point if Indian Point were brought offline. Similarly, in an August 2002 study by the TRC Environmental Group entitled, *Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC Emissions Avoidance Study* (the "TRC Report"), TRC concluded that "it is reasonable to assume that the majority of lost output [(if Indian Point were brought offline)] would be made up by increased generation of units nearest to the New York City/Westchester load pocket."

### **Increasing Air Pollution Without Indian Point**

The TRC Report further found that, if Indian Point is brought offline, the air quality in New York would decrease dramatically. For instance, if the gap created by Indian Point's closure were to be filled by the power plants located in New York City, almost all of which are in predominantly minority communities, CO<sub>2</sub> plant emissions would increase by 101% (or 12,494,172 tons), SO<sub>2</sub> plant emissions would increase by 106% (or 8,020 tons), and NO<sub>x</sub> plant emissions

## **Center Statement on Indian Point License Renewal Application**

### **Draft SPDES Permit Hinders IP Non-Air-Polluting Electricity**

Several conditions of the DEC's Draft SPDES Permit for Indian Point 2 and 3 significantly limit Indian Point's ability to generate electricity for the State of New York. For example, Special Condition 28 of the Draft Permit requires the construction of cooling towers. NYSDEC issued a draft SPDES permit for IP1, IP2, and IP3 in 2003 that, among other conditions, requires the design and, if appropriate, the installation of closed-cycle-cooling systems for IP2 and IP3 if the site seeks and receives from NRC license renewals for IP2 and IP3.

The Center understands that, under conservative estimates, it would take approximately 10 months of Indian Point being offline for a closed-cycle cooling system to be installed. The Center further understands that the costs of installing cooling towers are sufficiently prohibitive so that Indian Point's owners may elect to shut down the plants rather than invest in the retrofit. Either way, the results will be devastating in terms of the pollution-related health effects when New York's non-clean burning plants scramble to replace the power lost by Indian Point 2 and 3. For this reason, the Center objects to any provision of the Draft SPDES Permit for Indian Point 2 and 3 that imposes any significant limit on the facilities' ability to generate clean-burning electricity.

### **Conclusion**

The Center supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. We support this renewal because the facility is a positive structure for mitigating ground level air pollution, global warming and environmental injustice.

DRC

CASE NO.  
OFF. EXH. NO. 1, 30P  
D/D/RECD

2/12/09

# **Center for Environment, Commerce & Energy**

Written Statement of

**John McCormick**

Volunteer Consultant

Center for Environment, Commerce & Energy

For the

**Generic Environmental Impact Statement**

For

**License Renewal**

For the

**Indian Point Nuclear Power Plant**

Presented to the

**U.S. Nuclear Regulatory Commission**

**Office of Nuclear Reactor Regulation**

February 12, 2009

**Introduction**

My name is John McCormick and I am a volunteer consultant for the Center for Environment, Commerce & Energy (Center). The Center, founded in 1985, is an organization dedicated to protecting the environment, enhancing human, animal and plant ecologies and promoting the efficient use of natural resources. The Center supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. My comments today address the General Environmental Impact Statement (GEIS) of the License Renewal Application (LRA) and other environmental issues of concern to the Center regarding this proposed action.

Because nuclear power is emission-free and has a demonstrated safety record, whereas fossil-fuel power contributes to numerous health issues, The Center seeks to promote the safe use of nuclear power. The Center specifically supports the Indian Point 2 and 3 nuclear power facilities because these facilities provide significant electrical capacity to the State of New York with minimal human, animal, air, water, and land impacts.

**Fossil-Fuel Power Causes Serious Adverse Health Effects**

The Center is deeply concerned with any policy or measure that impacts the air quality of the communities where it is based, or that affects the health of American citizens. The license renewal of Indian Point is vitally needed because if units two and three are not producing emission free electricity then the air pollution will increase throughout the region. Closure of Indian Point would result in compliance issues for the State with respect to the federal Clean Air Act State Implementation Plan ("SIP"). Additionally, Indian Point provides reliable energy without contributing pollutants that exacerbate asthma.

In 1999, coal-fired power plants in the United States emitted into the environment 1.3 million tons of sulfur dioxide ("SO<sub>2</sub>"), a criteria air pollutant that is

## Center Statement on Indian Point License Renewal Application

correlated to asthma and impaired lung functions, 6.5 million tons of nitrogen oxides (“NO<sub>x</sub>”) which, when combined with other pollutants and sunlight, forms ozone, another lung irritant linked to asthma, and 1.9 billion tons of carbon dioxide (“CO<sub>2</sub>”), yet another contributor to increased ozone levels and global climate change.<sup>1</sup> This equates to approximately 60% of all SO<sub>2</sub> emissions, 25% of all NO<sub>x</sub> emissions, and 32% of all CO<sub>2</sub> emissions nationwide.<sup>2</sup>

These and other airborne pollutants emitted by fossil-fuel power stations may have a direct and significant effect on human health. In a study by Abt Associates, one of the largest for-profit government and business research consulting firms in the world, it was found that over 30,000 deaths each year are attributable to air pollution from U.S. power plants.<sup>3</sup> Another study found that air pollution from power plants was a contributing factor to higher infant mortality rates and higher incidences of Sudden Infant Death Syndrome (“SIDS”).<sup>4</sup> Research has further shown that pollutants from fossil-fuel power plants form tiny particles (called fine particulate matter) that are linked to diseases of both the respiratory and cardiovascular systems.<sup>5</sup>

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<sup>1</sup> See Rachel H. Cease, ADVERSE HEALTH IMPACTS OF GRANDFATHERED POWER PLANTS AND THE CLEAN AIR ACT: TIME TO TEACH OLD POWER PLANTS NEW TECHNOLOGY, 17 J. Nat. Resources & Env'tl. L. 157, 158 (2002-2003); Martha H. Keating, AIR INJUSTICE, at 4 (October 2002) (attached hereto as Exhibit B).

<sup>2</sup> 17 J. Nat. Resources & Env'tl. L. at 158.

<sup>3</sup> *Id.* at 159.

<sup>4</sup> See Martha H. Keating, AIR INJUSTICE, at 3 (October 2002).

<sup>5</sup> See *id.* at 4. See also Air Quality in Queens County: Opportunities for Cleaning Up the Air in Queens County and Neighboring Regions, at S-6, Synapse Energy Economics, Inc. (May 2003) (“Air Quality in Queens County”) (“Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die.”) (available at <http://www.synapse-energy.com/Downloads/Synapse-report-queens-air-quality-exec-summary-05-29-2003.pdf>); Children at Risk: How Pollution from Power Plants Threatens the Health of America's Children, at 2, Clean Air Task Force (May 2002) (“Power plant emissions and their byproducts form particulate matter, ozone smog and air toxics. These pollutants are associated with respiratory hospitalizations, lost school days due to asthma attacks, low birth weight, stunted lung growth and tragically, even infant death.”) (available at <http://cta.policy.net/fact/children/>).

## **Center Statement on Indian Point License Renewal Application**

Not surprisingly, air pollution has been characterized as one of the largest threats to public health.<sup>6</sup> In New York City, it is estimated that there are 2,290 deaths, 1,580 hospitalizations, 546 asthma-related emergency room visits, 1,490 cases of chronic bronchitis, and 46,200 asthma attacks yearly attributable to power plant pollution.<sup>7</sup> The New York City area has also been ranked as one of the top five U.S. metropolitan areas for particulate air pollution.<sup>8</sup> And again, these adverse effects disproportionately affect minority communities. In one study, nonwhites in New York City were found to be hospitalized twice as many times as whites on days when ozone levels were high.<sup>9</sup> Another study found that, of the 23 counties in New York State that fail to meet Federal air pollution standards, 37.7% of them are populated by people of color.<sup>10</sup>

### **Lost Production From Indian Point Will Be Replaced By In-City and Other Nearby Facilities**

If generation at Indian Point 2 and 3 were to be significantly limited or were to cease altogether, the lost electricity would most likely be replaced by nearby facilities, including the above-referenced in-city facilities and the Lovett coal-burning facility. For instance, in a study by Synapse Energy Economics, Inc., dated November 3, 2003 and entitled, *The Impact of converting the Cooling*

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<sup>6</sup> Allison L. Russell, URBAN POLLUTANTS: A REVIEW AND ANNOTATED BIBLIOGRAPHY, at 3, New York City Environmental Justice Alliance 2000 (available at <http://www.nyceja.org/pdf/Urban.pdf>).

<sup>7</sup> See Death, Disease & Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants, at 24, Clean Air Task Force (October 2000) (“Death, Disease & Dirty Power”) (Exhibit C) (available at <http://cta.policy.net/fact/mortality/mortalitylowres.pdf>).

<sup>8</sup> See New York’s Dirty Power Plants, Clear the Air – the National Campaign Against Dirty Power (available at <http://cta.policy.net/relatives/17841.pdf>). The Air Quality in Queens County Report states that “New York City ... [is] burdened with significant air quality problems” and “[t]he US EPA has determined that the NY metropolitan area ... is in ‘severe nonattainment’ for ozone.” *Id.* at S-5.

<sup>9</sup> See Martha H. Keating, AIR INJUSTICE, at 4 (October 2002).

<sup>10</sup> See Clear the Air: People of Color in Non-Attainment Counties (available at [http://cta.policy.net/fact/injustice/injustice\\_non\\_attainment.pdf](http://cta.policy.net/fact/injustice/injustice_non_attainment.pdf)).

## **Center Statement on Indian Point License Renewal Application**

*systems at Indian Point Units 2 and 3 on Electrical System Reliability* (attached hereto as Exhibit D), Synapse finds that New York electricity generators, particularly in-city generators, have excess capacity which would supplant capacity losses at Indian Point if Indian Point were brought offline. Similarly, in an August 2002 study by the TRC Environmental Group entitled, *Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC Emissions Avoidance Study* (the "TRC Report"), TRC concluded that "it is reasonable to assume that the majority of lost output [(if Indian Point were brought offline)] would be made up by increased generation of units nearest to the New York City/Westchester load pocket."

### **Increasing Generation at Facilities Near Indian Point Will Increase Air Pollution in the Communities Where These Facilities Are Based**

The TRC Report further found that, if Indian Point is brought offline, the air quality in New York would decrease dramatically. For instance, if the gap created by Indian Point's closure were to be filled by the power plants located in New York City, almost all of which are in predominantly minority communities, CO<sub>2</sub> plant emissions would increase by 101% (or 12,494,172 tons), SO<sub>2</sub> plant emissions would increase by 106% (or 8,020 tons), and NO<sub>x</sub> plant emissions would increase by 105% (or 16,107 tons). Even if replacement electricity were spread out more broadly, to include all of the Hudson Valley and New York City plants, CO<sub>2</sub> plant emissions would still increase by 57% (to 13,686,648 tons), SO<sub>2</sub> plant emissions would increase by 62% (to 35,961 tons), and NO<sub>x</sub> emissions would increase by 57% (to 20,258 tons).

## **Center Statement on Indian Point License Renewal Application**

And as the level of air pollution increases, so do the incidences of death and respiratory and cardiovascular ailments. For instance, in the National Morbidity and Mortality Air Pollution Study (“NMMAPS”), a team of investigators from Johns Hopkins University and the Harvard School of Public Health found, among other things, strong evidence linking daily increases in particle pollution to increases in death in the largest U.S. cities.<sup>11</sup> Links have also been found between fine particle levels and increased hospital admissions for asthma, cardiovascular disease, pneumonia, and chronic obstructive pulmonary disease.<sup>12</sup> Stated bluntly in the Air Quality in Queens County Report, “Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die

### **The Benefits of Indian Point 2 and 3**

The Indian Point facilities, located in the affluent and predominantly white Westchester County, have a combined generating capacity of approximately 2000 megawatts (MW). The facilities provide approximately 20-30% of the electricity for New York City and its northern suburbs. And, unlike New York’s fossil-fuel burning facilities, Indian Point 2 and 3 do not pollute the air.

### **Draft SPDES Permit Hinders Indian Point’s Ability to Produce Non-Air-Polluting Electricity**

Several conditions of the DEC’s Draft SPDES Permit for Indian Point 2 and 3 significantly limit Indian Point’s ability to generate electricity for the State of New York. For example, Special Condition 28 of the Draft Permit requires the construction of cooling towers. NYSDEC issued a draft SPDES permit for IP1, IP2, and IP3 in 2003 that, among other conditions, requires the design and, if

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<sup>11</sup> Cited in Death Disease & Dirty Power, at 14.

<sup>12</sup> *Id.*

## **Center Statement on Indian Point License Renewal Application**

appropriate, the installation of closed-cycle cooling systems for IP2 and IP3 if the site seeks and receives from NRC license renewals for IP2 and IP3.

The Center understands that, under conservative estimates, it would take approximately 10 months of Indian Point being offline for a closed-cycle cooling system to be installed. AAEA further understands that the costs of installing cooling towers are sufficiently prohibitive so that Indian Point's owners may elect to shut down the plants rather than invest in the retrofit. Either way, the results will be devastating in terms of the pollution-related health effects when New York's non-clean burning plants scramble to replace the power lost by Indian Point 2 and 3. For this reason, the Center objects to any provision of the Draft SPDES Permit for Indian Point 2 and 3 that imposes any significant limit on the facilities' ability to generate clean-burning electricity, including Special Condition 28.

### **Conclusion**

The Center supports the 20-year License Renewal (ESP) for the Indian Point nuclear power plant located in Buchanan, New York. We support this renewal because the facility is a positive structure for mitigating ground level air pollution, global warming and environmental injustice.

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2/12/09

Public Comment of Ross Gould  
E-mail: rgouldesq@gmail.com  
February 12, 2009  
Afternoon Session

Good afternoon. My name is Ross Gould. - I live and work in Manhattan and I am an attorney that is working with Hudson River Sloop Clearwater in the parallel proceedings before the Atomic Safety and Licensing Board (ASLB) involving Entergy's license renewal application. Although I actively work with Clearwater I do not represent them in my comments here today.

The Draft Supplemental Environmental Impact Statement (DSEIS) is insufficient and a more thorough assessment is required. Under NEPA, the NRC Staff must take a "hard look" at the environmental impacts caused by renewing Indian Point's license, as well as determine the range of alternatives and impacts to be considered. Significantly, the impacts from the various alternatives must be presented in a form that allows for the comparison of alternatives as to their scientific bases and environmental consequences. The NRC Staff has not met its burden and the impacts are not presented in a form that allows for an adequate comparison nor were the assessments ~~made~~ <sup>review</sup> a thorough assessment of all <sup>current</sup> scientific data. In fact, the NRC Staff ~~either~~ <sup>only</sup> relies upon ~~either~~ <sup>either</sup> Entergy's Environmental Review or government statistics, not once does the NRC Staff look to an independent non-governmental scientist, scientific organization or energy expert for the data upon which it relies. No assessment that relies on such a limited amount of information can be said to be taking a "hard look" at the issue. The NRC Staff must address these issues in the Final Supplemental Environmental Impact Statement.

The DSEIS is inadequate in many areas, however the issues I will focus on the inadequate assessment of the impacts on environmental justice communities and

Public Comment of Ross Gould  
E-mail: rgouldesq@gmail.com  
February 12, 2009  
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inadequate assessment of conservation, and energy efficiency and the generation of electricity from renewable sources as replacements for Indian Point. Other areas will be raised in written comments either presented by myself or by one of the organizations that I work with.

The DSEIS is inadequate in its assessment of environmental justice and here are a few examples of the shortcomings. The DSEIS fails to consider the many immobile people with disabilities and other institutionalized individuals in special facilities in the region who would be adversely affected by the renewal of the Indian Point licenses. Clearwater has asserted this as a contention in the parallel license renewal proceedings before the ASLB. These hospitalized and imprisoned individuals will be significantly impacted by the renewal of Indian Point's license. At the very least, the Supplemental EIS must consider the impacts upon these disabled and institutionalized populations.

The DSEIS also does not discuss the significant environmental justice community in Peekskill, which is 2.5 miles from Indian Point nor does the DSEIS assess the impact that the license renewal will have on this community. Additionally, the DSEIS does not provide a complete life cycle analysis of nuclear power generation and does not assess the impact of both the mining of the uranium on Native Americans and the disposal of the radioactive waste on environmental justice communities. NEPA requires the NRC Staff to make these assessments in the DSEIS.

Also, in the DSEIS the NRC Staff relies on incomplete demographic analyses and/or inconsistent data in making their assessments. For example, the DSEIS discusses the population within 20 miles of Indian Point based on the 2000 census

Public Comment of Ross Gould  
E-mail: rgouldesq@gmail.com  
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data; however there is no mention of the minority composition within 20 miles of Indian Point. Another inconsistency found in the DSEIS is the use of projected population growth rates for the total population during the license renewal period while not including projected growth rates for environmental justice communities over that same time period. Without complete and consistent data the DSEIS does not meet the minimum requirements of NEPA.

The DSEIS also inadequately discusses the no action alternative and conservation, energy efficiency and safe renewable sources of energy as a replacement for Indian Point. The DSEIS ignores current science on the feasibility and potential for conservation, energy efficiency and safe renewable sources of energy as replacements for Indian Point. There is substantial evidence that with today's currently available technologies we can replace Indian Point's electricity. However, the DSEIS does not adequately evaluate these alternatives and fails to consider their proven ability to generate electricity throughout the world, in other parts of the U.S. and here in New York.

It is also important to note that the DSEIS provides an assessment of the impact on employment that may occur if the plant shuts down, however the DSEIS does not assess the jobs that would be created if Indian Point was replaced with renewable sources of energy such as wind and solar. Anyone who stays current on the discussions relating to the stimulus package has heard news reports relating to the jobs that are expected to be created with investments in clean green renewable energy. In addition, the DSEIS fails to assess the associated revenues created as a result of the growth of the renewable energy industry.

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A sustainable energy portfolio of energy efficiency and an array of renewables (solar, wind, geothermal, tidal) is the alternative to the nuclear power produced by this increasingly failing facility. Investment of infrastructure into more sustainable, fossil-fuel free sources of electrical generation by 2013 and for the 20 years thereafter will be substantial. These must be reliably estimated and evaluated in the Supplement Environmental Impact Statement.

I respectfully request that the NRC Staff perform a more thorough assessment of the environmental justice communities and the impact of the license renewal on those communities. In addition, I request a more thorough assessment of conservation, energy efficiency, and renewable energy as viable options to safely replace the electricity produced by Indian Point.

Thank you.

*NRC*  
CASE NO. 1:308  
OFF. EXH. NO.  
ID: D/REC  
2/12/09

Darwin M. Davis

Executive Board Member

Greater Harlem Chamber of Commerce

Comments on the U.S. Nuclear Regulatory Commission's Report  
for Indian Point License Renewal

Feb 12, 2009

Thank you for the opportunity to address you this afternoon. My name is Darwin M. Davis and I am proud to represent the Greater Harlem Chamber of Commerce and its President Lloyd Williams as one of the Chamber's Executive Board Members.

While the Indian Point Energy Center and Entergy may not directly be in my backyard, the effects of Indian Point have a dramatic impact on it. For that reason and a host of others, I am here in support of Entergy's request and application for Indian Point's relicensing.

First, you should know that Indian Point provides up to 30% of the power used in New York City – where I and nearly 2,000 of the Chamber's Members reside. This is electricity that directly powers our subways, our schools, our hospitals, our homes and our businesses.

Secondly, while the business climate of Harlem has certainly improved over the past decade, the fact of the matter is that businesses within our region – and the working families who operate them would be severely impacted by the loss of Indian Point's reliable, low-cost electricity. Higher utility rates and interrupted service will only move my community further into the economic tsunami engulfing much of the nation.

Thirdly, Indian Point's environmental benefits are crucial to my community's quality of life. Indian Point produces emissions-free electricity, and closure of Indian Point would only lead to more fossil-fuel burning plants in our region. This would increase sulfur dioxide and nitrogen oxides emissions, whose negative health effects are quite serious and would further impact the already inordinately high incidence of Asthma and lung related illnesses in my community.

Fourth, Entergy has proven itself to be a good corporate citizen. It seeks collaborations with non-profit organizations in the service area of its facilities like the relationships it has with the Chamber and had with the New York Urban League when I was its CEO.

Communities like Harlem need affordable, reliable and clean sources of energy which enhance our quality of life. Indian Point does just that.

I urge you to support Indian Point's license renewal.

Thank you.

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**TESTIMONY OF AL SAMUELS**

**PRESIDENT, ROCKLAND BUSINESS ASSOCIATION**

MY NAME IS AL SAMUELS. I AM PRESIDENT AND CEO OF THE ROCKLAND BUSINESS ASSOCIATION. THE RBA REPRESENTS OVER 1,000 MEMBER COMPANIES –RANGING FROM MAJOR CORPORATIONS TO SMALL BUSINESS OWNERS.

THIS REFLECTS A DIVERSE MEMBERSHIP BASE AND A WIDE SPECTRUM OF INDIVIDUALS FOR WHOM WE SPEAK WHEN EXPRESSING CONCERNS ABOUT CRITICAL ISSUES FACING THIS REGION SUCH AS REBUILDING AND EXPANDING INFRASTRUCTURE, AFFORDABLE HEALTHCARE, AND THE RELIABILITY AND AVAILABILITY OF ELECTRICITY – WHICH IS WHY I COME BEFORE YOU TODAY.

HISTORICALLY, ROCKLAND'S RESIDENTS HAVE RARELY VIEWED INDIAN POINT AS BEING BENEFICIAL TO THE COUNTY. WHILE THEY HAVE PARTICIPATED IN THE EMERGENCY PLANNING PROCESS AS PART OF ROCKLAND'S OFFICIAL RESPONSIBILITIES TO THE E-PLAN, WITHOUT EITHER APPARENT TAX OR POWER BENEFITS FROM THE SITE, SOME RESIDENTS AND ELECTED OFFICIALS TOOK THE VIEWPOINT THERE WAS NO VIABLE CONNECTION BETWEEN THE SITE AND THE COUNTY.

IF RECENT EVENTS HAVE TAUGHT US ANYTHING, IT'S THAT SEEMINGLY DISCONNECTED PIECES OF OUR ECONOMY – WHETHER HERE OR THOUSANDS-OF-MILES AWAY – ARE DELICATELY INTERCONNECTED, AND WHEN THOSE PIECES BREAK, WE ALL SUFFER THE CONSEQUENCES AND EQUALLY FEEL THEIR FINANCIAL IMPACT.

**THE TIME FOR ROCKLAND'S AGNOSTIC FEELINGS TOWARD THE FUTURE OF INDIAN POINT IS OVER.**

INDIAN POINT'S POWER NOW FLOWS THROUGH OUR LINES AND TO OUR BUSINESSES AND HOMES. INDIAN POINT EMPLOYEES LIVE IN ROCKLAND COUNTY. WHEN THEY SPEND THEIR HARD-EARNED MONEY, THOSE DOLLARS FLOW THROUGH ROCKLAND SHOPS, GAS STATIONS, AND RESTAURANTS. WHEN THOSE SAME EMPLOYEES PAY THEIR SCHOOL TAXES, THEIR MONEY FLOWS TO ROCKLAND CLASSROOMS AND GOES TOWARD PAYING OUR TEACHERS' SALARIES.

WHEN INDIAN POINT BUYS GOODS AND SERVICES, IT'S ROCKLAND COMPANIES FULFILLING THOSE NEEDS ALONGSIDE BUSINESS OWNERS FROM THROUGHOUT THE REGION. WHEN ROCKLAND COUNTY'S EMERGENCY SERVICES ARE PROVIDING ASSISTANCE TO LOCAL RESIDENTS, IT'S BECAUSE INVESTMENT DOLLARS FROM INDIAN POINT

WERE GIVEN TO THE COUNTY THAT WENT BEYOND JUST PLANNING AND TRAINING FOR THE SLIM POSSIBILITY OF A RADIOLOGICAL EMERGENCY.

SINCE PURCHASING INDIAN POINT, ENTERGY HAS PROVEN TO BE A WORTHY CORPORATE CITIZEN. ENTERGY HAS EXTENDED IT'S REACH BEYOND THE WALLS OF INDIAN POINT, AND HAS COME ACROSS THE HUDSON TO EXTEND A HAND OF FRIENDSHIP TO ROCKLAND. THE COMPANY HAS NOT SHIED AWAY FROM MEETING WITH ELECTED OFFICIALS, THE MEDIA, BUSINESS OWNERS OR RESIDENTS.

WHEN ROCKLAND OFFICIALS RECENTLY RAISED CONCERNS ABOUT THE COVERAGE AREA FOR THE NEW SIREN SYSTEM, ENTERGY LISTENED AND DID RIGHT BY THE COUNTY AND ITS RESIDENTS.

NOW, IN THE FACE OF MOUNTING BUDGET CUTS AND THE THREAT OF ECONOMIC COLLAPSE, WE NEED INDIAN POINT'S GREEN, LOW-COST ELECTRIC POWER MORE THAN EVER. THE LOWER HUDSON VALLEY RECEIVES 18 – 38% OF ITS ELECTRICITY FROM INDIAN POINT -- A LARGE AMOUNT OF POWER, AND BY ANY REASONABLE MEASURE, AN AMOUNT WE CANNOT EASILY AFFORD TO LOSE OR EASILY REPLACE.

BUSINESS OWNERS CANNOT RELY ON EMPTY OR FANCIFUL PROMISES OF "ALTERNATIVE SOURCES OF ENERGY." WE HAVE BUSINESSES TO RUN,

EMPLOYEES TO PAY, TAX PAYMENTS TO SUBMIT TODAY AND EVERY DAY. WE MUST HAVE RELIABLE AND AFFORDABLE ELECTRICITY THAT RUNS AROUND THE CLOCK IN PARALLEL TO THE DEMANDS OF OUR BUSINESSES. WE NEED THIS IN ORDER TO REMAIN COMPETITIVE.

THE ROCKLAND BUSINESS ASSOCIATION FULLY SUPPORTS BOTH THE COUNTY'S AND THE STATE'S ENERGY EFFICIENCY EFFORTS, AS WELL AS INVESTING IN THE DEVELOPMENT OF NEW SOURCES OF GREEN POWER, BUT LET'S PROVE WE CAN BOTH SAVE ENOUGH ELECTRICITY THROUGH NEW EFFICIENCY PROGRAMS AND BUILD ENOUGH ADDITIONAL TRANSMISSION AND POWER PRODUCING INFRASTRUCTURE BEFORE WE CASUALLY DISMISS 2,000 MEGAWATTS OF EFFICIENT, BASELOAD POWER RIGHT HERE IN THE HUDSON VALLEY.

ROCKLAND IS NO STRANGER TO SEEING ENERGY PROVIDERS CLOSE UP SHOP. PLANT CLOSURES, SUCH AS THE LOVETT PLANT IN STONY POINT, HAVE SIGNIFICANTLY IMPACTED THE BUDGETS OF OUR NORTH ROCKLAND COMMUNITIES AND SCHOOL DISTRICT. WE CANNOT ALLOW MORE COMMUNITIES TO SUFFER THE SAME EXPERIENCE.

ENERGY HAS CONSISTENTLY PROVEN ITSELF A RESPONSIBLE OPERATOR. THEY RUN THE INDIAN POINT ENERGY CENTER WELL BY

INVESTING THE FUNDS NECESSARY TO ENSURE THE PLANTS ARE SAFE AND SECURE.

FOR OPPONENTS TO MALIGN ENTERGY'S REPUTATION SIMPLY BECAUSE IT RUNS A FOR-PROFIT BUSINESS IS A BASELESS ARGUMENT, AND GOES AGAINST EVERY PRINCIPLE OF GOOD REASON AND JUDGEMENT. I APPLAUD ENTERGY FOR SURVIVING AND THRIVING IN THIS MISERABLE ECONOMIC CLIMATE. THEY ARE REAPING THE BENEFITS OF THEIR INVESTMENT, AND WE, AS CUSTOMERS, TAXPAYERS AND BUSINESSES ARE CONTINUALLY BENEFITTING FROM THEIR SUCCESS.

THAT IS WHY I AM HERE TODAY TO SUPPORT THE CONTINUED OPERATION OF THE INDIAN POINT ENERGY CENTER AND URGE THE NUCLEAR REGULATORY COMMISSION TO EXTEND THE SITE LICENSE FOR ANOTHER 20 YEARS. THANK YOU.

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CASE NO.  
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2/12/09

HUDSON RIVER SLOOP  
**CLEARWATER**, INC.



**Public Comment**

**Manna Jo Greene, Environmental Director, Hudson River Sloop Clearwater, Inc.**

**February 12, 2009**

**INDIAN POINT ENVIRONMENTAL IMPACT STUDY IGNORES HEALTH RISKS,  
ENVIRONMENTAL JUSTICE IMPACTS AND BENEFITS OF RENEWABLE ENERGY**

My name is Manna Jo Greene; I am the environmental director for Hudson River Sloop Clearwater, Inc.

**Potential Health Impacts:** The Draft Supplemental Environmental Impact Statement (DSEIS) issued by Nuclear Regulatory Commission (NRC) staff on the relicensing of Indian Point nuclear reactors Units 2 & 3 in Westchester County, NY, and concludes that Indian Point poses no significant public health risk. Data just released by the New York State Health Department, however, show that thyroid cancer rates in the four counties closest to Indian Point are nearly double the U.S. average, and that childhood cancer is also above the national rate. Rockland, Orange, and Putnam Counties, three of the four counties flanking Indian Point, had the 1st, 2nd, and 3rd highest thyroid cancer rates in 2001-2004 of all 62 New York State counties. The other county, Westchester, had the 8th highest rate. A total of 992 persons in the four counties were diagnosed with thyroid cancer in these four years.

In addition, a study by the Mother's Milk Project shows that of 30 milk samples from breastfeeding mothers and goats within 50 miles of Indian Point, nearly all reveal levels of strontium-90 with the highest results occurring closest to the nuclear plant located on the Hudson River in Buchanan, New York. Together with the NYS Health Department data, this suggests that emissions from Indian Point may be compromising the health of local residents.

**Environmental Justice Impacts:** The SDEIS also dismisses any disproportionate impacts on minority or low-income communities, including impacts on families of subsistence fishermen who catch fish and crabs that contain traces of strontium-90 and other isotopes, as insignificant. In a previous generic environment impact study (GEIS) done in 1996 for all nuclear power plants, the health and environmental impacts were considered to be "small." The SDEIS focuses on any additional impacts from planned releases and discharges at Indian Point during normal operations and the leaks of radioactive isotopes that were discovered in and are specific to Indian Point.

While the regulatory standards the NRC staff used to evaluate the radioactive isotopes leaking from the plant into the Hudson may allow them to label the potential impacts "small" and "of no significant impact to plant workers, the public and the environment," we are not convinced. We believe that this additional burden of radioactivity to people who may be catching and eating fish, sharing their catch with friends and families, without even realizing that the plant is leaking radioactivity is an example of environmental injustice.

Specifically, the DSEIS does not evaluate the impacts of relicensing on the Environmental Justice Communities in Peekskill, Haverstraw and West Haverstraw.

**Impacts on the proposed Rockland Desalination Plant:** The SDEIS also fails to consider the impacts on United Water of New York's proposed desalination plant directly across the river in Haverstraw, which, if approved, would provide 7.5 million gallons a day of drinking water to Rockland County.

**Sustainable Energy Alternatives:** Although the SDEIS does provide comparisons renewable energy resources to nuclear power generated Indian Point, it underestimates the ability of energy efficiency and renewables to serve as more sustainable alternatives to nuclear or fossil fuel. It ignores for example, Westchester County Executive Andy Spano's aggressive plan to reduce the county's carbon footprint by 20 percent within the next seven years and 80 percent by 2050. Stanford University's Mark Z. Jacobson recently conducted the first quantitative, scientific evaluation of major, energy-related solutions currently extant, assessing not only their energy potential but also their impacts on global warming, human health, energy security, water supply, space requirements, wildlife, water pollution, reliability and sustainability. Jacobson—who received no funding from any interest group, company or government agency—ranked nuclear and coal with capture and carbon sequestration tied for last place as the two worst sources of energy. Best was wind, followed by concentrated solar, geothermal, tidal, solar photovoltaics, wave and hydroelectric.

**Impact on Fish:** In addition we share concerns expressed by Riverkeeper and others about the massive fish kill from once through cooling that results from the more than 2 billion gallons of Hudson River water the plant uses its cooling system. This is of even greater significance in the context of decreasing fish populations, with 10 of 13 signature Hudson River fish in serious decline.

**Narrowing of Relicensing Process:** In addition to minimizing concern in the issues that are addressed in the SDEIS, most of the public health, safety and environmental issues, which the public would assume are being considered, are deemed to be "out of the scope" of the relicensing proceedings. For example, although the huge increase in the surrounding population in the past 40 years is noted, the corresponding impossibility of a viable evacuation plan is considered to be out of scope, as are the plant's vulnerability to terrorism in a post-911 world, and its past history of serious, repeated problems related to aging, such as a steam boiler rupture, transformer explosion and clogged cooling system intake valves.

Thank you for this opportunity to raise our concerns. Clearwater will submit more detailed and annotated comments by March 11.

Respectfully submitted,

*Manna Jo Greene*

Manna Jo Greene  
Environmental Director  
Hudson River Sloop Clearwater  
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*NRC*  
CASE NO.  
OFF. EXH. NO. 130P  
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HUDSON RIVER SLOOP  
**CLEARWATER**, INC

**INDIAN POINT ENVIRONMENTAL IMPACT STUDY  
IGNORES HEALTH RISKS, ENVIRONMENTAL JUSTICE  
IMPACTS AND BENEFITS OF RENEWABLE ENERGY**

For Immediate Release  
February 12, 2008

POUGHKEEPSIE, NY – Manna Jo Greene, environmental director at Hudson River Sloop Clearwater, joined Joseph Mangano of the Radiation and Public Health Project today at the U.S. Nuclear Regulatory Commission (NRC) hearing in Cortlandt Manor, NY, in presenting newly released data that shows that thyroid cancer rates in the four counties closest to Indian Point are nearly double the U.S. average, and that childhood cancer is also above the national rate.

The NRC recently issued a Draft Supplemental Environmental Impact Statement (DSEIS) on the relicensing of Indian Point nuclear reactors in Westchester County, NY, and concluded that Indian Point poses no significant public health risk. The statement is part of the federal review for the application to extend the licenses for Indian Point Units 2 and 3 for 20 years.

Data just released by the New York State Health Department, however, show that thyroid cancer rates in the four counties closest to Indian Point are nearly double the U.S. average, and that childhood cancer is also above the national rate. Rockland, Orange, and Putnam Counties, three of the four counties flanking Indian Point, had the 1st, 2nd, and 3rd highest thyroid cancer rates in 2001-2004 of all 62 New York State counties. The other county, Westchester, had the 8th highest rate.

A total of 992 persons in the four counties were diagnosed with thyroid cancer in these four years. In addition, a study by the Mother's Milk Project shows that of 30 milk samples from breastfeeding mothers and goats within 50 miles of Indian Point, nearly all reveal levels of strontium-90 with the highest results occurring closest to the nuclear plant located on the Hudson River in Buchanan, New York. Together with the NYS

Health Department data, this suggests that emissions from Indian Point may be compromising the health of local residents.

The SDEIS also dismisses any disproportionate impacts on minority or low income communities, including impacts on families of subsistence fishermen who catch fish and crabs that contain traces of strontium-90 and other isotopes, as insignificant. In a previous generic environment impact study (GEIS) done in 1996 for all nuclear power plants, the health and environmental impacts were considered to be "small." The newly released SDEIS focused on any additional impacts from planned releases and discharges at Indian Point during normal operations and the leaks of radioactive isotopes that were discovered in and are specific to Indian Point.

Clearwater's Environmental Director, Manna Jo Greene, notes, "While the regulatory standards the NRC staff used to evaluate the radioactive isotopes leaking from the plant into the Hudson may allow them to label the potential impacts 'small' and 'of no significant impact to plant workers, the public and the environment,' we are not convinced. This additional burden of radioactivity to people who may be catching and eating fish, sharing their catch with friends and families, without even realizing that the plant is leaking radioactivity is an example of environmental injustice."

Although the SDEIS does provide comparisons renewable energy resources to nuclear power generated Indian Point, it underestimates the ability of energy efficiency and renewables to serve as more sustainable alternatives to nuclear or fossil fuel. It ignores for example, Westchester County Executive Andy Spano's aggressive plan to reduce the county's carbon footprint by 20 percent within the next seven years and 80 percent by 2050. Stanford University's Mark Z. Jacobson recently conducted the first quantitative, scientific evaluation of major, energy-related solutions currently extant, assessing not only their energy potential but also their impacts on global warming, human health, energy security, water supply, space requirements, wildlife, water pollution, reliability and sustainability. Jacobson—who received no funding from any interest group, company or government agency—ranked nuclear and coal with capture and carbon sequestration tied for last place as the two worst sources of energy. Best was wind, followed by concentrated solar, geothermal, tidal, solar photovoltaics, wave and hydroelectric.

In addition to minimizing concern in issues addressed in the SDEIS, most of the public health safety and environmental issues, which the public would assume are being considered, are deemed to be "out of the scope" of the relicensing proceedings. For example, although the huge increase in the surrounding population in the past 40 years is noted, the corresponding impossibility of a viable evacuation plan is considered to be out of scope, as are the plant's vulnerability to terrorism in a post-911 world, and its past history of serious, repeated problems related to aging, such as a steam boiler rupture, transformer explosion and clogged cooling system intake valves.

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TESTIMONY OF JOSEPH J. MANGANO  
TO THE U.S. NUCLEAR REGULATORY COMMISSION  
ON THE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT  
REGARDING LICENSE RENEWAL  
FOR THE INDIAN POINT 2 AND 3 NUCLEAR REACTORS

Cortlandt Manor NY  
February 12, 2009

I'm Joseph Mangano, Executive Director of the Radiation and Public Health Project. Scientists and health professionals in our group have published 23 medical journal articles and 7 books on health risks from nuclear reactors.

The DSEIS assumes that since routine emissions from Indian Point are below federally permitted limits, there were no health risks in the past, and won't be in the next 20 years. There is no hard evidence, no statistical data, in the DSEIS to support this assumption.

Our group elects to conduct research, rather than blindly accept this assumption, near Indian Point and other nuclear plants. To date, we have made several findings:

1. Routine radioactive releases from Indian Point are among the highest of U.S. plants
2. Westchester and Rockland child cancer incidence is significantly above the U.S. rate.
3. The average level of radioactive Strontium-90 in baby teeth local children is among the highest in the U.S., and rose sharply after the late 1980s.

Each finding suggests Indian Point has harmed local residents. Today I present new data on local thyroid cancer rates. For the first time, national county-specific incidence rates are now published (42 states) by the U.S. Centers for Disease Control and Prevention.

Thyroid cancer can be a red flag for harmful effects of radiation exposure. Specifically, radioactive iodine, only produced in nuclear weapons and reactors, enters the body through breathing and the food chain, and attacks cells in the thyroid gland. A 1997 study by the National Cancer Institute concluded that Iodine-131 from atomic bomb fallout caused as many as 212,000 Americans to develop thyroid cancer.

The great majority of residents in four New York counties live within 20 miles of Indian Point. According to official CDC data from 2001-2004, three of these counties (Rockland, Orange, and Putnam) have the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> highest thyroid cancer rates in the state. The other county, Westchester, ranks 8<sup>th</sup> of 62 New York counties.

Local thyroid cancer rates are actually among the highest in the U.S. The four counties rank 5<sup>th</sup>, 15<sup>th</sup>, 26<sup>th</sup>, and 122<sup>nd</sup> out of 806 counties published by the CDC.

The local thyroid cancer rate was slightly below the state average in the late 1970s, when Indian Point 2 and 3 had just started. Something caused the low local rate, now 67% above the U.S., to rise. Indian Point emissions must be considered as one possible factor. The high thyroid cancer rate represents a public health problem that officials should address promptly. Moreover, the DSEIS is incomplete without addressing thyroid cancer and other components of a local health “report card”.

No decision on license extension should be made until all historical health risks of Indian Point are studied using statistical evidence, and the public is fully informed. The fact that the NRC does not require evidence-based proof of safety as a condition for license extension is poor policy, which may put many lives at risk.

Thank you for your time. I hope the NRC will take my comments seriously.

Joseph J. Mangano MPH MBA  
Executive Director, Radiation and Public Health Project

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# **JOINT COUNCIL No. 16**

## **INTERNATIONAL BROTHERHOOD OF TEAMSTERS**



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**Mr. Andrew Stuyvenberg**  
**Environmental Project Manager**  
**Division of License Renewal, Office of Nuclear Reactor Regulation**  
**U.S. Nuclear Regulatory Commission**  
**Mail Stop 0-11F1**  
**Washington, DC 2055-0001**

RE: February 12, 2009 Public Hearing on the Relicensing of the Indian Point Energy Center

The Teamsters Joint Council 16, along with its 120,000 working men and women in the Greater New York area, strongly supports the relicensing of the Indian Point Energy Center. Our members work at Indian Point and live in the surrounding neighborhoods with their families of Indian Point Teamsters Joint Council 16 believe that this plant is 100% safe.

Relicensing Indian Point Energy Center is the right move for New York's union workers. Outside of being the backbone of the downstate regions' clean and affordable electricity supply, Indian Point employs thousands of highly skilled workers including hundreds of unionized workers. In addition to the scientists, physicists, security and maintenance personnel employed at the plant, there are hundreds of thousands of workers throughout the region who rely on the Indian Point's continued operation for their financial survival. At a time when New Yorkers are struggling and experts predict the loss of 225,000 jobs in the state over the next two years, now is not the time to drive working men and women to the unemployment lines.

Indian Point remaining open and operational is also a necessary component to creating a prosperous green energy economy. Through our years of work, the Teamsters Joint Council 16 and other labor unions have shown unwavering dedication to building a socially, economically and environmentally just New York City. We have worked to accomplish this by building new power plants, the construction of which creates new jobs, drives the cost of energy down and pumps millions of tax dollars into local economies. As the government now looks for ways to stimulate our sagging economy, we should encourage considerable investments in new power plants and other clean energy technology.

New Yorkers are now faced with a harsh reality. Governor Patterson and state leaders have reached a deal that will cut \$1.6 billion in spending from critical priorities including health care, education, human services and economic development. In the New York City, where the collapse of the financial sector has caused a \$4 billion dollar shortfall, workers are faced with budget cuts totaling hundreds of millions, and reduced services and fare hikes on mass transit. In light of these Depression-like numbers, the Teamsters believe we should be protecting the jobs provided and created by Indian Point, not eliminating them.

Thank you for allowing me the opportunity to address this public forum on the concerns of union workers across New York City. The labor community believes that closing down a vital source of clean and affordable energy like Indian Point will jeopardize jobs and, drain millions from local governments. It is the hope of unionized men and women across the region that we work together to produce a solution that not only protects jobs and encourages investment, but also ensures a continued supply of clean, safe and affordable energy for all New Yorkers.



**George Miranda**

**President**

**The Teamsters Joint Council 16**

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2/<sup>2</sup>~~1~~/09

**African American Environmentalist Association  
New York**

Written Statement of

**Dan Durett**

Director

New York Office

African American Environmentalist Association

For the

**Nuclear Regulatory Commission Meeting To Discuss The Draft  
Supplemental Environmental Impact Statement**

For

**License Renewal**

For the

**Indian Point Nuclear Power Plant**

Presented to the

**U.S. Nuclear Regulatory Commission**

**Office of Nuclear Reactor Regulation**

February 12, 2009

## **AAEA Statement on Indian Point License Renewal Application**

### **Introduction**

My name is Dan Durett and I am the Director of the African American Environmentalist Association New York Office (AAEA-NY). AAEA, founded in 1985, is an organization dedicated to protecting the environment, enhancing human, animal and plant ecologies and promoting the efficient use of natural resources. AAEA includes an African American point of view in environmental policy decision-making and resolves environmental racism and injustice issues through the application of practical environmental solutions. The New York Office was established in 2003.

AAEA New York supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. AAEA expressed public support for nuclear power for the first time in 2001 after a two-year internal process of studying and debating the issue. AAEA was the first environmental organization to support nuclear power. I am a veteran environmentalist with 34 years experience working on environmental and energy issues. My comments today address the Generic Environmental Impact Statement for the License Renewal of Nuclear Plants, Supplement 38, Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3.

AAEA-NY has members in the New York area. Members of AAEA live and work – and breathe the air in a Clean Air Act Nonattainment Area. Of particular import to AAEA-NY is the promotion of clean air in African American communities. Because nuclear power is emission-free and has a demonstrated safety record, whereas fossil-fuel power contributes to numerous health issues, AAEA-NY seeks to promote the safe use of nuclear power. AAEA-NY specifically supports the Indian Point 2 and 3 nuclear power facilities because these facilities provide significant electrical capacity to the State of New York with minimal human, animal, air, water, and land impacts. My comments will address specific environmental justice, air pollution, and global warming issues.

## **AAEA Statement on Indian Point License Renewal Application**

AAEA-NY agrees with the preliminary recommendation of the NRC staff:

“...that the Commission determine that the adverse environmental impacts of license renewals for IP2 and IP3 are not so great that not preserving the option of license renewals for energy planning decision makers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS, (2) the ER submitted by Entergy, (3) consultation with other Federal, State, and local agencies, (4) the staff's own independent review, and (5) the staff's consideration of public comments received during the scoping process.”<sup>1</sup>

### **Environmental Justice**

Environmental justice is defined by AAEA-NY as the fair treatment of all people regardless of race or income with respect to environmental issues.

AAEA-NY is deeply concerned with any policy or measure that impacts the air quality of the communities where it is based, or that affects the health of its members. Although AAEA-NY is concerned about air quality in all areas, we are particularly concerned with promoting clean air in African American communities because, in many instances, those communities suffer a disproportionate amount of total pollution.

The license renewal of Indian Point is vitally needed because if units two and three are not producing emission free electricity then the air pollution will increase throughout the region. Closure of Indian Point would result in compliance issues for the State with respect to the federal Clean Air Act State Implementation Plan (“SIP”). Additionally, Indian Point provides reliable energy without contributing pollutants that exacerbate asthma.

The New York State Department of Environmental Conservation's (DEC) Environmental Justice policy states that it is the general policy of DEC to promote environmental justice and incorporate measures for achieving environmental justice into its programs, policies, regulations, legislative proposals and activities. This policy is specifically intended to ensure that DEC's environmental permit

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<sup>1</sup> U.S. NRC GEIS for License Renewal of Nuclear Plants, Supplement 38, Regarding IP2 & 3, Draft Report For Comment, Main Report, Executive Summary, p. xvii.

## AAEA Statement on Indian Point License Renewal Application

process promotes environmental justice. (Environmental Justice Policy, Policy Statement CP-29, March 19, 2003).

We would like additional information as to why environmental justice is not evaluated on a generic basis. The environmental justice assessment in GEIS is woefully inadequate and does not consider the great benefits of IP2 and IP3 to nearby environmental justice communities. AAEA submits information regarding these benefits but it has yet to be incorporated into site-specific assessments. We would appreciate an explanation as to why these environmental justice benefits are not included in the assessments.<sup>2</sup>

We agree with the NRC conclusion in the GEIS on the environmental justice impacts if IP 2 and IP 3 are relicensed for another twenty years, which states:

“Based on the analysis on environmental health and safety impacts presented in this draft SEIS for other resource areas (contained in Chapters 2 and 4 of this SEIS), there would be no disproportionately high and adverse impacts to minority and low income populations from continued operation of IP2 and IP3 during the license renewal period.”<sup>3</sup>

We totally disagree with the environmental justice conclusion that, “the overall environmental justice impacts of constructing and operating a closed-cycle cooling system at the IP2 and IP3 site are likely to be SMALL.”<sup>4</sup> The impacts would be devastating because we believe Entergy would shut the facility down before building cooling towers and that would lead to significantly more air pollution in minority communities that are already inundated with a disproportionate amount of pollution sites. We support the alternative proposal that would combine the existing once-through cooling system with modified intake retrofits that would be equivalent to a new closed-cycle cooling system.

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<sup>2</sup> In the GEIS, the staff assessed 92 environmental issues and determined that 69 qualified as Category 1 issues, 21 qualified as Category 2 issues, and 2 issues were not categorized. The two issues not categorized are environmental justice and chronic effects of electromagnetic fields. Environmental justice was not evaluated on a generic basis and must be addressed in a plant specific supplement to the GEIS., p 1-4.

<sup>3</sup> GEIS, 4.4.6 Environmental Justice, p 4/45-4-46.

<sup>4</sup> GEIS, Section 8.1.1.2 Environmental Impacts of the Closed-Cycle Cooling Alternative, Environmental Justice, p. 8-16.

## **AAEA Statement on Indian Point License Renewal Application**

Requiring a closed-cycle cooling system is essentially the No-Action Alternative (shut down).

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The New York State Department of Environmental Conservation's (DEC) Environmental Justice policy states that it is the general policy of DEC to promote environmental justice and incorporate measures for achieving environmental justice into its programs, policies, regulations, legislative proposals and activities. This policy is specifically intended to ensure that DEC's environmental permit process promotes environmental justice. (Environmental Justice Policy, Policy Statement CP-29, March 19, 2003).

### **New York's Minorities Pay the Price for Fossil-Fuel Air Pollution**

New York is no exception to this national crisis. In New York City, it is estimated that there are 2,290 deaths, 1,580 hospitalizations, 546 asthma-related emergency room visits, 1,490 cases of chronic bronchitis, and 46,200 asthma attacks yearly attributable to power plant pollution.<sup>5</sup> The New York City area has also been ranked as one of the top five U.S. metropolitan areas for particulate air pollution.<sup>6</sup> And again, these adverse effects disproportionately affect minority communities. In one study, nonwhites in New York City were found to be hospitalized twice as many times as whites on days when ozone levels were

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<sup>5</sup> Death, Disease & Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants, at 24, Clean Air Task Force (October 2000) ("Death, Disease & Dirty Power") (Exhibit C) (<http://cta.policy.net/fact/mortality/mortalitylowres.pdf>).

<sup>6</sup> New York's Dirty Power Plants, Clear the Air – the National Campaign Against Dirty Power (available at <http://cta.policy.net/relatives/17841.pdf>). The Air Quality in Queens County Report states that "New York City ... [is] burdened with significant air quality problems" and "[t]he US EPA has determined that the NY metropolitan area ... is in 'severe nonattainment' for ozone."

## **AAEA Statement on Indian Point License Renewal Application**

high.<sup>7</sup> Another study found that, of the 23 counties in New York State that fail to meet Federal air pollution standards, 37.7% of them are populated by people of color.<sup>8</sup>

That African Americans and other minorities are disproportionately affected by air pollution in New York is not surprising when considering the fact that the majority of air-polluting power plants in the New York metropolitan area are located in African American and other minority communities. Based on figures from the 2000 U.S. Census, only 12.3% of New York State is identified as being African American, and only 29.4% of the total population is classified as a minority. However, in communities that are predominantly minority, such as Queens, the Bronx, and Brooklyn, there are a disproportionate number of fossil-fuel power plants emitting criteria air pollutants. For example, there are approximately 1,563,400 people of color, 217,247 children living in poverty, and 40,248 children who suffer from pediatric asthma within 30 miles of the Lovett facility, a coal-fired power plant bordering the New York City metropolitan area.<sup>9</sup> In the Bronx, which is 35.6% African American and 88% minority, there are two power plants, Harlem River Yards and Hell's Gate. In Brooklyn, which is 36.4% African American and 64.2% minority, there are seven power plants, the 23<sup>rd</sup> and 3<sup>rd</sup> Plant, Brooklyn Navy Yard, Gowanus, Hudson Ave., Narrows, the North First St. Plant, and Warbasse Cogen. In Queens, which is 20% African American and

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<sup>7</sup>Martha H. Keating, AIR INJUSTICE, at 4 (October 2002).

<sup>8</sup>Clear the Air: People of Color in Non-Attainment Counties ([http://cta.policy.net/fact/injustice/injustice\\_non\\_attainment.pdf](http://cta.policy.net/fact/injustice/injustice_non_attainment.pdf)).

<sup>9</sup>See Clear the Air: People of Color Living Within 30 Miles of a Specific Coal-Fired Power Plant (available at <http://cta.policy.net/relatives/20121.pdf>); Clear the Air, Power Plant Pollution Threatens the Health of New York's Children (June 11, 2002) (available at <http://cta.policy.net/relatives/20121.pdf>).

## **AAEA Statement on Indian Point License Renewal Application**

63.2% minority, there are six power plants, Astoria, Poletti, Far Rockaway, JFK Cogeneration, Ravenswood, and the Vernon Blvd. Plant. Queens is also ranked among the worst 10% of U.S. Counties in terms of its exposure to criteria air pollutants, and is one of two city boroughs that violate federal standards.<sup>10</sup> In the Air Quality in Queens County Report, it is stated that:

The concentration of generating capacity in Northwest Queens is exceptionally high for such a densely populated area. In addition, this community includes a high percentage of low-income people and persons of color. These demographics suggest that "environmental justice" concepts and policies should be taken into account when considering options for addressing air quality in Queens and in considering the siting of further sources of air pollution. The steam generating units in Queens are responsible for a large percent of the NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub> emitted in Queens.

In total, there are 24 power plants in the New York metropolitan area, only a handful of which are in areas where minorities do not comprise the majority of the population. One of these is the Indian Point power generating facility.<sup>11</sup>

### **Lost Production From IP Will Be Replaced By In-City and Other Nearby Facilities**

If generation at Indian Point 2 and 3 were to be significantly limited or were to cease altogether, the lost electricity would most likely be replaced by nearby facilities, including the above-referenced in-city facilities and the Lovett coal-burning facility. For instance, in a study by Synapse Energy Economics, Inc., dated November 3, 2003 and entitled, *The Impact of converting the Cooling systems at Indian Point Units 2 and 3 on Electrical System Reliability* (attached hereto as Exhibit D), Synapse finds that New York electricity generators,

<sup>10</sup> Air Quality in Queens County, at S-5.

<sup>11</sup> All population data compiled from the 2000 U.S. Census.

## **AAEA Statement on Indian Point License Renewal Application**

particularly in-city generators, have excess capacity which would supplant capacity losses at Indian Point if Indian Point were brought offline. Similarly, in an August 2002 study by the TRC Environmental Group entitled, *Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC Emissions Avoidance Study* (the "TRC Report"), TRC concluded that "it is reasonable to assume that the majority of lost output [(if Indian Point were brought offline)] would be made up by increased generation of units nearest to the New York City/Westchester load pocket."

### **Increasing Generation at Facilities Near Indian Point Will Increase Air Pollution in the Communities Where These Facilities Are Based**

The TRC Report further found that, if Indian Point is brought offline, the air quality in New York would decrease dramatically. For instance, if the gap created by Indian Point's closure were to be filled by the power plants located in New York City, almost all of which are in predominantly minority communities, CO<sub>2</sub> plant emissions would increase by 101% (or 12,494,172 tons), SO<sub>2</sub> plant emissions would increase by 106% (or 8,020 tons), and NO<sub>x</sub> plant emissions would increase by 105% (or 16,107 tons). Even if replacement electricity were spread out more broadly, to include all of the Hudson Valley and New York City plants, CO<sub>2</sub> plant emissions would still increase by 57% (to 13,686,648 tons), SO<sub>2</sub> plant emissions would increase by 62% (to 35,961 tons), and NO<sub>x</sub> emissions would increase by 57% (to 20,258 tons).

And as the level of air pollution increases, so do the incidences of death and respiratory and cardiovascular ailments. For instance, in the National Morbidity and Mortality Air Pollution Study ("NMMAPS"), a team of investigators

## **AAEA Statement on Indian Point License Renewal Application**

from Johns Hopkins University and the Harvard School of Public Health found, among other things, strong evidence linking daily increases in particle pollution to increases in death in the largest U.S. cities.<sup>12</sup> Links have also been found between fine particle levels and increased hospital admissions for asthma, cardiovascular disease, pneumonia, and chronic obstructive pulmonary disease.<sup>13</sup> Stated bluntly in the Air Quality in Queens County Report, "Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die

Based on the above data and studies, it is clear that if Indian Point 2 and 3 were to be brought offline, forced to close, or if their production were limited, the void in electricity production would be filled by power plants located in minority communities, with a corresponding increase in the rates of asthma and other respiratory diseases, cardiovascular diseases, and even infant mortality in these communities.

### **The Benefits of Indian Point 2 and 3**

The Indian Point facilities, located in the affluent and predominantly white Westchester County, have a combined generating capacity of approximately 2000 megawatts (MW). The facilities provide approximately 20-30% of the electricity for New York City and its northern suburbs. And, unlike New York's fossil-fuel burning facilities, Indian Point 2 and 3 do not pollute the air.

AAEA has a strong environmental interest in this proceeding because AAEA is an environmental action group, with a chapter in Manhattan, New York,

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<sup>12</sup> Cited in Death Disease & Dirty Power.

<sup>13</sup> Cited in Death Disease & Dirty Powers

## **AAEA Statement on Indian Point License Renewal Application**

with a stated goal of promoting clean air in low-income and minority communities by, among other things, supporting the safe use of nuclear energy. AAEA also has members in the New York area whose air quality may be impacted by the DEC's Permit for Indian Point 2 and 3. Further, AAEA has publicly supported Indian Point 2 and 3, due to its positive impact on New York's air quality, for several years. For instance, in May 2002, AAEA President Norris McDonald presented testimony before the Committee on Environmental Protection in opposition to Chairman James F. Gennaro's Resolution 64, which called for the immediate shutdown of Indian Point. AAEA also presented testimony on February 28, 2003, before the New York City Council's Committee on Environmental Protection, again opposing efforts to shut down Indian Point. And most recently, AAEA participated in the DEC's legislative hearing relating to Indian Point's Draft SPDES Permit.

### **Conclusion**

AAEA New York supports the 20-year License Renewal (ESP) for the Indian Point nuclear power plant located in Buchanan, New York. We support this renewal because the facility is a positive structure for mitigating ground level air pollution, global warming and environmental injustice.

NRC

CASE NO.  
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2/12/09

Melvin Burr<sup>u</sup>ess, *President*  
African American Men of Westchester

The environmental, economic and health impacts of closing Indian Point would truly hurt Westchester County.

- Indian Point currently helps New York progress on improving the quality of the air we breathe daily. Any replacement options would surely increase the pollutants and toxins that this congested region already faces throughout the year.
- Indian Point also helps the region maintain independence from the radically fluctuating oil and gas prices. New York State, in efforts to maintain a clean environment has relied very heavily on natural gas for electricity production. This reliance is beneficial in that it produces fewer pollutants than coal, but significantly raises our costs. Nuclear power affords us much more stability.
- The economic impacts of closing Indian Point are very real. At this time there is no feasible alternative to the 2,000 megawatts of power produced continually by the plant. The shutdown of the facility would result in real prices to pay in terms of job losses and increased costs to Westchester residents.
- Besides the large job losses and increased electricity costs, Indian Point is its own economic engine. The taxes paid by Entergy surely are a great benefit to the county as well as the charitable contributions and contributions to emergency response services.
- Many Westchester County residents are already struggling to keep their houses and pay their electricity bills, the closure of Indian Point would have an immediate negative impact on these people. While the environmental impacts of the plant are important and deserve careful review, the socio-economic impacts of the plants closure need to also be considered. If we shut down the plant to save a few fish but as a consequence decrease the region's electricity reliability, double our electric bills, and increase airborne pollutants, who are we really benefitting?

WRC

CASE NO.  
OFF. EXH. NO.  
ID'D/REC'D

7PM

2/12/09

# **Center for Environment, Commerce & Energy**

Written Statement of

**Norris McDonald**

President

Center for Environment, Commerce & Energy

For the

**Generic Environmental Impact Statement**

For

**License Renewal**

For the

**Indian Point Nuclear Power Plant**

Presented to the

**U.S. Nuclear Regulatory Commission**

**Office of Nuclear Reactor Regulation**

February 12, 2009

## **Introduction**

My name is Norris McDonald and I am the President of the Center for Environment, Commerce & Energy (Center). The Center, founded in 1985, is an organization dedicated to protecting the environment, enhancing human, animal and plant ecologies and promoting the efficient use of natural resources. The Center supports the 20-year License Renewal for the Indian Point nuclear power plant located in Buchanan, New York. My comments today address the General Environmental Impact Statement (GEIS) of the License Renewal Application (LRA) and other environmental issues of concern to the Center regarding this proposed action.

The Center agrees with the preliminary recommendation of the NRC staff:

“...that the Commission determine that the adverse environmental impacts of license renewals for IP2 and IP3 are not so great that not preserving the option of license renewals for energy planning decision makers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS, (2) the ER submitted by Entergy, (3) consultation with other Federal, State, and local agencies, (4) the staff’s own independent review, and (5) the staff’s consideration of public comments received during the scoping process.”<sup>1</sup>

## **Federal and State Water Permit Issues**

Constituents of the Center live and work – and breathe the air in a Clean Air Act Nonattainment Area. Of particular import is the promotion of clean air in New York metropolitan area communities. Because nuclear power is emission-

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<sup>1</sup> U.S. NRC GEIS for License Renewal of Nuclear Plants, Supplement 38, Regarding IP2 & 3, Draft Report For Comment, Main Report, Executive Summary, p. xvii.

## **Center Statement on Indian Point License Renewal Application**

free and has a demonstrated safety record, whereas fossil-fuel power contributes to numerous health issues, the Center seeks to promote the safe use of nuclear power. The Center specifically supports the Indian Point 2 and 3 nuclear power facilities because these facilities provide significant electrical capacity to the State of New York with minimal human, animal, air, water, and land impacts.

The license renewal of Indian Point is needed because if units two and three are not producing emission free electricity then the air pollution will increase throughout the region. Closure of Indian Point would result in compliance issues for the State with respect to the federal Clean Air Act State Implementation Plan ("SIP"). Additionally, Indian Point provides reliable energy without contributing pollutants that exacerbate asthma.

In order to reduce the levels of impingement and entrainment of Hudson River fish, the Department of Environmental Conservation's ("DEC") Draft SPDES Permit could substantially limit the ability of Indian Point 2 and 3 to generate electricity, and may even lead to the closure of the facilities. Any substantial reduction in the amount of electricity generated by Indian Point 2 and 3 will spark demand for replacement electricity from nearby power plants. As production at these fossil-fuel plants increases, the air quality in and around these plants will further deteriorate, causing a spike in the incidences of respiratory and cardiovascular diseases in the communities where these plants are based.

EPA suspended the Cooling Water Intake Structure Regulations for existing large power plants on July 2, 2007. This suspension is in response to the

## Center Statement on Indian Point License Renewal Application

2nd Circuit Court of Appeals decision in *Riverkeeper, Inc., v. EPA*. In the meantime, all permits for Phase II facilities should include conditions under section 316(b) of the Clean Water Act developed on a Best Professional Judgment basis. See 40 C.F.R. § 401.14.<sup>2</sup> This issue is of vital importance because an unacceptable permit could cause Entergy to close the facility, which would exacerbate air quality issues in the region. We are submitting this information in the hope that NRC will utilize it for the Final EIS (FEIS) and will also see the important environmental implications of this facility.

### Climate Change – Aquatic Resources

The Center is deeply concerned about the potential effects of climate change described in the GEIS, which warns about sea level rise, salinity changes and wind and water circulation changes. The GEIS says that these changes result in the reduction or redistribution of submerged aquatic vegetation, affect spawning patterns or success, change the nature of sediment and nutrient inputs and generally influence the estuarine food web on many levels. The GEIS concludes that: The extent and magnitude of climate change impacts to the aquatic resources of the lower Hudson River are an important component of the cumulative assessment analyses and could be substantial.<sup>3</sup> IP2 and IP3 do not contribute to global warming and actually serve to mitigate global warming, and thus, the problems described above.

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<sup>2</sup><http://www.epa.gov/waterscience/316b>, Federal Register Notice (July 09, 2007) Implementation Memo (PDF) (1 page, 72K, [About PDF](#); March 20, 2007)

<sup>3</sup> GEIS, Draft NUREG-1437, Supplement 38, 4.8.1: Cumulative Impacts on Aquatic Resources, Climate Change, p. 4.58.

### Fossil-Fuel Power Causes Serious Adverse Health Effects

In 1999, coal-fired power plants in the United States emitted into the environment 11.3 million tons of sulfur dioxide ("SO<sub>2</sub>"), a criteria air pollutant that is correlated to asthma and impaired lung functions, 6.5 million tons of nitrogen oxides ("NO<sub>x</sub>") which, when combined with other pollutants and sunlight, forms ozone, another lung irritant linked to asthma, and 1.9 billion tons of carbon dioxide ("CO<sub>2</sub>"), yet another contributor to increased ozone levels and global climate change.<sup>4</sup> This equates to approximately 60% of all SO<sub>2</sub> emissions, 25% of all NO<sub>x</sub> emissions, and 32% of all CO<sub>2</sub> emissions nationwide.<sup>5</sup>

These and other airborne pollutants emitted by fossil-fuel power stations may have a direct and significant effect on human health. In a study by Abt Associates, one of the largest for-profit government and business research consulting firms in the world, it was found that over 30,000 deaths each year are attributable to air pollution from U.S. power plants.<sup>6</sup> Another study found that air pollution from power plants was a contributing factor to higher infant mortality rates and higher incidences of Sudden Infant Death Syndrome ("SIDS").<sup>7</sup> Research has further shown that pollutants from fossil-fuel power plants form tiny particles (called fine particulate matter) that are linked to diseases of both the respiratory and cardiovascular systems.<sup>8</sup>

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<sup>4</sup> See Rachel H. Cease, ADVERSE HEALTH IMPACTS OF GRANDFATHERED POWER PLANTS AND THE CLEAN AIR ACT: TIME TO TEACH OLD POWER PLANTS NEW TECHNOLOGY, 17 J. Nat. Resources & Envtl. L. 157, 158 (2002-2003); Martha H. Keating, AIR INJUSTICE, at 4 (October 2002) (attached hereto as Exhibit B).

<sup>5</sup> 17 J. Nat. Resources & Envtl. L. at 158.

<sup>6</sup> *Id.* at 159.

<sup>7</sup> See Martha H. Keating, AIR INJUSTICE, at 3 (October 2002).

<sup>8</sup> See *id.* at 4. See also Air Quality in Queens County: Opportunities for Cleaning Up the Air in Queens County and Neighboring Regions, at S-6, Synapse Energy Economics, Inc. (May 2003) ("Air Quality in Queens County") ("Epidemiological studies tell us that on days when air pollution levels are high, more

## Center Statement on Indian Point License Renewal Application

Not surprisingly, air pollution has been characterized as one of the largest threats to public health.<sup>9</sup>

### New Yorkers Pay the Price for Fossil-Fuel Air Pollution

In New York City, it is estimated that there are 2,290 deaths, 1,580 hospitalizations, 546 asthma-related emergency room visits, 1,490 cases of chronic bronchitis, and 46,200 asthma attacks yearly attributable to power plant pollution.<sup>10</sup> The New York City area has also been ranked as one of the top five U.S. metropolitan areas for particulate air pollution.<sup>11</sup> Another study found that, of the 23 counties in New York State that fail to meet Federal air pollution standards.<sup>12</sup>

### Lost Production From Indian Point Will Be Replaced By In-City and Other Nearby Facilities

If generation at Indian Point 2 and 3 were to be significantly limited or were to cease altogether, the lost electricity could not be completely replaced with existing resources. However, any attempts to do so would most likely be replaced by nearby facilities.

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people get sick or die.”) (available at <http://www.synapse-energy.com/Downloads/Synapse-report-queens-air-quality-exec-summary-05-29-2003.pdf>); Children at Risk: How Pollution from Power Plants Threatens the Health of America’s Children, at 2, Clean Air Task Force (May 2002) (“Power plant emissions and their byproducts form particulate matter, ozone smog and air toxics. These pollutants are associated with respiratory hospitalizations, lost school days due to asthma attacks, low birth weight, stunted lung growth and tragically, even infant death.”) (available at <http://cta.policy.net/fact/children/>).

<sup>9</sup> Allison L. Russell, URBAN POLLUTANTS: A REVIEW AND ANNOTATED BIBLIOGRAPHY, at 3, New York City Environmental Justice Alliance 2000 (available at <http://www.nyceja.org/pdf/Urban.pdf>).

<sup>10</sup> See Death, Disease & Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants, at 24, Clean Air Task Force (October 2000) (“Death, Disease & Dirty Power”) (Exhibit C) (available at <http://cta.policy.net/fact/mortality/mortalitylowres.pdf>).

<sup>11</sup> See New York’s Dirty Power Plants, Clear the Air – the National Campaign Against Dirty Power (available at <http://cta.policy.net/relatives/17841.pdf>). The Air Quality in Queens County Report states that “New York City ... [is] burdened with significant air quality problems” and “[t]he US EPA has determined that the NY metropolitan area ... is in ‘severe nonattainment’ for ozone.” *Id.* at S-5.

<sup>12</sup> See Clear the Air: People of Color in Non-Attainment Counties (available at [http://cta.policy.net/fact/injustice/injustice\\_non\\_attainment.pdf](http://cta.policy.net/fact/injustice/injustice_non_attainment.pdf)).

## Center Statement on Indian Point License Renewal Application

### Increasing Generation at Facilities Near Indian Point Will Increase Air Pollution in the Communities Where These Facilities Are Based

The TRC Report further found that, if Indian Point were brought offline, the air quality in New York would decrease dramatically. For instance, if the gap created by Indian Point's closure were to be filled by the power plants located in New York City, CO<sub>2</sub> plant emissions would increase by 101% (or 12,494,172 tons), SO<sub>2</sub> plant emissions would increase by 106% (or 8,020 tons), and NO<sub>x</sub> plant emissions would increase by 105% (or 16,107 tons). Even if replacement electricity were spread out more broadly, to include all of the Hudson Valley and New York City plants, CO<sub>2</sub> plant emissions would still increase by 57% (to 13,686,648 tons), SO<sub>2</sub> plant emissions would increase by 62% (to 35,961 tons), and NO<sub>x</sub> emissions would increase by 57% (to 20,258 tons).

And as the level of air pollution increases, so do the incidences of death and respiratory and cardiovascular ailments. For instance, in the National Morbidity and Mortality Air Pollution Study ("NMMAPS"), a team of investigators from Johns Hopkins University and the Harvard School of Public Health found, among other things, strong evidence linking daily increases in particle pollution to increases in death in the largest U.S. cities.<sup>13</sup> Links have also been found between fine particle levels and increased hospital admissions for asthma, cardiovascular disease, pneumonia, and chronic obstructive pulmonary disease.<sup>14</sup> The Air Quality in Queens County Report states that, "Epidemiological studies tell us that on days when air pollution levels are high, more people get sick or die.

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<sup>13</sup> Cited in *Death Disease & Dirty Power*, at 14.

<sup>14</sup> *Id.*

## **Center Statement on Indian Point License Renewal Application**

Based on the above data and studies, it is clear that if Indian Point 2 and 3 were to be brought offline, forced to close, or if their production were limited, the void in electricity production would be filled by power plants located in minority communities, with a corresponding increase in the rates of asthma and other respiratory diseases, cardiovascular diseases, and even infant mortality in these communities.

### **The Benefits of Indian Point 2 and 3**

The Indian Point facilities, located in the affluent and predominantly white Westchester County, have a combined generating capacity of approximately 2000 megawatts (MW). The facilities provide approximately 20-30% of the electricity for New York City and its northern suburbs. And, unlike New York's fossil-fuel burning facilities, Indian Point 2 and 3 do not pollute the air.

### **Draft SPDES Permit Hinders Indian Point's Ability to Produce Non-Air-Polluting Electricity**

Several conditions of the DEC's Draft SPDES Permit for Indian Point 2 and 3 significantly limit Indian Point's ability to generate electricity for the State of New York. For example, Special Condition 28 of the Draft Permit requires the construction of cooling towers. NYSDEC issued a draft SPDES permit for IP1, IP2, and IP3 in 2003 that, among other conditions, requires the design and, if appropriate, the installation of closed-cycle cooling systems for IP2 and IP3 if the site seeks and receives from NRC license renewals for IP2 and IP3.

The Center understands that, under conservative estimates, it would take approximately 10 months of Indian Point being offline for a closed-cycle cooling system to be installed. The Center further understands that the costs of installing

## **Center Statement on Indian Point License Renewal Application**

cooling towers are sufficiently prohibitive so that Indian Point's owners may elect to shut down the plants rather than invest in the retrofit. Either way, the results will be devastating in terms of the pollution-related health effects when New York's non-clean burning plants scramble to replace the power lost by Indian Point 2 and 3. And since most of these plants are in African American and minority communities, the bulk of the adverse health effects – including asthma and other respiratory diseases, cardiovascular disorders, and even infant mortality – will be borne by these communities. For this reason, the Center objects to any actions or provisions that impose any significant limit on the facilities' ability to generate clean-burning electricity, including Special Condition 28.

The Center has a strong environmental interest in this proceeding because the Center is an environmental action group, with a chapter in Long Island, New York, with a stated goal of promoting clean air in low-income and minority communities by, among other things, supporting the safe use of nuclear energy. Further, the Center has publicly supported Indian Point 2 and 3, due to its positive impact on New York's air quality, for several years. For instance, in May 2002, Center President Norris McDonald presented testimony before the Committee on Environmental Protection in opposition to Chairman James F. Gennaro's Resolution 64, which called for the immediate shutdown of Indian Point. The Center also presented testimony on February 28, 2003, before the New York City Council's Committee on Environmental Protection, again opposing

## **Center Statement on Indian Point License Renewal Application**

efforts to shut down Indian Point. And most recently, the Center participated in the DEC's legislative hearing relating to Indian Point's Draft SPDES Permit.

### **Conclusion**

The Center supports the 20-year License Renewal (ESP) for the Indian Point nuclear power plant located in Buchanan, New York. We support this renewal because the facility is a positive structure for mitigating ground level air pollution, global warming and environmental injustice.

NRC

CASE NO.  
OFF. EXH. NO. ~~#30P-7P~~  
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2/12/09

Dr. Patrick Moore  
Co-Founder of Greenpeace and  
Advisor – New York Affordable Reliable Electricity Alliance  
Prepared Remarks to the U.S. Nuclear Regulatory Commission  
Indian Point Environmental Impact Hearing  
February 12, 2009

## **Introduction**

Good evening.

My name is Dr. Patrick Moore. I am a co-founder of Greenpeace, former Greenpeace leader, Chair of Greenspirit Strategies Ltd and advisor to the New York Affordable Reliable Electricity Alliance.

Thank you for the opportunity to speak to you this evening about why, from an environmental perspective, nuclear energy and Indian Point are so important to the energy future of downstate New York.

I have often said – and I continue to believe – that there are few places where nuclear power makes as much sense or is as important as in New York. Indeed, the state is a microcosm of the challenges America and the world face to have ample, clean and reasonably priced electricity.

Let me make three key points.

### ***Nuclear energy is reliable and affordable***

Nuclear energy makes economic sense. The cost of producing nuclear energy in the United States is on par with coal and hydroelectric. That's a very important consideration in New York, which has the country's second-highest electricity costs. This impacts the poor and elderly, in particular, and makes it difficult for the business sector to operate efficiently as well.

### ***Nuclear power is safe.***

Worldwide, nuclear energy is one of the safest industrial sectors. Here in North America, no one has been harmed by a radiation-related incident in the entire history of civilian nuclear power generation. Indeed, it's proven safer to work at a nuclear power plant than in the finance or real estate sectors.

A 2004 Columbia University Study of 53,000 workers concluded that “...nuclear power plant workers in the United States...live longer and have significantly lower cancer rates compared to the general population.”

Very much related to the topic of safety, people often talk about the dangers of nuclear waste. The notion is misleading, as used fuel is not all 'waste'. After its first cycle, spent fuel still contains 90 percent of its energy. Future generations will be able to put this valuable resource to work, powering the country. Used nuclear fuel is one of America's most important future domestic energy resources.

***Nuclear energy has strong environmental benefits***

Nuclear energy has the lowest impact on the environment – air, land, water and wildlife – of any major energy source. Not only does it produce no harmful greenhouse gases or controlled air pollutants, but its waste byproducts are isolated from the environment.

In addition, nuclear energy requires less land to produce the same amount of electricity as any other electricity sources.

Nuclear power plants improve air quality by reducing smog. It is well established that this pollution has harmful health effects, especially for children and the elderly. This needs to be addressed now. Downstate New York arguably has the worst air quality of any region in the country, thanks to high levels of ozone and particulate pollution.

U.S. EPA recent statistics about New York show that pollution from coal power plants shortens the lives of 1,212 citizens annually, causes 164,612 lost workdays, 1,191 hospitalizations, and 28,665 asthma attacks.

**More on Indian Point**

I would like you to consider the following points about Indian Point nuclear facility:

1) Indian Point nuclear plant makes New York a cleaner, healthier place

- Indian Point mitigates 14 million tons of CO<sub>2</sub> annually. In fact, New York has one of the lowest per capita CO<sub>2</sub> emissions of any state, because nearly 50 percent of its electricity comes from nuclear and hydroelectric plants.
- The American Lung Association's State of the Air 2007 gives several counties in New York State failing air quality grades and the U.S. EPA says New York has some of the worst air in the country. The situation would be even worse without Indian Point.
- It would require four to five natural gas fired power plants to replace Indian Point's 2,000 megawatts of electricity. This would increase toxins and airborne particulates significantly, which we know are linked to asthma and other respiratory illnesses.

## 2) Indian Point is compatible with a clean, thriving Hudson River

- Back in the early 1970s when my colleagues at Greenpeace were advocating for fundamental environmental changes, the Hudson River was extremely polluted, “dead” in some areas, and was an international disgrace. Since then, Indian Point’s two nuclear plants were built.
- Robert Kennedy Jr., the leader of Riverkeeper, has said, and I quote, “This waterway was a national joke in 1966 ... It was dead water for 20-mile stretches north of New York City, south of Albany. It turned color. It caught fire ... Today it’s the richest body of water in the North Atlantic region, producing more pounds of fish per acre than any other waterway in the Atlantic Ocean north of the equator.”
- Indian Point not only is compatible with a clean Hudson River, but by mitigating pollution from other plants that causes the release of other harmful substances, including acid rain, it makes the Hudson cleaner.
- Riverkeeper has recently claimed there is:

“the slaughter of billions of fish, eggs and larvae every year that results from Indian Point...”

As a lifelong student of marine ecosystems, I can say categorically that this statement is misleading at best. Billions of fish cannot possibly be at risk because the plant goes to great lengths to screen out fish at the water intake. It is not possible for a fish of any size to enter the cooling system.

It is also basic fish biology that each productive female fish produces thousands of eggs, and only a very small percentage of those eggs will normally result in fry. If Indian Point is killing a billion fish eggs imagine how many trillions of fish eggs there are in the Hudson River.

- Water flow at Indian Point is reduced during spring months to optimize fish spawning conditions. Studies conducted during the last 25 years demonstrate that the relatively small number of larvae and eggs that enter the plant have no impact on the Hudson River’s overall fish population. **In fact, fish populations in the Hudson are on the rise.**
- **Moreover**, Indian Point uses high-tech underwater screens to prevent fish as small as a finger from entering the plant in the water that is used for cooling. The screens slowly rotate to ensure that young fish caught near them are transported to a device that safely returns the fish to the river away from the water intake structures.

### 3) Nuclear energy from Indian Point is much safer than the alternatives

- If the power generated by Indian Point nuclear plant was replaced with coal power almost 6,300 tons of SO<sub>x</sub> emissions and over 1,400 tons of NO<sub>x</sub> emissions would be released into the New York air every year. Also released would be 48 tons of particulate matter and almost 1,500 tons of CO would enter the atmosphere.
- Replacing Indian Point energy with natural gas energy isn't much better: 212 tons of SO<sub>x</sub> and 679 tons of NO<sub>x</sub> emissions per year would be released. 143 tons of CO and 118 tons of particulate matter would also be generated from creation of natural gas energy.
- As to safety issues raised: Dry casks storage and spent fuel pools at Indian Point are not particularly vulnerable to terrorist attack. Consider that water serves as a natural—and one of the most effective—barriers to radiation. This is why spent fuel is stored in pools. The fuel is contained neatly in fuel rods in a 40 foot deep pool. The racks stand 13 feet high leaving the fuel completely contained and safely submerged under 27 feet of water.
- The spent fuel pool for Indian Point 1 is in a fully-enclosed concrete building. Both Indian Point pools are 99% to 100% underground making them virtually impossible to compromise from the sides. The roof of the spent-fuel pool building has no nuclear safety function. Damage to it would not have safety consequences. The fuel pools can easily be re-filled with water and have several backup mechanisms for doing so. In fact, it is highly unlikely there would be significant off-site radiological consequences even if the pools were drained of their water.
- Casks are placed upright on a concrete pad and are hardened structures capable of withstanding natural disasters and terrorist attacks. The canister/cask system is very robust, about 20 feet in height and 11 feet in diameter, with a cask wall that is over two feet thick and a total loaded weight of about 360,000 pounds.
- And finally, the plants and property at Indian Point Energy Center are monitored around the clock, 24 hours a day, seven days a week by well-trained, armed security guards, both at guard stations and in constant patrols. **The security force rivals the size of most local law enforcement troops, and is comprised of highly trained officers.** They attend fire range practice on a regular basis. These are extremely hardened targets.

Some have mentioned leaks. Let me say a couple of words about that:

- Once discovered, Entergy immediately took steps to identify and mitigate leakage of strontium-90 and tritium from the spent fuel pool of the non-operating Unit 1 plant and tritium from Unit 2 pool. Entergy installed a water purification system to remove more than 95% of SR-90 from the Unit-1 pool water.

- To stop leakage permanently, Entergy moved up its timetable to 2008 for removing the spent fuel and draining the water from pool. Entergy also installed more than 35 monitoring and sampling wells after its initial detection in September of 2005.
- In addition, Entergy has continued to inspect the inner liner of the IP2 pool with **no reports of any active leaks to date.**

### **Conclusion**

In order to meet New York's energy needs going forward, and to continue to do so in an environmentally responsible manner, we must mobilize all the clean energy sources available. The time for common sense, for scientifically sound decisions on energy and support for nuclear power generation is here and now. Thank you.

NPC

CASE NO.  
OFF. EXH. NO. 7PM  
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DATE

2/12/09

Mr. Falciano

I would like to thank you very much  
for having my class at Indian Point.  
I really learned alot about nuclear  
power, from the tour of the plant  
and the presentation. I now believe  
nuclear power will be the power of  
the future.

Thank you  
*Joseph A. ...*

Mr. Felicio,

I wanted to thank you for allowing us to tour the facility and experience what a nuclear power plant is like. The chance was unlike any other I have had before and really opened my eyes to the truths about nuclear energy. Once again, I would like to thank you for the opportunity your generosity afforded me.

Sincerely,  
Brian Johnson

Have a Merry Christmas  
+  
a Happy New Year!

Pat,

With sincere  
appreciation  
and  
warmest thanks.

I think the kids had a  
great experience and really  
appreciated your hospitality.  
In fact my son Chris said he  
thought you were "pretty cool".  
(Huge compliment)

Thanks again,

Pat

You're always doing  
something nice.

Dear Ms. Falciano,

Thanks for showing me how your facility  
operates. It is a very interesting process  
to produce electricity. Once again thanks  
for everything it was a very enjoyable trip.

Sincerely,

A. Mostofi

Arceen Mostofi

Dear Patrick Falciano,

Thank you for the tour of the nuclear plant. I thought the clip of the plane vanishing into the wall when the plane crashed into it was amazing. I did not imagine that the domed building was that strong. Thank you very much for your time.

- Sincerely

Patrick Verboosky

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Thanks for  
The tour of  
your Nuclear  
Power Plant

To Mr. Falciano,

Thanks for taking the  
time to show us your  
place of work. It was  
surprising to find out  
how much power comes  
from so little energy. I  
also feel safer knowing  
the facts of Nuclear power.  
Someday I might decide  
to become a nuclear  
engineer.

Sincerely,  
Thomas Waller

Dear Mr. Falciano,

Thank you for inviting <sup>us</sup> to tour Indian Point  
I never knew that nuclear energy sources  
were so sensible and efficient. It's a shame  
they're not used more widely. I commend you  
for your hard work.

Sincerely,

Chris Rittendale

THANK YOU

Mr. Falciano,

Thank you very much for your  
Presentation of your company.  
I never knew a nuclear power  
plant could be so simple and  
yet so difficult. Also the tour  
was very intriguing. Please allow  
for future classes to come and  
see how their energy is produced.

Joe

Thanks!  
Samantha  
Bova

Thanks  
- Ravi Shetty

Sarah Angell  
Mike Chelso  
Thanks  
- Chris Nardo

Thank you!  
- Erica Krienes

Thanks so much!  
- Saumya Bhutani

Thanks  
- Zaira Raiyan

Thank you!  
Jessica  
Inclik

12/8/08

Dear Pat,

Thank you for the time and effort  
that you put into making our visit  
to Indian Point both educational  
and fun. Sincerely, AP Chemistry  
Arlington High

Glavin

Thank you  
Raj Mathew

Thank you!  
- Brian Lei

Thank you,  
Matthew Ossa

Thank-you!  
- Carolyn  
Nest

Thank you!  
- Alex Ma

Thank you!  
- Sarah Chulman  
Thank-you!  
Christy Stasiak  
Thank you!  
- Kelli Hawekamp

Pat -  
Many thanks  
for your help! It  
is wonderful allowing  
students to see real world  
objects that pertain to their  
learning.  
thanks again -  
Kristen Arbour

Thank you,  
You really helped  
us on our project!  
We really appreciate  
it. Thanks again!  
Macy, Megan - Kevin  
usatt

Dear Mr. Falciano,

Thank you very much for the tour of Indian Point. I found the simulated control room especially interesting because it was so identical to the actual control room new technology can be tested in order to determine what effects it will have on the power plant before introducing it to the actual control room. I also found the information in your lecture about nuclear power plants fascinating because prior to my visit to Indian Point I had a bias against nuclear power plants, from hearing horror stories from the high level waste they create. After the lecture, however, I realized those were

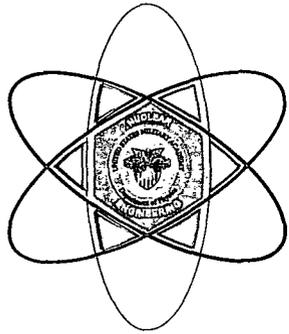
Dear Mr. Falciano,

Thank you for your time to tour the  
West Point personnel on Friday, Sept. 19<sup>th</sup>.

I enjoyed the opportunity, and your presentation  
was excellent. It was a pleasure to meet you.

Again - thank you,

Melani Conroy



# Certificate of Appreciation



*awarded to*

**Mr. Pat Falicano**

**For outstanding assistance given to the NE355 Advanced Nuclear Reactor Design class from the United States Military Academy. Your knowledge was instrumental in teaching the cadets about Indian Point and applied nuclear engineering. The cadets were motivated by your example to strive for more understanding in nuclear power plant operations. Your actions reflect great credit upon yourself, Indian Point, and the Entergy Corporation.**

Edward P. Naessens, Jr.  
Colonel, United States Army  
Academy Professor,  
Department of Physics

Raymond J. Winkel, Jr.  
Colonel, United States Army  
Head of the Department,  
Department of Physics

**Falciano, Patrick**

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**From:** Dooley, P. COL C&LS [Patricia.Dooley@usma.edu]  
**Sent:** Friday, July 16, 2004 9:20 AM  
**To:** Falciano, Patrick  
**Cc:** Appleton, A. MAJ C&LS; Meyer, J. LTC CHEM  
**Subject:** Presentation to Cadets

Mr. Falciano,

Your presentation aboard the USMA ferryboat last Sunday to the Mid-Hudson Section of the American Chemical Society was most interesting. I commend you on your ability to compete with the gorgeous scenery of the river—and win—in an enthralling talk about the Indian Point nuclear reactor.

I am including the course director and assistant course director of our Advanced General Chemistry course at USMA in the CC: by way of introduction; MAJ Appleton is responsible for arranging for and inviting speakers to give lunchtime brown-bag presentations to the freshman cadets, and I will encourage him to make contact with you about the feasibility of having you up some time this semester.

Again, thank you for a riveting and rewarding talk.

Patricia A. Dooley, Ph.D., Colonel, U. S. Army, Academy Professor

Airborne & "Old Ironsides" Signaleer

Department of Chemistry and Life Science

United States Military Academy, West Point NY 10996

845/938-3909 DSN 688-3909 Fax -2235

*The ultimate weapon is an educated mind.*

**GO ARMY TRACK!**



# *Dobbs Ferry Union Free School District*

DOBBS FERRY HIGH SCHOOL  
Dr. Michael Kuchar, Principal

December 8, 2004

Dear Mr. Pat Falciano,

I am writing this letter of behalf of myself, my colleagues and our students as a thank you for a fantastic presentation. We are all very impressed with your knowledge and are appreciative of your time.

Your PowerPoint presentation was excellent and our students thoroughly enjoyed it. Often times our students are misinformed about nuclear energy and safety issues. I applaud you for addressing those concerns as you handled criticism with diplomacy and grace. Many of our students remarked that after your lecture, they felt more at ease about the safety of Indian Point.

Also, thanks for the "goodie bags". The students loved their gifts and we all appreciate you putting them together and bringing them along. Thanks again for you time and attention.

Kind Regards,

Justine Henry  
Teacher of Science

## **Falciano, Patrick**

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**From:** Libby, Earl  
**Sent:** Monday, May 10, 2004 9:18 AM  
**To:** McMullin, Kathy; Falciano, Patrick  
**Subject:** John Jay High School - Chemistry Class Presentation

Kathy,

I had the opportunity to attend the presentations to the Chemistry Classes at John Jay High School by Mr. Pat Falciano on Friday 05/07/2004. Mr. Falciano is a talented presenter who well represented Indian Point Energy Center and Entergy Nuclear to that high school population. It was my pleasure to assist Pat with this outreach program.

**Tx:** Earl R. Libby, Ops Tech Support Supervisor  
Phone: (914) 736-8514 Pager: (888) 437-5785

## Falciano, Patrick

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**From:** Terri Campbell [tcampbell@vcmail.ouboces.org]  
**Sent:** Friday, April 02, 2004 12:34 PM  
**To:** Falciano, Patrick  
**Subject:** Nuclear Presentation

Thank you so much for visiting our school and sharing your presentation with us. All of the students were impressed with the material and it generated a fantastic discussion the following day. I will not forget you for next year.

Terri Campbell

Terri Lee Campbell  
Science Department

Mr. Patrick Falciano  
IPEC Communications GSB  
450 Broadway  
Buchanan, NY 10511

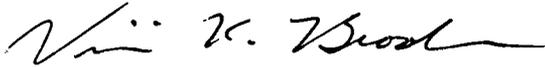
January 10, 2006

Dear Mr. Falciano,

Thank you for visiting Harmony Christian School on December 6, 2005. The staff and students enjoyed the excellent, informative presentation on the workings of a nuclear power plant. The subject matter presented was a benefit to our middle and high school students and also the staff that were able to attend.

We look forward to scheduling another visit with you next year. We also will be looking into scheduling a field trip to the Indian Point Energy Center for some of our high school students next year.

Respectfully,



Mrs. Vivian K. Brooks  
Middle School Science Dept.



Mr. Kevin Barry  
High School Science Dept.



## WESTPORT, CONNECTICUT

DIANE GOSS FARRELL  
*First Selectwoman*

April 11, 2005

Ms. Kathleen McMullin  
Communications Manager  
Indian Point Energy Center  
450 Broadway, Suite 1  
Buchanan, New York 10511

Dear Kathy:

Thank you very much for your highly competent assistance relative to my tour of the Indian Point Energy Center on April 4<sup>th</sup>.

The tour was extremely interesting and impressive. Seeing the operations and facilities first hand makes for a better understanding of the safety procedures.

Thank you again for your help. Best wishes.

Sincerely,

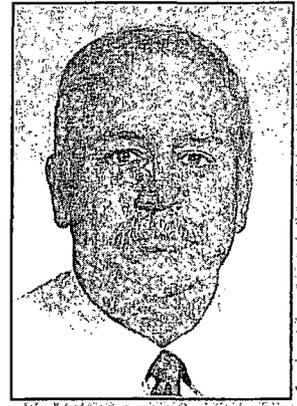
  
Diane Goss Farrell  
First Selectwoman

DGF:ps

# William John Rock

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## Somers Middle School



*MR. PAT FALCIANO*

Entergy Nuclear Northeast  
Entergy Nuclear Operations, Inc.  
Entergy Nuclear IP2, LLC  
P.O. Box 249  
Buchanan, NY 10511

July 26, 2005

Dear Pat,

Enclosed are copies of the pictures that you kindly took for me while on the tour of the Indian Point Nuclear Power Plant on July 19, 2005.

I also received your wonderful power point presentation as well.

I will put all of this great information to use in my classroom to help better educate our Middle School students about Nuclear Energy.

I feel that Nuclear Energy is a very important part of the solution for both our current and future energy needs.

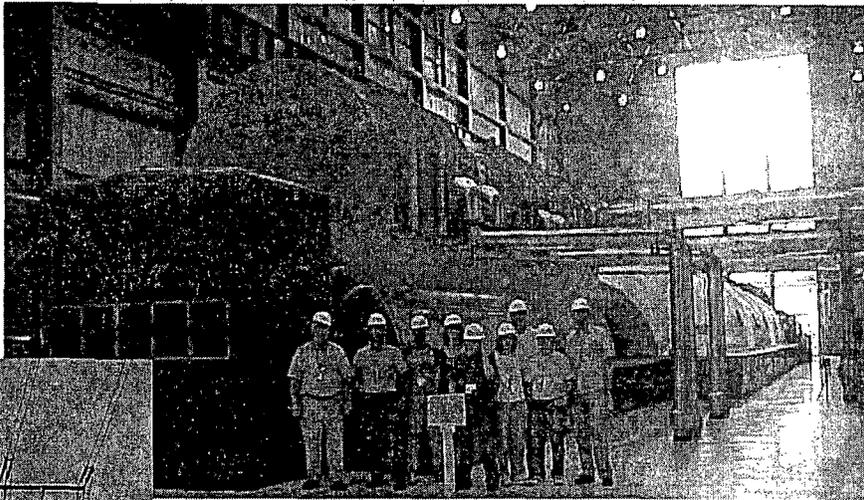
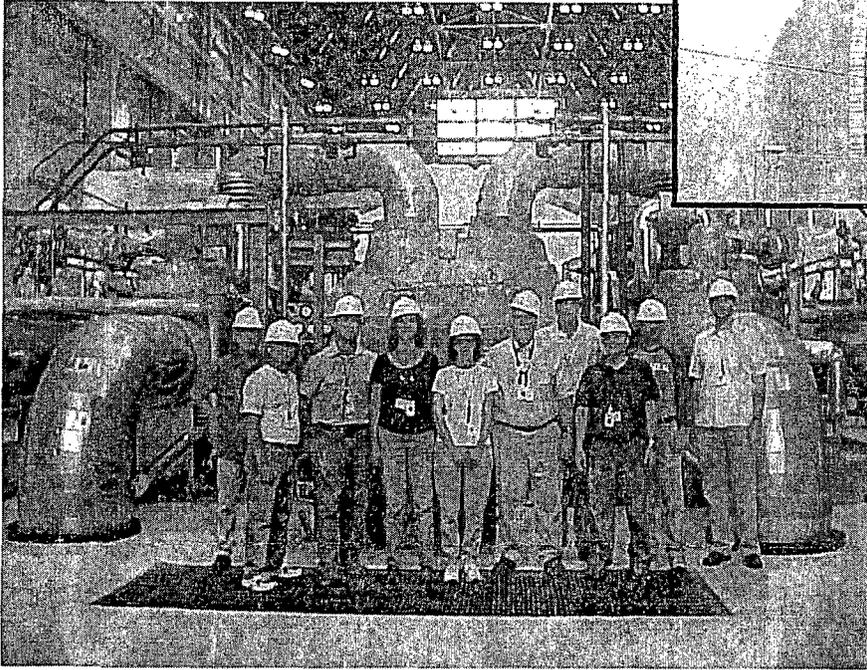
Thank you very much,

William Rock

Technology Education  
Teacher  
Somers Middle School  
Route 202  
Somers, NY 10589  
914-277-3399 x 650

Home  
30 Frances Drive  
Katonah, NY 10536  
914-277-5966  
e-mail [wjrvc@aol.com](mailto:wjrvc@aol.com)

Indian Point Pictures 2005



Dear Pat - These are the pictures  
I will use to explain about my  
tour thru the plant - They are excellent!  
Thank you - Bill Rock

PS- COMBINED WITH YOUR VERY  
WELL DONE POWER POINT PRESENTATION  
I WILL BE READY AND ABLE TO  
TEACH MY STUDENTS ABOUT NUCLEAR  
POWER - AGAIN, THANK YOU

**Falciano, Patrick**

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**From:** Dick Willstatter [RWillstatter@msn.com]  
**Sent:** Friday, April 30, 2004 5:14 PM  
**To:** Falciano, Patrick  
**Subject:** Re: photos

Pat,

Thanks for sending copies of the photos of the R.M.A. men visiting Indian Point. I will certainly make copies for their enjoyment.

By the way, (wish I could have been there, really do) every single report of their visit was complementary not only of the visit but most especially of how well you (yes, you) were able to handle the job of presentation. Well done,,,, and thanks !! They way they put it is, "You are a real professional".

Dick Willstatter

— Original Message —

**From:** Falciano, Patrick  
**Sent:** Thursday, April 15, 2004 12:49 PM  
**To:** 'RWillstatter@msn.com'  
**Subject:** photos

Dick,

Attached are the photos we took during the Association's visit to Indian Point. I was asked to send them to you. One of your guys wanted to forward them to a local newspaper.

<<DSCN1201.JPG>> <<DSCN1202.JPG>> <<DSCN1203.JPG>>

Pat

**Falciano, Patrick**

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**From:** Biaglow, A. DR C&LS [Andrew.Biaglow@usma.edu]  
**Sent:** Monday, November 15, 2004 7:59 AM  
**To:** Falciano, Patrick  
**Subject:** Thank You

Patrick,

Thank you for your visit on Friday. I enjoyed your talk tremendously. Indian Point seems like a fascinating place, and I am sure the cadets really enjoyed your talk as well. If possible, I would greatly appreciate a field trip to Indian Point. We would like to bring faculty and/or cadets. I do not know what has to be done on your end, but if there is a PR office that I could contact, please let me know.

I am also interested in arranging summer internships with our cadets who are studying chemical engineering. I am sure there is a world of fascinating projects for them to work on. If you are interested, I would greatly appreciate it if you could forward this message to anyone who might be interested.

I am also interested in faculty internships during summer months. If this is something you would like to discuss further, please let me know.

Thanks again, and best regards,

Andrew Biaglow  
Associate Professor  
Program Director for Chemical Engineering  
Department of Chemistry and Life Science  
United States Military Academy  
West Point, NY 10996  
845-938-5814  
ma7196@usma.edu

1/13/2005

## Falciano, Patrick

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**From:** Rachel Van Der Stuyf [rvanderstuyf@bedford.k12.ny.us]  
**Sent:** Tuesday, December 21, 2004 2:36 PM  
**To:** Falciano, Patrick; kmcmullin@entergy.com  
**Subject:** Re: Indian Point visit

Kathy and Pat,  
Thank you for setting up the visit for us today and for being flexible regarding our time constraint. We obviously would have liked a tour of the facility and appreciate the fact that you had one set up for us. I will contact you in the next day or two about either a follow up visit to Indian Point or a having one of you come to our school for a discussion.

Thanks again,  
Rachel Van Der Stuyf  
Academic Community for Educational Success

At 08:57 AM 12/20/2004, Falciano, Patrick wrote:  
>Rachel,  
>  
>Please give me a call ASAP @ 914-271-7441.  
>  
>Pat Falciano



Norwalk Community College  
188 Richards Avenue Norwalk CT 06854-1655

May 11, 2004

Jim Knubel  
Vice President- Operations  
Executive office  
Indian Point Energy Center  
295 Broadway, Suite 1  
P. O. Box 249  
Buchanan, New York 10511-0249

Dear Mr. Knubel:

On Behalf of NCC, my students and myself, I would like to let you know how much we appreciated your staffs professional attitude and effort in handling our "Nuclear Power Plant Field Trip."

From the very beginning, you accorded the curious students waiting to see for themselves what a Nuclear Power Plant is all about sincerity and respect. They have learned a great deal just on that. There was Pat Falciano who came to NCC on May 4 to give a talk on the Nuclear Fuel Cycle. By the way, it was very favorably televised on the local news channel 12. After clearing security on May 5 we had our visit which included a guided tour by Tom McKee, Pat Falciano and Joan Etzweiler culminating with a power point slide show by Al Genadry. All by the way were excellent hosts and made our visit very memorable from the beginning to the end. Our students were excited to learn, I could almost see them "bragging" to whoever was willing to listen and wherever they went.

It was a very successful educational trip. Thank you very much for all you did for our students and the college.

Sincerely yours,

John J. Dolhun  
Associate Professor Chemistry

Cc: Pat Falciano



January 21, 2005

Pat Falciano  
450 Broadway  
Suite 1  
Buchanan, NY 10511

Dear Pat,

Thank you for coming to our school and sharing information with us regarding Indian Point and the nuclear power industry. It was very helpful to our class because we were able to use the information in our research papers. We really appreciate your visit to our community, you are always welcome.

Sincerely,

Academic Community for Educational Success

STEPHANICRUZ

Jillian Kawicki

Andrea E. J.

[Signature]

[Signature]

JULIANNA CAMPOS

Elizabeth Baruskin

Niko Poutas

Nick Conners

[Signature]

Camille [Signature]

**ACADEMIC COMMUNITY FOR EDUCATIONAL SUCCESS**

**FOX LANE HIGH SCHOOL**

**175 Railroad Avenue • Bedford Hills • NY • 10507**

**914 - 666 - 5983**

February 28, 2006

Dear Mr. Falciano,

I would like to thank you for taking the time to show my class around Indian Point last Wednesday. I learned a lot from your PowerPoint presentation and you showed me a new point of view on nuclear power. It was nice to here a different perspective and learn things that the textbooks leave out such as actual radiation exposure, actual threat of meltdown, and actual waste the reactors produce. You must be very busy and I and my classmates truly appreciate you taking an entire day to teach us about the process of nuclear energy and its production.

Sincerely,

Alex Scaros, Senior at Hackley School

February 27, 2006

Dear Mr. Falciano,

I would like to thank you again for giving me and my classmates the opportunity to visit Indian Point. Your PowerPoint presentation was very informative and my tour, led by Joe Carlick, was incredibly interesting. Prior to the visit, I was very skeptical about nuclear energy but I have to admit you have eased many of my concerns. I now obtain a greater sense of knowledge of the power plant, as well as a greater sense of security. I am very grateful for the services that you put into the power plant which enables my house to receive electricity. Once again I would like to thank you for your time, patience, and willingness to educate me and my classmates about nuclear energy.

Sincerely,

A handwritten signature in black ink that reads "Kristen Vecchio". The signature is written in a cursive style.

Kristen Vecchio

Dear Mr. Falciano,

2/28

Thank you so much for giving us such an educational tour of Indian Point. Before our trip, I was not sure of my opinions about nuclear power, but now I feel more informed. I think that the information was well presented, but I feel that facts should be presented in a more balanced manner. I think that nuclear power is a great source of energy, and I do not agree with the ideas that all nuclear power plants should be phased out. It is safe, efficient and lessens the dependency on oil and other sources that are nonrenewable.

Thanks again,

Komal Gargwal

Jonathan Lampert

Dear Mr. Falciano,

Thank you very much for the tour and information about Nuclear Point. I appreciate the time you spent and as a result of the information I received, I have changed my view on nuclear power. I particularly found interesting the discussion on how nuclear power works, how power is generated in nuclear point. I also found interesting the discussion of safety and security at Nuclear Point. This discussion effectively cleared up the myths I had heard; essentially, ~~all~~ a disaster at Nuclear Point is virtually impossible. I found the tour fascinating, specifically the tour of the simulator. It's amazing how much training you have to go through in order to work at Nuclear Point.

Sincerely,  
Jonathan Lampert

Dear Mr. Falciano and everyone involved with our trip to Indian Point,

On behalf of myself and my class, I would like to say thank you for your informative lecture, openness to questions, and overall congenial attitude that most major corporations lack when dealing with skeptical visitors. As a student who has witnessed many public relations lectures concerning how and why I should think this or that way about any given topic, I can honestly say that this particular information center was not only lucid and persuasive, but also addressed and attempted to amend one of the greatest hurdles that proponents of nuclear power face today: public ignorance. Of course, both the media and public are correct in worrying about the safety hazards complicit with nuclear power (what with the disaster at Chernobyl and the frantic, though seemingly harmless meltdown at Three Mile Island), for they are a reality, no matter what any one says. As long as we as humans use nuclear power as a source of energy, there will be an intrinsic fear of a catastrophe (meltdown, terrorist attack) and the problem as to where and how to dispose of high-level nuclear waste. However, not only was I thoroughly impressed with the excessive attention to security and safety at the power plant, but I also learned how environmentally friendly nuclear power actually is. Who would of thought that one ~~pot~~ pellet of uranium has the same energy potential as 2000 pounds of coal?!

Thanks again,

Tom Breen

By the way, the goody bags at the end of the tour would have converted even the most stubborn anti-nuclear power activist.

Mr. Falciano

Thank you very much for the wonderful tour of Indian Point. I have always been intrigued by nuclear power, and so I found your talk particularly interesting. It also settled many of my concerns about nuclear power and radiation. Thank you again for taking the time to talk to us and bring us around the plant, it was greatly appreciated.

Sincerely,

Ruby Cameron

Dear Pat Falciano,

Thank you very much for the educational tour of Indian Point. Honestly, I was always afraid of the dangers of nuclear power plants, and easily gave into the fearful media coverage. After learning about the mechanics of the plant, the beneficial effects industrially and the friendly impacts environmentally, I have definitely become a nuclear power supporter. The containment of the radioactive material and the minute amount that could ever affect surrounding people is comforting as I live within a 10 mile radius of the plants. The lecture was both informative and interesting and I thoroughly enjoyed the presentation. Confident in my ability to defend nuclear energy, I have already found myself enlightening others with the knowledge you have bestowed me with. Thank you for the tour as well, it was a great experience and I know the information I received I will remember for life.

Just as the generous items received in my "goodie bag" say, Indian Point is *safe, secure* and *vital* and with my newly gained knowledge, I have evidential support!

Thank you,

Chelsea Wendlinger

(Hackley School Student)

Dear Mr. Falciano,

I just wanted to take this opportunity to thank you for allowing our school to visit Indian Point Power Plant. I was personally fascinated by the precision and intricacy of the technology used at Indian Point. You gave a very well done presentation on the power plant that was entirely factually based, which I very much appreciated to clear up some rumors. Through the media I developed a biased view toward the plant; I thought if even the slightest thing were to go wrong, or if it was attacked the effects would be catastrophic. I now know that is not true.

I was very impressed with the facilities and the warm atmosphere from the technicians at the plant. I also appreciated the high level of security, and while they were not as warm as the technicians, I understand the importance of maintaining a very high level of security.

I now think that nuclear energy is viable alternative to fossil fuels. Nuclear energy creates absolutely no pollution emissions, but there are draw-backs. We have to think about thermal pollution and storage of lethal radioactive waste. But, fossil fuels are more of a problem for our atmosphere at the present moment, so I think if we created an extra storage tank for the radioactive waste, or simply find ways of making the waste inert and non-lethal, harnessing radioactive energy would be just as Entergy says, "Safe, Secure and Vital." I won't go on about what should be done, but to simply thank you for giving me the educational opportunity to see what harnessing nuclear energy is really like first hand.

With great appreciation,

  
Ty Smith

Dear Mr. Fulcrano,

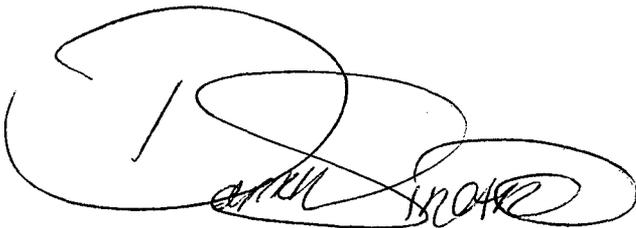
Thank you so much for giving us a very informative tour and presentation of Indian Point. I learned so much about the intricate workings of a nuclear power plant, especially in regard to the fuel rods and uranium pellets. I had no idea of how small they were, and how they were assembled within the reactor! Also I enjoyed learning how well constructed the containment buildings are, how little of an effect certain amounts of radiation can have on the human body, as well as how diluted the radioactive material becomes once it is two, five or ten miles away from its origin.

In addition to the information I learned during the presentation, I thoroughly enjoyed taking a tour of the power plant. It gave me an idea of how many components are included in the process of creating energy through the use of uranium. The amounts of water pumped into the plant each hour stunned me, as did size of the complex. The size of the room that contained the reactor alone was astonishing! One of the most impressive things I encountered at the plant, though, was the security. The fact that students were obliged to pass through a metal detector, a bomb detector and two sets of radioactive detectors was very reassuring, and showed the amount of technology available at the plant.

Again, I would like to thank you so much for our tour and presentation, and I know each one of us had an electrifying time at Indian Point.

Regards,

Darren Sinatro

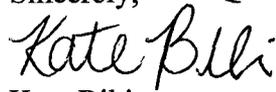
A handwritten signature in black ink, appearing to read 'Darren Sinatro', written over a large, loopy scribble.

February 28<sup>th</sup> 2006

Dear Mr. Falciano,

I wanted to thank you for the informative lecture and tour you gave Hackley School last Wednesday. From the lecture, I found that nuclear plants, especially those as secure as Indian Point, are much safer than the public tends to think. Nuclear power is clean burning, safe, and secure. I believe that nuclear power will be very important in our futures (as rising adults) as the public learns how safe it really is. I enjoyed the tour immensely, and I loved how we had access to many sections of the plant. Thank you again for helping me understand the truth about nuclear plants and the many positive effects they have on society. Thank you!

Sincerely,

A handwritten signature in cursive script that reads "Kate Bibi". The signature is written in black ink and is positioned above the printed name.

Kate Bibi

Dear Mr. Fabrizio,

I just wanted to tell you how much I enjoyed my time at Indian Point. I found the lecture very informative and interesting. I learned several things about power production in general, and nuclear power in particular that I did not know before. Actually seeing the turbines and other parts of the plants was fun. Thanks so much for taking the time to give us a tour.

Sincerely,  
Sarah Hunt

Dear Mr. Fabiano,

Before our trip to Indian Point I was both Apprehensive and Skeptical. Because of the media and public opinion, I admit I had a negative view of Indian Point. However, after your presentation and the tour my group was given, I no longer have that opinion. My view of Indian point is now positive, and I would like to thank you for that. I now know that Indian Point is safe from terrorist attacks, even if a plane is used as a weapon. I now know that an incident such as Chernobyl is impossible. I now know that if there ever was a meltdown I know that we aren't doomed. And I also know Indian Point isn't polluting. All the skepticism I had about Indian point is no more and again I would like to thank you for that.

Sincerely,

Dear Mr. Valciano,

I am grateful to you and to your co-escorts for educating me and my class about nuclear power, and about the processes occurring at Indian Point. We all learned a great deal, and you served as a great counterbalance to the overwhelming slew of bad press that Indian Point has a tendency to generate.

Frankly, given all the negative hype about nuclear power, I half-expected to see a bunch of mad scientists trucking around weapons-grade plutonium on little handcarts everywhere. I think a fair number of my classmate were afraid that at any minute a 767 might slam into one of the containment buildings and nuke Westchester. Clearly, you can see how badly we needed education.

I think that what we learned last week goes farther than just how nuclear power works, and why Indian Point is not the threat we think it is. We also saw the people, such as yourself, working at the plant. As a twelfth grader vying for admission to college, I've been on a lot of tours lately. I wish that the students giving those college tours had been half as enthusiastic and passionate about their colleges as you and your colleagues were about nuclear power! I think that one major oversight that the public has in writing of nuclear power as evil is the quality of those working at your facility. I saw nothing but sincerity and integrity, and the dedication to keep Indian Point in top working order. I feel safe knowing that the nuclear power plant in my county is in such good hands.

Thank you again, for you have shown us a side of an issue that will only grow in importance, that nobody else could show us.

Sincerely,

Dear Mr. Falciano,

Thank you for taking time out of your busy schedule to educate us on the benefits of nuclear power plants. I did not know how safe they, in fact, were and how little radiation even a worker is exposed to there. The most interesting part of the entire trip for me was the video that demonstrated how virtually indestructible the transportation tanks were. Overall, the trip was very informative and gave me a new perspective on nuclear energy.

Thanks again for your time,

Dear Pat,

Thanks so much for taking so much time for us. The kids had a great time. They were very interesting in your talk to the plant. It was great for them to have such a pro nuclear point of view since the media gives them a con. I look forward to working with you next year!

Sincerely

Jonas Malpass  
AP Environmental Science Class  
February 27, 2006

Dear Mr. Falciano,

Thank you so much for your tour of Indian Point. The tour and lecture was very interesting and informative. The trip cleared up a lot of my fears and questions concerning nuclear energy. I learned many things while on the tour, and I am now in favor of nuclear energy.

Thank you very much for giving us your time, and touring us around Indian Point. I enjoyed myself very much.

Sincerely,

Dear Mr. Falciano:

Thank you so much for the opportunity to come & visit Indian Point. I learned that the plant is really much safer & more productive than I originally thought. It was an amazing experience that I will never forget. Thank you again for your willingness to educate my class about nuclear energy.

Sincerely,

February 28, 2006

Dear Mr. Falciando,

Thank you so much for the lecture and tour at Indian Point. Prior to hearing your talk, I had a bias against nuclear power and even favored closing Indian Point. I have drastically changed my view point, though, after hearing what you had to say about nuclear power. I now realize that the media takes the most extreme cases and twists the facts in order to prove their point. Most people never get to hear another side, though, and I got that opportunity. You have opened my eyes to another side of nuclear power and I am more educated for it. Thank you!

Sincerely,

2/28/06

Dear Mr. Falciano,

Thank you so much for allowing my class and I to take a field trip to Indian Point. The experience was extremely beneficial and I learned a lot of important things about Nuclear Power Plants. Visiting the plant is an experience I will never forget. I loved seeing how everything was controlled in such an organized (and safe!) manner. It was informative and comforting at the same time. Thanks again!

**Dear Mr. Falciano,**

**Thank you very much for allowing my class to visit Indian Point. I won't lie; I had a lot of reservations about nuclear power from what I had studied previously. You and Jim, my tour guide, put all of my concerns to rest. You were very informative throughout your presentation and as was Jim during the tour. The passion that both of you had for your job was incredible! It was really very impressive and I thank you for doing your job to power my house and therefore my computer so I could write this note!**

**Thanks again,**

# The Masters School



Dear Mr. Falciano,

On behalf of the entire 6<sup>th</sup> grade class, I would like to thank you for taking time out of your schedule to give a presentation on Indian Point and giving an informal discussion talk to Mrs George's students. The ideas presented in your PowerPoint have given students the tools to objectively evaluate the use of nuclear power in the U.S. We hope to continue using you as a resource to help enrich our curriculum.

Sincerely,

A handwritten signature in black ink, appearing to read "Scott Corn", written in a cursive style.

Scott Corn



**NEW ROCHELLE HIGH SCHOOL**  
265 CLOVE ROAD  
NEW ROCHELLE, NEW YORK 10801-1247

**DONALD CONETTA**  
PRINCIPAL

TEL: (914) 576-4502  
(914) 576-4503  
FAX: (914) 576-4284

**JOYCE KENT**  
SCIENCE CHAIRPERSON

TEL: (914) 576-4596  
(914) 576-4580  
EMAIL: JOYCEKENT@NRED.ORG

Pat Faciano  
Indian Point Station  
Broadway & Bleakley  
Buchanan, NY 10511  
New York, NY 10032

May 29, 2008

Dear Mr. Faciano,

Dr. Archibold and her students join me in thanking you for your informative talks on nuclear energy. We are truly facing an energy crisis and your lecture made us all aware of the importance of considering alternative sources of power.

It is beneficial to involve the community in the education of our youth. Your lecture served to make the students more aware of the problems the next generation will be facing. Urging them to find solutions enabled students to think about their effect on our fragile planet.

I look forward to seeing you again soon and hope to invite you back to speak to our students next year.

Sincerely,

Joyce S. Kent

cc: J. Archibold  
J. Pollock

# The Legislature of Rockland County



**JOHN A. MURPHY**

Legislator

Town of Orangetown - District 16

Budget & Finance Committee

Government Operations Committee

August 21, 2006

Mr. Thomas Fitzpatrick  
Vice President  
Giuliani Partners, LLC  
5 Times Square  
New York, NY 10036-6530

Ms. Kathleen McMullin  
Communications Manager  
Entergy Nuclear Operation, Inc  
Indian Point Energy Center  
205 Broadway, Suite 1  
Buchanan, NY 10511-0249

Mr. Patrick Falciano  
Outreach Coordinator  
Indian Point Energy Communications  
205 Broadway, Suite 1  
Buchanan, NY 10511-0249

Dear Kathleen, Patrick and Thomas:

Thank you for being such gracious and professional hosts on my recent visit.

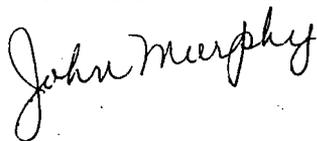
I was so impressed by your professionalism that I am moved to suggest a similar visit by my County Legislative colleagues who may not have enjoyed an opportunity to visit the Center to date. I would also like to include the Town Board of the Town of Orangetown, New York, in which lies my County Legislative District and, where I have resided for almost 50 years.

August 21, 2006

Page 2

Likewise, I would love the Publisher/Editor of our highly respected weekly newspaper, the "Our Town" to be invited. It is mailed free to every home in the Town of Orangetown every week.

Very truly yours,

A handwritten signature in cursive script that reads "John Murphy". The signature is written in black ink and is positioned above the printed name.

JOHN A. MURPHY  
County Legislator

JAM/ms

**Falciano, Patrick**

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**From:** GRAVES, ALLISON LESLEY  
**Sent:** Friday, December 08, 2006 2:00 PM  
**To:** Theobalds, Kenneth; Fay, Deborah; McMullin, Kathleen M; Carpino, Ronald J; Falciano, Patrick  
**Cc:** Kansler, Michael R; HEBERT, CURTIS L; Halvorsen, Jerald V  
**Subject:** House Committee staff – Indian Point tour follow-up

Deb, Kathy, Pat and Ron,

Thank you all for conducting and arranging the tour of Indian Point last Sunday. It was a very thorough and educational tour, and I appreciate you accommodating the House Committee staff's schedule and giving us so much of your time on Sunday. The knowledge Pat and Ron offered on the tour was fantastic. As you know, these four staffers represented both the Democratic and Republican staff of the House Homeland Security Committee – a committee that could potentially help or hurt our nuclear fleet.

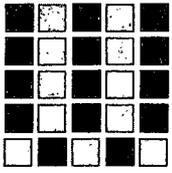
In fact, I saw Colleen O'Keefe last night. Colleen was the staffer that arranged the tour. She complimented the tour and said how impressed they all were with the facility, the security measures, our employees – just overall impressed. She said, "in fact, we were talking about it this week – how safe we would all feel living next to a nuclear power plant." She went on to say how much they appreciated us conducting the tour on Sunday and that we were much more accommodating than the folks on their tour of Plum Island the next day. Job well done! Thank you for showing some of these key Hill staffers what a well-run facility Indian Point is.

Have a good weekend.

*Allison*

Allison Graves  
Director, Federal Energy Policy  
ENTERGY CORPORATION  
101 Constitution Ave., NW, Suite 200 East  
Washington, DC 20001  
202-530-7300 (office)  
202-530-7350 (fax)  
202-957-4022 (cell)  
[agrave1@entergy.com](mailto:agrave1@entergy.com)

12/11/2006



# Westchester Community College

State University of New York

November 7, 2007

Mr. Patrick Falciano, Outreach Coordinator  
IPEC Communications  
Indian Point Energy Center  
450 Broadway  
P.O. Box 249  
Buchanan, NY 10511-0249

Dear Mr. Falciano,

It was a pleasure to have you speak with our Green Team on Wednesday, October 24, 2007. Your presentation was invaluable and a learning experience for all those in attendance. Thank you for clarifying the misconceptions regarding the function and safe operation of Indian Point.

I will be in touch shortly to arrange for a tour of the Indian Point Power Plant for our Green Team.

Sincerely,

Seymour Rosenfeld  
Professor Engineering Technology  
Green Team Mentor

SR:wal

pc: Dr. Hankin, Dean Wang



November 15, 2006

Ms. Kathy McMullin  
Entergy Nuclear Northeast  
Indian Point Energy Center  
450 Broadway  
P.O. Box 429  
Buchanan, NY 10511-0294

Dear Ms. McMullin:

On a scale of 1 to 10 the recent visit of the Orange County Community College Engineering Department to your Indian Point facility was a 10+. Mr. Charles Koesis and Mr. Patrick Falciano could not have been more welcoming and more professional. Our students have already been exposed to a fair amount of physics, chemistry, mathematics and engineering and Misters Koesis and Falciano instinctively found the correct level on which to address them. During the visit there were a few other gentlemen who assisted with hosting us but I did not get their names. I assure you that they too were first rate representatives of your company.

Our students thoroughly enjoyed the visit - a visit which reinforced both their theoretical physics/engineering courses as well as their desire to find a career in an exciting engineering field. The motivational factor that results from this quality of exposure cannot be overemphasized. The impressive expertise of Mr. Koesis and the obvious experience of Mr. Falciano served to motivate the students as well as inform them.

Thank you for making this opportunity possible.

Cordially,

John F. Cummins, Ph.D.  
Chair, Science & Engineering

*p.s. should you bump into  
Jerry Steets, please  
give him my regards*

**Falciano, Patrick**

---

**From:** Shu-Ping Chang [spchang@us.ibm.com]  
**Sent:** Monday, October 30, 2006 9:50 AM  
**To:** Falciano, Patrick  
**Cc:** PELLEGRINOR@coned.com  
**Subject:** Feedback from attendees of IEEE TZ, ASME, SME Oct. 17 Energy Center meeting

Dear Friend:

We have received positive feedbacks from our attendees for the visit to your facility. Attached is one of them. We would like to thank you for your assistance to make our October meeting successful. We surely will plan future activity to your center to educate more of our members.

Cheers!  
SP Chang, Ph. D.  
IBM T.J. Watson Research Center  
19 Skyline Dr. Hawthorne, NY 10532  
Phone: +1 914 784-7746 (t/l 863-7746)  
spchang@us.ibm.com

----- Forwarded by Shu-Ping Chang/Watson/IBM on 10/30/2006 09:44 AM -----

"Daniel Wallace" <dwalln@yahoo.com>

To Shu-Ping Chang/Watson/IBM@IBMUS

cc

10/29/2006 06:04 PM

Subject Re: IEEE TZ, ASME, SME Oct. 17 Energy Center meeting TOMORROW

Shu-Ping,

My father and I attended the IEEE / ASME / SME meeting and tour of Indian Point. Both of us had a wonderful time and learned a great deal about the Entergy Energy center. My father actually grew up in Croton on Hudson and although not an engineer was quite impressed with the visit. Visiting an actual nuclear power plant with a tour lead by one of its control room operators is an experience that is very unique and truly impressive and we very much appreciate the effort that went into planning the event. Reflecting back on the visit I came away with a more comfortable feeling about the operation and safety of nuclear plants than before I arrived.

Hopefully there will be more of such events in the future, opportunities to visit unique facilities in the New York area.

Please share my comments with those at Entergy.

Thank you again,

Daniel

10/30/2006



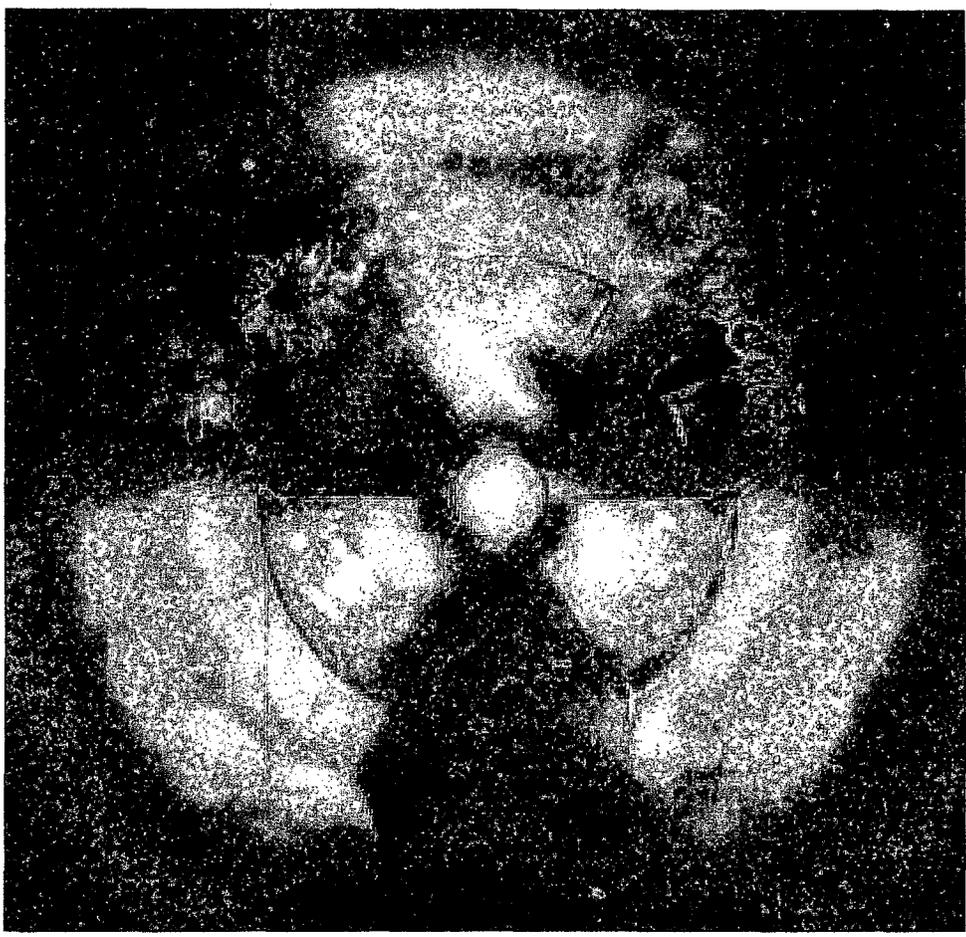
**Thank you**  

---

**Mr. Falciano!**

\* Thank you for teaching us. I really learned a lot. *Amay*  
*Coimbra* \*

**From**  
**New Rochelle High School**  
**Chemistry Students**



We appreciate the time you spent sharing what you know about

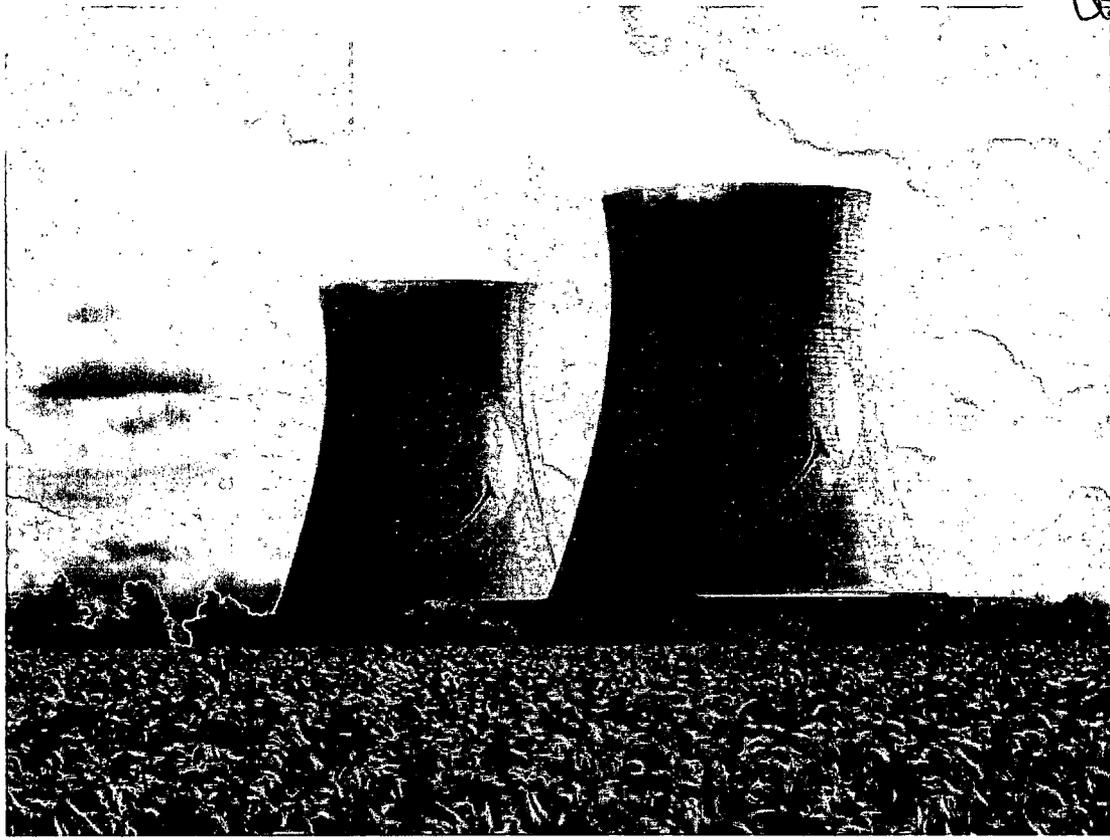
**Nuclear Power.**

*Thank you for broadening my world. AND that I'm a student of yours. I really learned a lot. Patrick*

Thank you  
for taking the  
time to teach  
us about

nuclear  
chemistry.  
It was gr-  
eat to learn  
about nucle-  
ar chem  
from a  
expert.

-Crystal  
Cascio



Thanks  
-Nick

Thank so much for  
coming. Your talk  
on nuclear power  
really convinced me  
that there are alternatives  
to a green energy.

- Alex Koban

Thanks for  
taking time  
out of your  
schedule to  
come and  
talk to us and  
prove to us  
nuclear  
power is safe.

Thank you  
for taking out time  
in your schedule to  
come talk to us about  
nuclear power! It's  
greatly appreciated.

-maria  
maffucci

By the  
way the  
kid running  
the powerpoint  
is Scott. (U)  
-Jenny  
Prakash

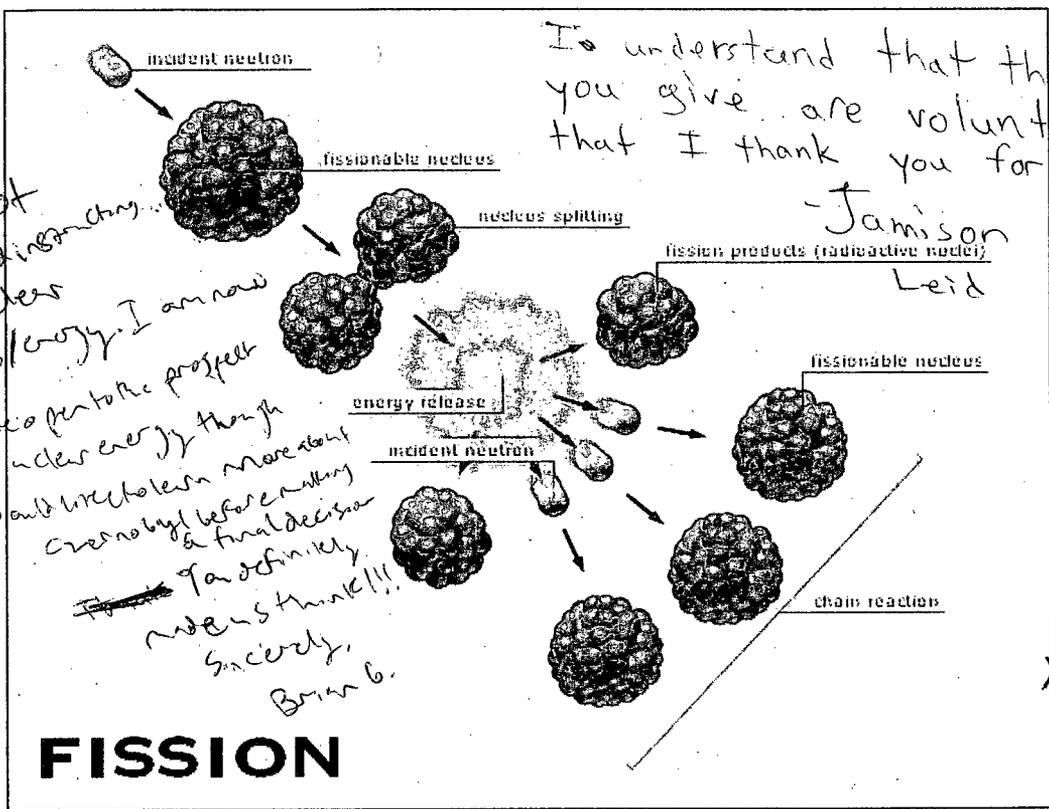
Thank you  
for teaching  
us about  
nuclear stuff

-Danny Vargas

Thanks for coming  
to our class and  
teaching us about  
nuclear chemistry =)

-Chelsea

~~You don't know who I am,~~  
but I



# FISSION

Thanks a lot  
for coming and interesting  
us about nuclear  
power plants/energy. I am now  
much more into the prospect  
of nuclear energy though  
I would like to learn more about  
Cernobyl before making  
a final decision  
to do so. Thanks  
for thinking  
sincerely,  
Brian G.

I appreciate your  
visit; your  
presentation was  
very informative  
DND

I understand that these lectures  
you give are voluntary, and for  
that I thank you for your generosity  
Thank you  
for visiting  
us ☺  
- Jamison  
Leid

Thank you for  
coming in for the  
visit. Your presentation  
was superb.  
Aloria

Thanks a lot for  
visiting. I gained a  
lot of insight from your  
visit.  
- Karley Anderson

I appreciate the time  
you took to enlighten us  
- Aki Bajulaize

Thanks for coming by  
and teaching us!  
- Charles  
(the Cynic)

Thanks for coming  
We appreciate you  
coming and teaching  
us about Nuclear Power  
- Jabbika  
Danns

thanks for coming!  
- Hannah

Thanks for giving your  
time to teach us about  
the Nuclear Power Plant.  
IT really changed my  
perspective about Nuclear  
Power  
- Janeth  
Barajas

thanks for  
coming in !!  
And giving up  
your time to teach  
us about the  
Nuclear Power stuffs.  
- Lucke Jyne  
Near

Thank you for  
coming! I've  
enjoyed your  
lessons!  
- Christa  
George

Mr. Falciano,  
Wow!  
Love, -Steven

Mr. Falciano

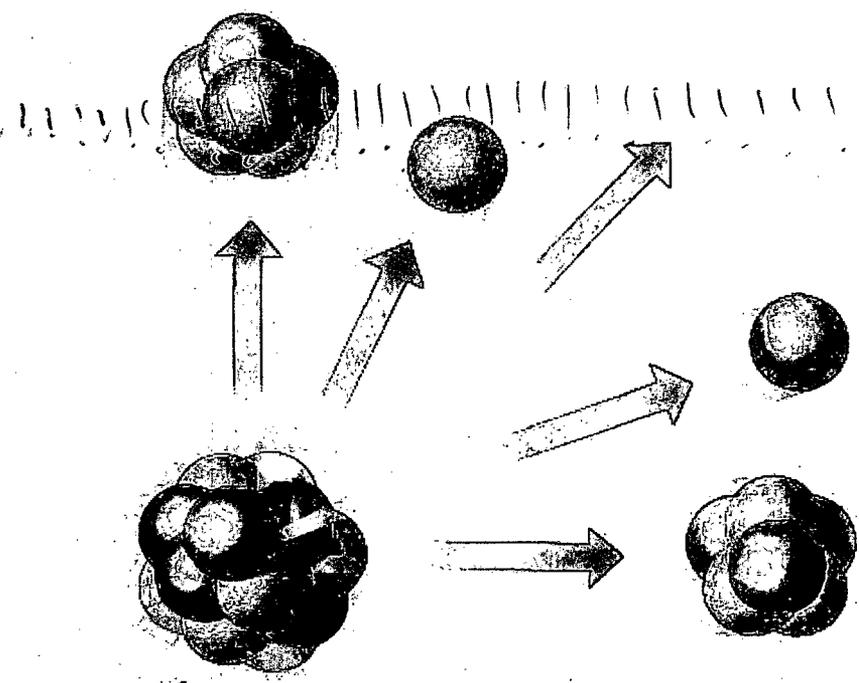
Thank you for  
coming to NPTS.  
we learned alot!!!  
You are a gangster

Love  
Alex

My name is Tess  
our presentation  
is great! Thanks  
or coming.

No, that was  
Nick Mendoza but  
thanks for enlight-  
ning us and really  
showing how safe  
nuclear power is.

enjoyed your whole  
presentation.



Thank you Mr. Falciano  
for educating us on nuclear  
power. You have corrected many  
of my misconceptions about  
nuclear power and its effects.  
It was truly interesting and  
thanks for your visit! 😊

-Lauren Tsuboyama

Stay tru  
mah du!  
you know it!

-ya boyz  
weird

!!  
-tess kuhaj

We truly appreciate the  
time you spent enlightening  
us about Nuclear power.  
I had no idea it was  
so safe!

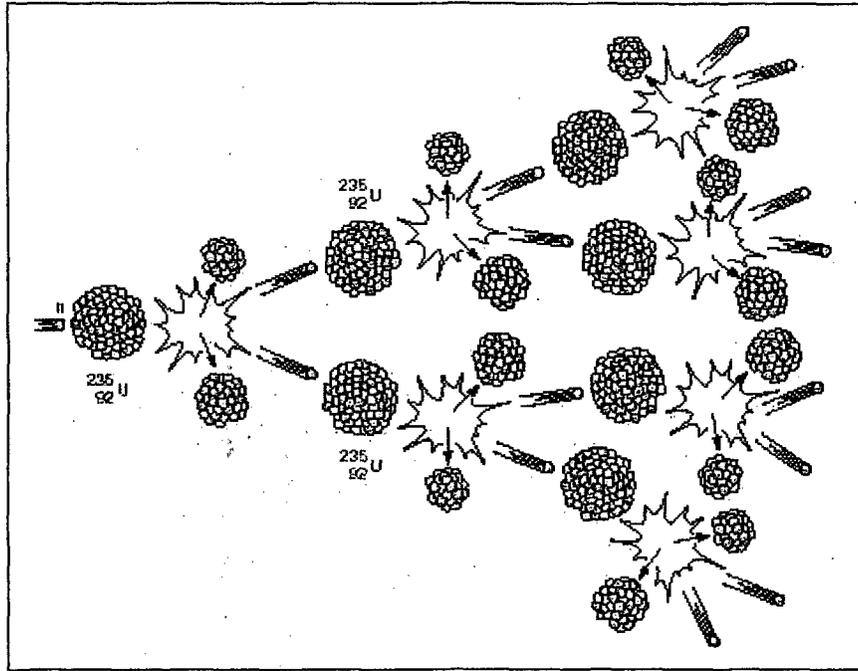
Thanks  
Noen

Thank you so much  
for coming! You're  
presentation was  
great.

Sincerely,  
Stefanie

Thanks alot  
for showing us  
how safe nuclear  
power was. I  
truly learned alot.  
-Jaime

Thanks! I  
learned a lot!  
Jessica Hernandez



Thanks for  
teaching us  
about nuclear  
power! I  
learned a  
lot!  
- Sarah

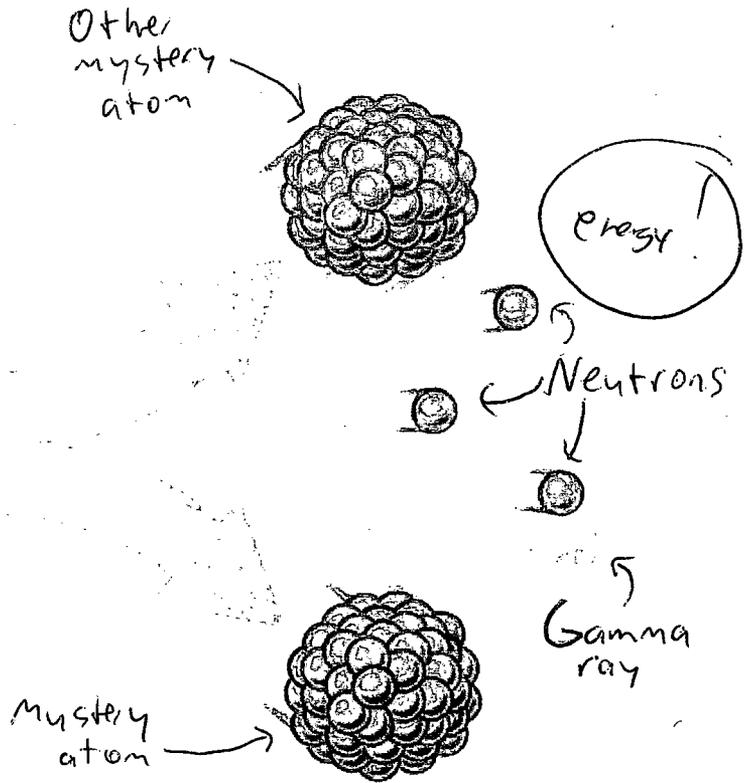
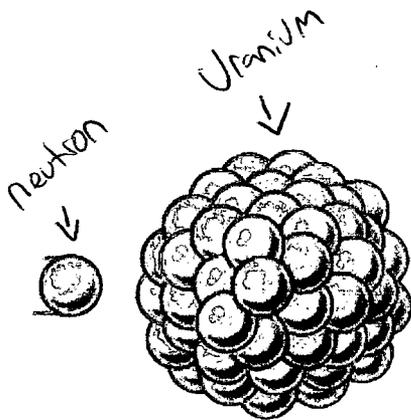
Thank you so much for  
teaching us about nuclear  
energy! I learned a lot!  
- Allison Richman

Thank you so much  
for taking your  
time to visit us  
and teach us a lot  
about nuclear power!!  
I learned many things  
from you  
- Hannah Kang

Thanks a lot  
for teaching us  
about Nuclear  
Power plants, I  
was really interested  
in the anatomy  
of the Nuclear  
Reactors!  
- Brian Bradley

Thank You for taking  
the time to teach us  
about Nuclear power!! It  
intrigued me very much!  
- Matt Moliterno

Fission!



Thank you for coming  
and talking to us about  
nuclear power. I really enjoyed  
it and learned a lot.  
-Scott McSweeney

Thank you  
for coming -  
Aaron G. Gifford

Thank you for taking  
time and to talk to  
us about nuclear energy  
as a reliable source of  
power :)  
-Vicki

Thank you for  
coming and teaching  
us about nuclear  
power.  
-Chris

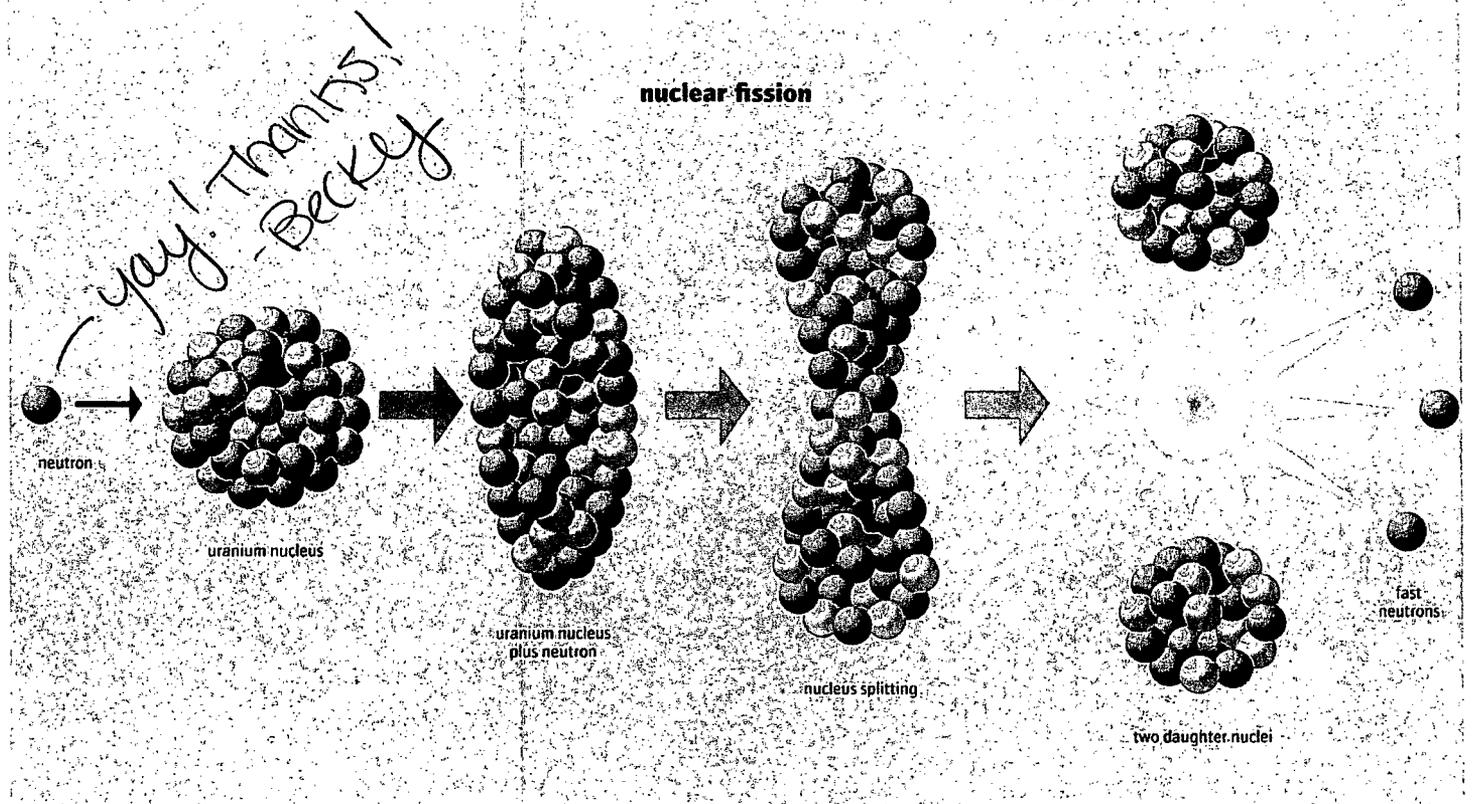
Wood  
Nuclear Power

Thanks  
Daniel

Thanks for coming,  
I enjoyed your  
presentation. - Mike

Thank you very much  
for coming and teaching  
us about nuclear power.  
It was very interesting  
and I learned a lot!

Thanks Again  
Elizabeth Ronan



Thanks for coming!  
It was really interesting  
to learn how safe Nuclear  
energy ~~is~~ is!  
-Nick Pasqua

Thanks you really  
convinced me that  
nuclear energy is  
totally safe  
-Andrew Diabbio

I love nuclear energy!  
-Mark Schweig

Thanks for  
spending time  
teaching us  
about nuclear  
power

Thank You  
-Paul Williams

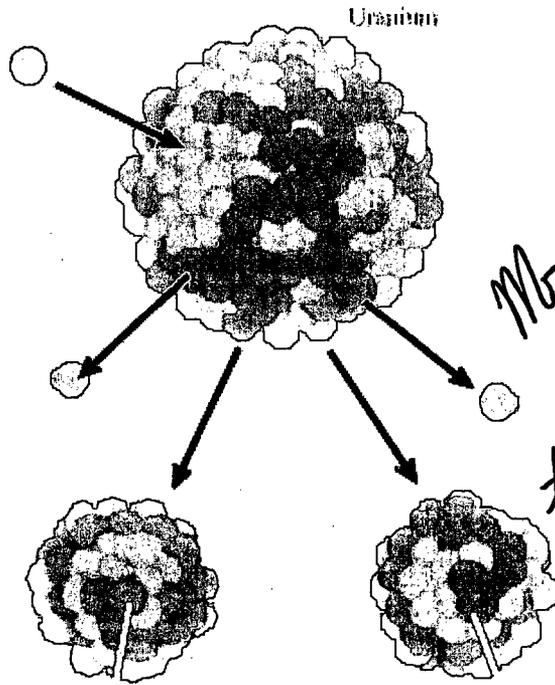
Thanks for coming  
-Pam

-Sam  
Watkins

Nuclear energy is cool... And so are you!  
- Corey

Dear Mr. Falciano,  
Thank you for teaching the class how we can solve the energy problem, and teaching me facts when I want to continue defending Nuclear power.

- Justin Latourden



⬡ proton  
○ neutron  
| radiation

Mr. Falciano,  
Thanks for coming to NRAS to talk to us. We really learned a lot from you and enjoyed the presentation!

thank you for coming!  
I learned a lot  
- Julia

- Mike

Dear Mr. Falciano,  
I really enjoyed your presentation. I really learned a lot about nuclear power.  
- Mia

Dear Mr. Falciano  
When I came here I thought this was something I would get bored. But I found it very interesting. I see how energy is simply made. I enjoyed your speech and you were able to answer all my questions. Think you for coming.  
- Giovanni Gomez

Dear Mr. F,  
I'm glad that you were able to clear up all the "confusion" about ~~the~~ nuclear power.  
- Marc Langer