Citizens Environmental Coalition

Main Office: 33 Central Ave, 3rd Floor, Albany, New York 12210
Phone: (518) 462-5527 • Fax: (518) 465-8349 • E-mail: *cectoxic@igc.org*

Websites: www.cectoxic.org • www.ecothreatny.org • www.toxicfreefuture.org

April, 18, 2011

State Energy Plan Comments
NYSERDA
17 Columbia Circle
Albany, NY 12203-6399

Re: Scope of the State Energy Plan

The current scope for the Energy Plan reflects business as usual, an outline not very different from previous revisions to the Energy Plan. However, while New York did not experience an earthquake and tsunami on March 12, 2011, it will be experiencing the long term political fallout of the ongoing Japanese nuclear disaster for some time. If the state faces reality it will be very seriously examining an energy future that excludes nuclear and figure out a way to quickly close every nuclear plant in the state as soon as possible and replace that power. The ramifications to the next energy plan should be profound, thus the need for a different outline or scope. While Fukushima was a more recent event that the scope could not capture, the extraordinary developments surrounding hydraulic fracturing as a means of recovering natural gas from Marcellus Shale have been ongoing for more than a year. This scope says nothing about hydraulic fracturing or gas drilling.

There is also a new legal framework for Energy Planning under Article 6 of the State Energy Law, which requires more careful consideration of impacts associated with energy use, production and delivery. The current scope does not adequately incorporate these new requirements.

State Energy Law requires:

- reducing the overall costs of energy in the State,
- minimizing health and environmental impacts,
- maximizing cost-effective energy efficiency to meet projected demand growth

As required by the Energy Law, the State Energy Plan must include:

- Security Issues analysis
- Environmental Justice analysis
- Energy costs for Consumers, Low income consumers
- Health, Safety, Welfare
- Environmental Quality

We believe New York now needs a dramatically different direction rather than a simple revision to its usual energy planning process. The Energy Plan must reflect recent events and address the requirements of the Energy Law amendments.

Our enclosed comments address costs and the need for a Consumer Utility Board, the need for protection of the Public Trust, and Trash Incineration as a dirty, costly and unsustainable energy source.

Thank you for your attention.

Sincerely,

Barbara J. Warren

Barbara J. Warren
Executive Director

Nuclear Power will require the most attention in the Planning process. The first step for New York State is to move from denial about the magnitude of the Fukushima disaster and face the reality of the implications for the state.

Nuclear Power is incompatible with life and health. It has required enormous public subsidies to survive in business and the marketplace. If it was a product on store shelves, the public would not buy it. Yet the public has been forced by the government to pay for this expensive and dangerous undertaking and live with serious threats.

State Energy Law requires minimizing health and environmental impacts. Nuclear power plants have the potential to cause death and illness to large numbers of people and render vast areas uninhabitable. Such severe effects are irreversible and irreparable. At the same time this power comes at very high costs, which include enormous federal subsidies that are borne by taxpayers. The marketplace has clearly spoken regarding the economics of nuclear power by refusing to invest private money in new nuclear power. Thus today there is a last ditch effort by the nuclear industry for governments to pick up the tab. In reality no new nuclear plants will be built in this country without both federal and state subsidies, paid by the public, either as taxpayers or ratepayers.

Nuclear waste is stored under inadequate and unsafe conditions. When monies flow from the government small amounts are cleaned up, but in general inadequate funds are allocated to attend to existing radioactive waste. More nuclear power generates more radioactive waste. New York State is today fighting for funds from the federal government to cleanup the West Valley nuclear site, home of a failed venture into nuclear waste reprocessing. When the federal government doesn't pay a fair share for nuclear waste, it becomes a burden on the state and an unfunded mandate.

Energy Planning should be comprehensive as the Energy Law indicates. Analysis of nuclear energy requires looking at New York's legacy of nuclear waste and the challenges and costs this represents. Existing nuclear power plants represent extraordinary danger particularly for a state that experienced the 911 terrorist attack on the World Trade Center. New York cannot be reassured by the existing federal regulatory structure in the Nuclear Regulatory Commission. The Agency's shortcomings have been under increased scrutiny since Fukushima with outside organizations providing multiple critical reports. Even the Agency's own Inspector General raised safety issues--- but this has not altered their operational mode. The NRC has repeatedly exempted nuclear reactors from its own safety standards. The NRC gave the Oyster Creek nuclear reactor over 20 exemptions in the month after the disaster. In response to Congressional oversight the NRC is conducting inspections that won't study any vulnerabilities that weren't already studied for the reactor's design basis. Inspectors are limited to 30 days for a single plant and 50-60 days for a facility with multiple reactors, even though multiple reactors carry more risks and more stored fuel. More shockingly inspectors were ordered not to document in their reports any vulnerabilities found that were outside the design basis for the plant. (Letter of Congressman Markey to Chairman Jaczko of the NRC, 4/15/11) These actions undermine Governor Cuomo's efforts in calling for a serious safety review of Indian Point.

Analysis of Nuclear Costs & Impacts

State Energy Law requires full analysis of all the security issues associated with nuclear power its catastrophic potential and related environmental impacts are fully examined. Japan has been

paralyzed not just by a natural disaster but by the hubris of the nuclear industry, that assumed a level of safety it did not have. Other industries have been forced to shutdown impacting industry in other countries. In a worst case what critical industries would be impacted in NY? what health care facitilites? What permanent and irreparable damage would occur to our water supplies and the Great Lakes? to property and agriculture? In Japan, they are diluting radioactivity in the ocean, but the Great Lakes take a century to turn over or flush contaminants. All of this should be evaluated in this energy plan.

Numerous reports have critiqued the safety record of the nuclear industry and the laissez-faire approach of the NRC, which should be at the forefront of nuclear safety. NRC risk estimates put the frequency of nuclear meltdowns at one every 10,000 years, yet according to a recent report by Thomas Cochran of NRDC we have had a dozen events with reactor core damage worldwide since 1957. Today with 439 reactors operating worldwide, we should expect to have a nuclear event involving core damage once every 3 years. (See NY Times 4/11/2011)

The Energy Plan should estimate the worst case costs of a severe nuclear event in New York in lives, health, property damage and long lived contamination.

Spent Fuel Pools represent a large part of the risk associated with nuclear reactors. "A 1997 report for the NRC by Brookhaven National Laboratory found that a severe pool fire could render about 188 square miles uninhabitable, cause as many as 28,000 cancer fatalities, and cost $59 billion in damage." (Alvarez article from Bulletin of Atomic Scientists, 2002. Full article attached.)

Article 6 requirements demand the minimization of health and environmental impacts. In the face of such catastrophic consequences, there can be no place for nuclear in New York's energy portfolio.

Existing safety problems at New York's reactors point to problems that need attention NOW. At Indian Point there are numerous safety systems below required standards-- electrical cables cannot adequately withstand fire damage, fire detectors and fire suppression systems are missing and rather than automatic systems, the plant relies on employees to undertake complex emergency actions. (NYTimes, 4/16/2011) A fire occurred at Nine Mile Point One in March. The Fitzpatrick nuclear reactor has 72 defective control rods out of 137 total. They are in danger of failing from cracking and fragmenting. Failure of control rods could cause them to get stuck and render them inoperable-- thus hindering their ability to prevent a meltdown. (Syracuse Post-Standard, Feb. 25, 2011)

The following Op-Ed article appeared in the San Francisco Chronicle on Tuesday, April 19, 2011:

Who would pay if nuclear disaster happened here?
Rochelle Becker

While the nuclear industry, including PG&E and Southern California Edison, continues to deny that the unimaginable could happen at its aging reactors or to its on-site radioactive waste pools, California must heed the economic impacts of Japan's catastrophe and review our liability limits. The federal Nuclear Regulatory Commission's fact sheet states that each reactor is covered by private liability insurance of up to $375 million.

For claims in excess of that amount, the federally subsidized secondary pool of reactor insurance is capped at $12.6 billion. In reality, that secondary pool is shallow.

Twelve billion dollars in offsite damages is less than half of the current estimates from Japan. JP Morgan has reported that Tepco, the nuclear utility in Japan, could face $23.6 billon in damage claims, and that the utility and the Japanese government are considering limiting liabilities to $36 billion. Ignoring the economic risks of the still-unfolding lessons of Tepco and the citizens of Japan could devastate California's tourism, agricultural, fishing and other invaluable industries. Who would visit California's scenic coast or buy our agricultural products should there be a radioactive release in our state - or even the mere perception of contamination? And check your policies: There is no private insurance, at any cost, to cover the loss of our homes or businesses.

Before March 11, neither the Japanese government nor the nuclear utilities had contemplated the realities they are facing today. It is clear the unimaginable must be considered and the costs must be paid - but by whom?

New York needs to assess realistically the costs of a nuclear catastrophe and require private operators to purchase sufficient insurance to cover these costs.

Planning for the Phase Out of Nuclear Reactors

For the next Energy Plan New York State must plan for a full phase out of nuclear power in the near term including:

1. A moratorium on new nuclear power plants in New York.

2. No upfront subsidies for nuclear reactors, such as requiring customers to pay while a plant is being built. CEC opposes any repeat of what occurred during the 1980s when customers of four New York utilities were forced to pay for Nine Mile Point Two before it commenced commercial operations.

3. Development of a closure plan for all nuclear plants in the state:
   - The Indian Point facility must be closed immediately this year.
   - A task force must be appointed to conduct a thorough review of nuclear reactors in the state to address priority safety issues. Task Force members must be independent of the NRC and the nuclear industry.
   - Immediate reductions in amount of spent fuel in every fuel pool.
   - Immediate preparations for moving spent fuel rods over 5 years old from fuel pools to hardened on site storage.
   - Immediate preparations for the orderly shut down of the two GE Mark I reactors- Fitzpatrick and Nine Mile Point 1 - within 2 years. These are the same type of reactors as those at Fukushima, Japan.
   - The last 2 reactors in NYS must be closed within 3 years- Nine Mile Point 2 and Ginna.

We have prioritized reactor closures based on information we already possess. It is possible that the task force may find safety issues that necessitate a change in the closure order. However, our overall view is that nuclear reactors are far too dangerous to continue operation in New York. They must be closed and their nuclear fuel safely secured. We recognize that New York State will have to explore the full range of its authority and use innovative methods to achieve these outcomes.

4. Adequate financial insurance to cover a nuclear catastrophe in NY and adequate financial resources to ensure the safe storage of the backlog of nuclear waste.

The Energy Plan must plan for Replacing Nuclear Power

1. The first priority activity must be dramatically expanded energy conservation and efficiency. New York should bring in the expertise of Amory Lovins to get this program moving more quickly. New York is behind on reaching its energy efficiency goals and has never adequately articulated energy conservation goals.

2. Ratepayer funds are collected in electric bills for energy efficiency and renewables. The allocations in NYC have never equaled consumer contributions from NYC. Since this is also a seriously constrained area in terms of electric supply, we need to expand the allocations for energy efficiency and clean renewables to address NYC's electric needs and facilitate the closure of Indian Point.

3. Once the serious electric restraints for Downstate NY are addressed, greater attention should turn to replacing the power of the other nuclear reactors that must be shut down and using ratepayer funds to aid power replacement.

Addressing Energy Costs, particularly for Low Income Consumers: Establish a Citizens Utility Board

New York Energy Law amendments require greater attention to energy costs and low income consumers. Unfortunately New York State has largely ignored consumers in a rush to support deregulation and to turn over most energy planning to industry. New York State has facilitated and watched over rising electric costs, believing that deregulation would reduce costs for consumers. Previous energy plans have failed to help low income consumers and New York has some of the highest electric costs in the nation. Fortunately energy efficiency and clean renewables offer opportunities for lower overall costs.

New York needs a **Citizens Utility Board.** In 2009 former Assemblymember Brodsky released a report finding that the NY Independent System Operator overcharges New Yorkers by $2.2 billion annually. (Albany Times Union 6/5/09) See *Rebuild New York*, NYPIRG, Dec. 2010, p. 43-44.

A Citizens Utility Board would provide a means to increase democratic participation for the public including providing expert technical assistance on energy, climate change, and consumer costs. New York currently has multiple structures created and run by industry interests. It is time we established one that serves as a watchdog for consumers. Other states have realized substantial savings through the function of their CUBs. A NY CUB could bring expertise to bear on the side of consumers. A CUB is even more essential now to analyze complex new programs

for energy efficiency, clean tech, building codes and steps to address a sustainable and environmentally sound energy system. A Citizens Utility Board could implement measures to address climate change and adaptation and provide essential public information.

Energy Efficiency and Conservation are key ways to reduce energy costs for consumers. Yet even with "15 by 15" goals for energy efficiency at the state level, New York is behind in attaining those goals. Building any new power plants is expensive for consumers as multiple previous energy analyses have shown. The Article 6 amendments specifically direct that cost-effective energy efficiency must be maximized.

Environmental Justice

The costs of energy weigh heavily on those with low or fixed incomes. As discussed above a Citizens Utility Board could work to provide relief mechanisms for those especially burdened by energy costs. Nuclear reactors in close proximity to New York City also threaten millions of people with limited ability to evacuate in an emergency. The Energy Plan must evaluate the full range of environmental justice impacts of nuclear reactors and emergency conditions.

Public Trust Doctrine in Relation to Nuclear Reactors and Hydrofracking

Protection of the Public Trust including all natural resources for future generations is especially meaningful in relation to nuclear power and Marcellus Shale hydrofracking.

In both cases the potential for serious irreparable and irretrievable consequences are apparent. New York State has an essential role in protecting the Public Trust. Decisions about Energy policy and plans should place a high priority on protection of the public trust. Like nuclear power, the benefits of hydrofracking are short-term - ten or twenty years - while the impacts are virtually forever. Groundwater, once ruined cannot be repaired. Clean water will become ever more vital in coming decades and centuries and the NYS government should takes steps that assure the protection of New York's water quality. The Precautionary Principle is particularly appropriate for protecting the public trust for future generations.

Nuclear safety has been guided by government facilitating dangerous technology and allowing numerous exemptions.

The Oil and Gas Industries have also obtained numerous exemptions from Existing Environmental Laws. This is why it is imperative for New York to use all of its existing authority to protect the public from harm in relation to nuclear reactors and hydrofracking. The original environmental impact statement for Marcellus shale hydrofracking was grossly deficient.

Oil & Gas Industry Exemptions from Environmental Laws.

The Sierra Club Atlantic Chapter delineated these exemptions in their Winter 2010 newsletter, which can be accessed at the following website.

http://newyork.sierraclub.org/SA/Vol40/ConservationAction.htm

Important Laws that the oil and gas industries have received exemptions under include:

- The Comprehensive Environmental Response Compensation and Liability Act
- Resource Conservation and Recovery Act
- Safe Drinking Water Act
- Clean Water Act
- Clean Air Act
- National Environmental Policy Act
- Emergency Planning and Community Right to Know Act, Provisions of the Toxic Release Inventory

As new revelations come to light, we have reason to be increasingly concerned that are surface waters, drinking water and freshwater bodies in the state could be permanently degraded and lost to future generations of New Yorkers. Toxic additive chemicals and radioactive elements could contribute to a toxic stew that once released cannot be retrieved or remediated.

The Newsletter from the Keuka Citizens Against Hydrofracking reports on a new proposal for storage of gas in salt caverns near Seneca Lake. See www.gasfreeseneca.com Article copied here.

The Planned Massive Industrialization of the Finger Lakes?
Inergy, LP is a Kansas City, Mo based company that wants to develop LPG (Liquefied Petroleum Gas) Storage in depleted salt caverns at the US Salt property, just north of Watkins Glen and on the west side of Seneca Lake. The initial permit application calls for 2.1 ***million*** *barrels of liquid propane and butane (88.2* ***million*** *gallons). The caverns in question were created by solution mining for salt and some have been abandoned for more than 50 years! As they move the LPG back and forth, the gas will be displaced by brine which will be stored* ***aboveground in a 14 acre, open air pond situated on the steep hillside roughly 2,500 feet from Seneca Lake with an earthen berm on the downhill side.*** *In order to service the storage there will be a new truck depot capable of loading and unloading 4 semi-trucks per hour and a new 6 track siding capable of loading and unloading 24 rail cars in 12 hours, all able to run 24 hours a day, 7 days a week year round. For an excellent article describing this go to: http://www.dcbureau.org/201010181243/Bulldog-Blog/the-marcellus-shale-play-a-reporters-peaceful-retreat-becomes-a-natural-gas-industry-target.html*
The NYS DEC is concerned enough about the potential for significant environmental impacts from this project that they took over Lead Agency Status from the Town of Reading and required Inergy to draft an Environmental Impact Statement. Their concerns are listed in the Scoping Document here: http://www.dec.ny.gov/docs/permits_ej_operations_pdf/finalscope.pdf
What doesn"t seem to be common knowledge, however, are the longer term plans Inergy has for this area. In company documents and from the pages of an industry magazine, Inergy plans to increase their salt cavern storage capacity to ***5 million barrels*** *(that"s* ***210 million gallons****) of LPG and has recently acquired NYSEG"s 2 billion cubic feet of underground natural gas storage with plans to expand to 5-10 billion cubic feet. They have been acquiring LP and natural gas storage in this region since 2005 and, according to LP Gas Magazine and their own website they plan to make the Finger Lakes Region,* ***"a gas storage and transportation hub" for the Northeast United States!*** *See the entire article here: http://www.lpgasmagazine.com/lp-gas-content/salt-earth*
Does all this tie in, somehow, to hydrofracking in the Marcellus Shale in New York State? The company seems to think so. In his own words John Sherman, Inergy CEO talks about the

transportation and storage hub and its relationship to the Marcellus Shale in this video titled- "Inergy: Making Marcellus Happen".
http://link.brightcove.com/services/player/bcpid1079049304?bctid=75891229001
From a 2010 SEC filing, ***"Inergy's opportunities in the Northeast continue to be enhanced by the Marcellus Shale. The aggressive pace of exploration and development of the Marcellus will play an important role in Inergy's midstream growth".***
How much worse could it get? NYSEG has recently been given a $29.6 million dollar grant by the DOE to study the feasibility of ***using depleted salt caverns adjacent to the LPG storage*** *site to store compressed air to power a150 MW power plant with a target in service date in 2014!*
http://www.sandia.gov/ess/docs/pr_conferences/2010/rettberg_nyseg.pdf

New York was also where one of the worst industrial accidents in this nation's history occurred when 40 workers were killed while cleaning and repairing LNG tanks on Staten Island. Security and emergency planning related to gas storage should also be covered in the Energy Plan.
The State Energy Law requires careful consideration of health and environmental impacts-- and doesn't allow state agencies to just view the Marcellus Shale as a new energy source. A ban on all hydrofracking needs to be instituted now.

Later after industry does sufficient research and development work to have safe methods in its tool box, the state might review the merits of hydrofracking. New York must ensure that an adequate legal framework exists for regulating this industry if it is allowed to go forward in the face of so many federal exemptions from environmental law.

Waste to Energy: Trash Incineration

Many energy companies are looking to be the first to build electric generating capacity. With energy efficiency and renewable energy goals, some of these companies think they have a great idea to use the millions of tons of waste the state produces as a source of energy. Trash incineration is a terrible idea, however there are other ways to harness energy from waste. A key way to differentiate a bad waste to energy idea from a sustainable one is to determine whether resources are destroyed. Most systems use thermal destruction and resources are definitely destroyed. However, anaerobic digestion is a type of composting without air, that generates methane gas. Organic or green food scraps and yard trimmings are recycled, not destroyed and can later be used to enrich soil with nutrients. The methane gas provides energy.

We fully support the recycling of source- separated organics through composting or anaerobic digestion.

New York is planning to expand the use of Biomass combustion, including municipal solid waste, as a renewable energy source. Solid Waste Incineration and newer thermal technologies represent dirty energy sources and they are unsustainable because:

- They destroy natural resources and recover only a small portion of the energy embedded in consumer products. Recycling recovers natural resources and 4-5 times the amount of energy that an incinerator recovers.

- They produce 30% more CO2 than coal-fired power plants, making them a poor solution for climate change.

- They are the most expensive solid waste management option, burdening local communities with exorbitant costs and pushing some to cut essential services and entertain bankruptcy, ie., Harrisburg, PA.

- They emit toxic pollutants including heavy metals and dioxins into the air and in the ash residue, which is landfilled.

- They foreclose investment in and use of other sustainable solid waste options—waste reduction, reuse, recycling and composting—which provide more jobs & economic development, while saving overall costs, and providing energy and environmental benefits.

A Clean and Sustainable Energy Future cannot be built on Dirty Energy or Unsustainable Policy options.

We recommend the following:

- Establish a moratorium on garbage incinerators, and newer thermal treatments including gasification, pyrolysis and plasma arc as Massachusetts has done. No expansions of existing facilities should be permitted.

- Provide no financial support or facilitate the construction of garbage incinerators.

- Support Waste Reduction, Reuse, Recycling and Composting as key energy efficiency and renewable energy strategies to achieve greenhouse gas reductions.

- Support only Clean Renewable Energy and a Clean Renewable Energy Portfolio Standard, not dirty energy sources as renewable energy.

- Opposition to a Low Carbon Portfolio Standard LCPS as a replacement for the Renewable Portfolio Standard. A LCPS would require utilities to purchase a fixed percentage of low carbon fuel which could include nuclear energy or other dirty energy sources, like trash incineration.

In November 2010, the US Energy Information Administration published *Updated Capital Cost Estimates for Electricity Generation Plants.* These cost estimates show trash incineration to be the most costly way of generating electricity with the highest capital costs of $8232/kW and the highest operating costs at $373/kW. Such costs are much higher than the estimated costs for IGCC, Integrated Gasification Combined Cycle for coal with Carbon capture and sequestration at $5348/kW. This is a technology viewed as very expensive. See attachment.

ATTACHMENTS

Representative Markey's Press Release

FOR IMMEDIATE RELEASE
>
>
> Contact: Giselle Barry 202-225-2836, Eben Burnham-Snyder 202-225-6065

> *Markey: NRC Directing Secrecy in the Wake of Fukushima Meltdown*
>
> *Limits Placed on Time, Scope, Transparency of Inspections Designed to
> Assess U.S. Vulnerability*
>
>
> WASHINGTON (April 15, 2011) – In the wake of the Fukushima disaster,
> the Nuclear Regulatory Commission (NRC) set out to inspect the U.S.
> fleet of nuclear reactors to ensure their safety and report publicly on its findings.
> Yet today, Rep. Edward J. Markey (D-Mass.) revealed that significant
> limits may be imposed on the inspections, and that inspectors also
> have been directed to keep many of the most serious vulnerabilities secret.
>>
> In a letter sent to Greg Jaczko, the Chairman of the Nuclear
> Regulatory Commission, Rep. Markey notes that he has been informed
> that inspectors are limited to 40 hours to check a nuclear power plant
> with only one unit, and 50-60 hours to check a plant with multiple
> units. Inspectors were also initially instructed to limit their
> inspections only to the adequacy of safety measures needed to respond
> to "Design Basis Events." These inspections were therefore looking at
> the vulnerabilities to events that have already been contemplated and
> analyzed by the NRC, but not to many of the events that occurred in
> Fukushima which were previously considered to be impossible and
> therefore not subject to regulation. When NRC's own inspectors
> complained about this limitation, it was removed, but inspectors were
> then directed not to record any observations or findings of
> vulnerabilities that went beyond design-basis events in any document that would eventually become public as part of the NRC's review.
>
>> "These limitations, if true, severely undermine my confidence in the
> Commission's interests in conducting a full and transparent assessment
> of the ability of U.S. nuclear power plants to be kept safe in the
> event of an incident that exceeds the current design basis assumptions
> regarding earthquakes or electricity outages -- such as the ones that
> occurred in Japan," wrote Rep. Markey, who is the top Democrat on the
> Natural Resources Committee and a senior member of the Energy and
> Commerce Committee. "This also seems entirely at odds with the
> Commission-approved direction to study the implications of the
> Fukushima meltdown on U.S. facilities and report publicly on the
> findings of the study. We should stand prepared to learn from the
> catastrophe in Japan and plan ahead to address what was unforeseen but
> occurred anyway, rather than attempting to hide our vulnerabilities
> from public view and, potentially, use the fact that the information will be kept secret to avoid taking all necessary regulatory action."
>
>
> "The fact that they plan to keep the most serious vulnerabilities
> secret raises questions about whether the Nuclear Regulatory

> Commission is more interested in public relations than public safety,"
> said Rep. Markey in additional comments.
>
>
> In the letter, Rep. Markey asks Chairman Jaczko and the NRC to respond
> to these reports, and ensure that the decision to hide some of the
> results from public view is reversed. Rep. Markey also asks whether
> U.S. nuclear power plants' vulnerability to events that are known or
> thought to have occurred in Japan – such as more severe earthquakes
> and tsunamis than expected, the melting of core nuclear fuel rods
> through the reactor pressure vessel, hydrogen explosions in reactor
> cores and spent nuclear fuel areas, long electricity outages and
> losses of cooling to reactor cores and spent nuclear fuel storage
> areas, and the failure of multiple safety systems and diagnostic
> capabilities – will be both analyzed and reported on publicly as the Commission was supposed to do.
>
>The full letter is available here <http://markey.house.gov/docs/4.15.11.nrc.pdf
It is also attached to these comments.

Bulletin of Atomic Scientists, 2002, Vol. 58, No. 1, pp. 45-47

January/February 2002

What about the spent fuel?

By Robert Alvarez
Until recently, concerns about attacks on commercial nuclear power plants focused mainly on the vulnerability of reactor containment buildings. But nuclear power plants may have a weaker link—spent fuel ponds. "Reactors are inside steel vessels surrounded by heavy structures and containment buildings," says Gordon Thompson, senior scientist at the Institute for Resource and Security Studies. "Spent fuel pools, containing some of the largest concentrations of radioactivity on the planet, can catch fire and are in much more vulnerable buildings."
Public officials share Thompson's concern. "I'm not so worried about the core; I'm worried about the spent fuel pool," Gov. Howard Dean of Vermont told the (November 2). "There's basically no protection there."

The ponds, typically rectangular or L-shaped basins about 40 feet deep, are made of reinforced concrete walls four to five feet thick and stainless steel liners. Basins without steel liners are more susceptible to cracks and corrosion. Most of the spent fuel ponds at boiling water reactors are housed in reactor buildings several stories above ground. Pools at pressurized water reactors—representing about two-thirds of all ponds—are partially or fully embedded in the ground, sometimes above tunnels or underground rooms.

New York Times
Fire and water
Over the past 25 years, Thompson, a physicist and engineer, has worked on behalf of citizen groups and state and local governments to convince nuclear regulators in the United States and Europe that spent fuel pools pose severe risks. The most serious risk, he says, is loss of the pool water that cools and shields the highly radioactive spent fuel assemblies. Water loss could expose spent fuel, leading to a catastrophic fire with consequences potentially worse than a reactor meltdown. Most U.S. reactors store spent fuel in high-density pools. If that fuel were exposed to air and steam, the zirconium cladding would react exothermically, catching fire at about 1,000 degrees Celsius. A fuel pond building would probably not survive, and the fire would likely spread to nearby pools. The Nuclear Regulatory Commission (NRC) concedes that such a fire cannot be extinguished; it could

rage for days.

On average, spent fuel ponds hold five to 10 times more long-lived radioactivity than a reactor core. Particularly worrisome is the large amount of cesium 137 in fuel ponds, which contain anywhere from 20 to 50 million curies of this dangerous isotope. With a half-life of 30 years, cesium 137 gives off highly penetrating radiation and is absorbed in the food chain as if it were potassium. According to the NRC, as much as 100 percent of a pool's cesium 137 would be released into the environment in a fire.

In comparison, the 1986 Chernobyl accident released about 40 percent of the reactor core's 6 million curies of cesium 137 into the atmosphere, resulting in massive off-site radiation exposures. A single spent fuel pond holds more cesium 137 than was deposited by all atmospheric nuclear weapons tests in the Northern Hemisphere combined.

If a fire were to break out at the Millstone Reactor Unit 3 spent fuel pond in Connecticut, it would result in a three-fold increase in background exposures. This level triggers the NRC's evacuation requirement, and could render about 29,000 square miles of land uninhabitable, according to Thompson. Connecticut covers only about 5,000 square miles; an accident at Millstone could severely affect Long Island and even New York City.

A 1997 report for the NRC by Brookhaven National Laboratory also found that a severe pool fire could render about 188 square miles uninhabitable, cause as many as 28,000 cancer fatalities, and cost $59 billion in damage. (The Brookhaven study relied on a different standard of uninhabitability than Thompson.) While estimates vary, "the use of a little imagination," says Thompson, "shows that a pool fire would be a regional and national disaster of historic proportions."

Several events could cause a loss of pool water, including leakage, evaporation, siphoning, pumping, aircraft impact, earthquake, accidental or deliberate drop of a fuel transport cask, reactor failure, or an explosion inside or outside the pool building. Industry officials maintain that personnel would have sufficient time to provide an alternative cooling system before the spent fuel caught fire. But if the water level dropped to just a few feet above the spent fuel, the radiation doses in the pool building would be lethal.

The procedures fuel handlers need to follow to recognize problems, repair heavily damaged equipment, and command off-site resources have yet to be formalized, much less tested. But if routine operations are any indication, not all reactors would pass muster: By the NRC's own admission, significant temperature rises in fuel ponds have gone undetected for days.

Old policy, older problems

Over the years, Thompson's persistence has paid off, and the NRC has grudgingly made important concessions. For 20 years, the NRC assumed that aged spent fuel, which has had several years for radioactive isotopes to decay, was at little risk of catching fire. But in an October 2000 study of spent fuel risks at sites where reactors were being decommissioned, the NRC conceded that "the possibility of a zirconium fire cannot be dismissed even many years after a final reactor shutdown." Equipment installed to make high-density ponds safe actually exacerbates the fire danger, particularly with aged spent fuel. In high-density pools at pressurized water reactors, fuel assemblies are packed about nine to 10.5 inches apart—slightly more than the spacing inside a reactor. To compensate for the increased risk of criticality, pools have been retrofitted with enhanced water chemistry controls and neutron-absorbing panels between assemblies. The extra equipment restricts water and air circulation, creating vulnerability to systemic failures. If the equipment collapses or fails, as might occur during a terrorist attack, for example, air and water flow to exposed fuel assemblies would be obstructed, causing a fire, according to the NRC's report. Heat would turn the remaining water into steam, which would interact with the zirconium, making the problem worse by yielding flammable and explosive hydrogen. As a result, the NRC concluded that "it is not feasible, without numerous constraints, to define a generic decay heat level (and therefore decay time) beyond which

a zirconium fire is not physically possible."

Perhaps the most important concession was made in June 2001, when the NRC staff reported that terrorist threats against spent fuel ponds are credible and cannot be ruled out. "Until recently, the staff believed that the [design basis threat] of radiological sabotage could not cause a zirconium fire. However, [NRC's safety policy for spent fuel storage] does not support the assertion of a lesser hazard to the public health and safety, given the possible consequences of sabotage."

Despite acknowledging spent fuel pond dangers, the NRC's ability to adapt to a much more dangerous world remains to be seen. It took 10 days after the September 11 attacks before the NRC admitted that "nuclear power plants were not designed to withstand [jet airliner] crashes." Although this statement was widely covered by the media, the NRC was just restating the results of old policy. In 1982, the NRC's Atomic Safety and Licensing Board ruled that reactor owners "are not required to design against such things as . . . kamikaze dives by large airplanes. Reactors could not be effectively protected against such attacks without turning them into virtually impregnable fortresses at much higher cost." This view is buttressed by NRC's equally long-standing policy blocking

consideration of terrorist acts in licensing proceedings. Because acts of terrorism are unpredictable, the NRC reasons, they are not germane to safety requirements. Incredibly, a day after the September 11 attacks, the NRC ruled that concerns about terrorists raised by Georgians Against Nuclear Energy (GANE) regarding the mixing of plutonium in nuclear fuel at the Energy Department's Savannah River Site were not valid because "GANE does not establish that terrorist acts . . . fall within the realm of 'reasonably foreseeable' events."

Running out of room

The NRC is now reviewing from "top to bottom" its safety and security policies, "working around the clock to ensure protection of nuclear power plants and nuclear fuel facilities," NRC spokesman Victor Dricks told the on November 1. "Everything's on the table. I'd like to tell you that everything's going to be okay, but I can't do that."

Will more gates, guards, and guns be enough? About 40,000 tons of spent nuclear fuel are stored in pools at 110 operating and closed reactor sites across the United States, with over 2 billion curies of long-lived radioactivity. Over the next several years, the Energy Department estimates that storage space for an additional 11,000 tons of spent fuel will be needed.

Plant owners are already lobbying for more space. For example, Connecticut's Millstone plant has 585 fuel assemblies in its reactor Unit 3 pond. But Millstone's owner, Dominion Nuclear Connecticut Inc., wants permission from the NRC to expand the pool's capacity to hold 1,860 assemblies. Spent fuel ponds were designed to be temporary—and to store only a small fraction of what they currently hold. "Neither the AEC [now the Energy Department] nor utilities anticipated the need to store large amounts of spent fuel at operating sites," said Millstone's owner last October. "Large scale commercial reprocessing never materialized in the United States. As a result, operating nuclear sites were required to cope with ever-increasing amounts of irradiated fuel. . . . This has become a fact of life for nuclear power stations."

The underlying assumption of NRC's policy allowing for expanded pool storage is that some day the government will permanently dispose of it all, as required under the 1982 Nuclear Waste Policy Act. But the Energy Department will not accept custody of spent fuel until 2010 at the earliest—if at all. Even if Energy and the Bush administration are able to overcome the formidable opposition to opening the proposed repository at Yucca Mountain in Nevada, there could be considerable risk in transporting thousands of shipments of highly radioactive waste.

Washington Post

Storage solutions

In light of the NRC's admissions about spent fuel vulnerabilities, it seems it would be easier to cause an accident at a spent fuel pond than to breach and release the radioactive contents of multiple

hardened concrete and steel dry storage casks. Casks and other storage alternatives would greatly reduce, or even eliminate, the risk of a pond fire. A handful of reactor owners have put only about 4 percent of the nation's spent fuel into dry storage.

Today, the pressure felt by reactor owners from electricity deregulation works against nuclear safety. According to a report on utility deregulation and nuclear power by the Nukem Corporation, "In an era of deregulation there will be no pool of captive customers to shoulder uneconomic operating costs or massive capital additions." Because of deregulation, the owners of many reactors are limited liability companies with little or no cash reserves. There is no financial incentive to move wastes to safer dry storage.

Other nations are taking spent fuel vulnerabilities very seriously. Germany is seeking ways to harden its dry-stored spent fuel in even more robust containers. France has installed anti-aircraft missiles around its spent fuel ponds at the La Hague reprocessing facility, where some 100 million curies of cesium 137 are stored. What the United States will do to protect the public from this serious nuclear vulnerability remains to be seen.

The permanent disposal of spent fuel from commercial reactors now seems a greater abstraction than does a terrorist strike against a nuclear power plant. Safely securing the spent fuel in crowded pools should be a public safety priority of the highest degree. If the events of September 11 have taught us anything, it is that the war against terrorism will be an unpredictable struggle. The cost of fixing America's nuclear vulnerabilities may be high, but the price of doing too little is incalculable.

Robert Alvarez served as a senior policy adviser in the Energy Department and is now a senior scholar at the Institute for Policy Studies.

A More Detailed Paper is Available: "Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States," Alvarez, Robert, et. al, Science and Global Security, 11:1-51,2003.

US Energy Information Administration Cost Estimates for Electric Generating Plants Attached.

US Representative Markey Letter

Updated Capital Cost Estimates for Electricity Generation Plants

November 2010

U. S. Energy Information Administration
Office of Energy Analysis

U.S. Department of Energy
Washington, DC 20585

U.S. Energy Information Administration
Independent Statistics and Analysis

Table 1. Updated Estimates of Power Plant Capital and Operating Costs

	Plant Characteristics		Plant Costs		
	Nominal Capacity (kilowatts)	Heat Rate (Btu/kWh)	Overnight Capital Cost (2010 $/kW)	Fixed O&M Cost (2010$/kW)	Variable O&M Cost (2010 $/MWh)
Coal					
Single Unit Advanced PC	650,000	8,800	$3,167	$35.97	$4.25
Dual Unit Advanced PC	1,300,000	8,800	$2,844	$29.67	$4.25
Single Unit Advanced PC with CCS	650,000	12,000	$5,099	$76.62	$9.05
Dual Unit Advanced PC with CCS	1,300,000	12,000	$4,579	$63.21	$9.05
Single Unit IGCC	600,000	8,700	$3,565	$59.23	$6.87
Dual Unit IGCC	1,200,000	8,700	$3,221	$48.90	$6.87
Single Unit IGCC with CCS	520,000	10,700	$5,348	$69.30	$8.04
Natural Gas					
Conventional NGCC	540,000	7,050	$978	$14.39	$3.43
Advanced NGCC	400,000	6,430	$1,003	$14.62	$3.11
Advanced NGCC with CCS	340,000	7,525	$2,060	$30.25	$6.45
Conventional CT	85,000	10,850	$974	$6.98	$14.70
Advanced CT	210,000	9,750	$665	$6.70	$9.87
Fuel Cells	10,000	9,500	$6,835	$350	$0.00
Uranium					
Dual Unit Nuclear	2,236,000	N/A	$5,335	$88.75	$2.04
Biomass					
Biomass CC	20,000	12,350	$7,894	$338.79	$16.64
Biomass BFB	50,000	13,500	$3,860	$100.50	$5.00
Wind					
Onshore Wind	100,000	N/A	$2,438	$28.07	$0.00
Offshore Wind	400,000	N/A	$5,975	$53.33	$0.00
Solar					
Solar Thermal	100,000	N/A	$4,692	$64.00	$0.00
Small Photovoltaic	7,000	N/A	$6,050	$26.04	$0.00
Large Photovoltaic	150,000	N/A	$4,755	$16.7	$0.00
Geothermal					
Geothermal – Dual Flash	50,000	N/A	$5,578	$84.27	$9.64
Geothermal – Binary	50,000	NA	$4,141	$84.27	$9.64
MSW					
MSW	50,000	18,000	$8,232	$373.76	$8.33
Hydro					
Hydro-electric	500,000	N/A	$3,076	$13.44	$0.00
Pumped Storage	250,000	N/A	$5,595	$13.03	$0.00

Table 2. Comparison of Updated Plant Costs to *AEO2010* Plant Costs

Table II					
	Overnight Capital Cost ($/kW)			Nominal Capacity KW's[1]	
	AEO 2011	AEO 2010	% Change	AEO 2011	AEO 2010
Coal					
Advanced PC w/o CCS	$2,844	$2,271	25%	1,300,000	600,000
IGCC w/o CCS	$3,221	$2,624	23%	1,200,000	550,000
IGCC CCS	$5,348	$3,857	39%	600,000	380,000
Natural Gas					
Conventional NGCC	$978	$1,005	-3%	540,000	250,000
Advanced NGCC	$1,003	$989	1%	400,000	400,000
Advanced NGCC with CCS	$2,060	$1,973	4%	340,000	400,000
Conventional CT	$974	$700	39%	85,000	160,000
Advanced CT	$665	$662	0%	210,000	230,000
Fuel Cells	$6,835	$5,595	22%	10,000	10,000
Nuclear					
Nuclear	$5,339	$3,902	37%	2,236,000	1,350,000
Renewables					
Biomass	$3,860	$3,931	-2%	50,000	80,000
Geothermal	$4,141	$1,786	132%	50,000	50,000
MSW - Landfill Gas	$8,232	$2,655	210%	50,000	30,000
Conventional Hydropower	$3,078	$2,340	53%	500,000	500,000
Wind	$2,438	$2,007	21%	100,000	50,000
Wind Offshore	$5,975	$4,021	49%	400,000	100,000
Solar Thermal	$4,692	$5,242	-10%	100,000	100,000
Photovoltaic	$4,755	$6,303	-25%	150,000	5,000

[1] Higher plant capacity reflects the assumption that plants would install multiple units per site and that savings could could be gained by eliminating redundancies and combining services.

COMMITTEES

NATURAL RESOURCES
RANKING DEMOCRAT

ENERGY AND COMMERCE

EDWARD J. MARKEY
7TH DISTRICT, MASSACHUSETTS

2108 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–2107
(202) 225–2836

DISTRICT OFFICES:

5 HIGH STREET, SUITE 101
MEDFORD, MA 02155
(781) 396–2900

188 CONCORD STREET, SUITE 102
FRAMINGHAM, MA 01702
(508) 875–2900

http://markey.house.gov

Congress of the United States
House of Representatives
Washington, DC 20515–2107

April 15, 2011

The Honorable Greg Jaczko
Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Chairman Jaczko:

I write to express my concern regarding the post-Fukushima meltdown inspections currently being conducted by Nuclear Regulatory Commission (NRC) personnel at U.S. nuclear power plants. According to reports I have received, the NRC has decided to keep the results of most of these investigations secret, and their scope and depth may be severely constrained. As such, they may not provide the sort of information needed to adequately assess, let alone remedy, the safety of U.S. nuclear facilities.

As you know, on March 23 the Commission voted to require a multi-phase review[1] of U.S. nuclear reactor safety in the wake of the Japanese meltdown. The near-term review portion of these efforts called for the establishment of a task force to:

> "Evaluate currently available technical and operational information from the events that have occurred at the Fukushima Daiichi nuclear complex in Japan to identify potential or preliminary near term/immediate operational or regulatory issues affecting domestic operating reactors of all designs, including their spent fuel pools, in areas such as protection against earthquake, tsunami, flooding, hurricanes; station blackout and a degraded ability to restore power; severe accident mitigation; emergency preparedness; and combustible gas control."

The task force was additionally directed to develop near-term recommendations for regulatory and other changes, and is also required to inform its efforts using stakeholder input. The longer (90 day) review is supposed to include more extensive stakeholder input, and the task force was directed in this phase to "evaluate all technical and policy issues related to the event to identify potential research, generic issues, changes to the reactor oversight process, rulemakings, and adjustments to the regulatory framework that should be conducted by NRC." All of the results of these efforts were supposed to be made public.

---

[1] Tasking Memorandum – COMBJ-11-0002 – NRC Actions Following The Events In Japan

I have recently learned that the NRC has initiated inspections at operating nuclear power plants for purposes of assessing the operational or regulatory issues that may have arisen as a result of the Fukushima meltdown, and that the results of these inspections, which are intended to inform the 90 day review, must be completed by April 29. I have also learned of the following constraints that have been placed on these inspections:

- The NRC is only allowing its inspectors 40 hours in which to perform each inspection for nuclear power plants that contain one nuclear reactor. For nuclear power plants with more than one unit, inspectors are being provided with only 50-60 hours total in which to complete their work.
- The NRC inspectors were initially told to limit their inspections to the adequacy of safety measures needed to respond to Design Basis Events. This meant that inspectors would be assessing licensees' ability to withstand and respond only to events that have already been contemplated and analyzed by the NRC and for which regulatory requirements have been implemented, but not events such as the ones that occurred in Japan, which were previously believed to be impossible.
- After several NRC inspectors complained that it made no sense to limit the scope of the inspections to Design Basis Events, the guidance was changed to enable inspectors to look beyond them; however, they were explicitly told not to record any of their beyond Design Basis observations or findings in documents that would be made public as part of the Commission's review or public report(s). Instead, these findings would be entered into a private NRC database and kept secret.

These limitations, if true, severely undermines my confidence in the Commission's interests in conducting a full and transparent assessment of the ability of U.S. nuclear power plants to be kept safe in the event of an incident that exceeds the current design basis assumptions regarding earthquakes or electricity outages -- such as the ones that occurred in Japan. This also seems entirely at odds with the Commission-approved direction to study the implications of the Fukushima meltdown on U.S. facilities and report publicly on the findings of the study. This is unacceptable, and must immediately be remedied. We should stand prepared to learn from the catastrophe in Japan and plan ahead to address what was unforeseen but occurred anyway, rather than attempting to hide our vulnerabilities from public view and, potentially, use the fact that the information will be kept secret to avoid taking all necessary regulatory action. In order to better understand what the NRC is doing here, I request that you please respond to the following questions and requests for information:

1. Who at the Commission made the decisions to a) initially direct its inspectors to limit the scope of the inspections to Design Basis Events and b) subsequently direct its inspectors not to record findings or observations of any beyond Design Basis Events in a manner that would result in the public disclosure of any identified vulnerabilities? Please provide me with a copy of all documents (including reports, emails, correspondence, memos, phone or meeting minutes or other materials) related to both the

decisions regarding the scope of the inspections as well as the manner in which inspection findings and observations would be recorded and reported.

2. Will you immediately reverse the current direction to NRC inspectors to keep all findings and observations of vulnerabilities of U.S. reactors to beyond Design Basis events secret and excluded from all public reports on the Commission's Fukushima review? If not, why not?

3. The NRC review is supposed to evaluate the currently available information from the events that occurred in Japan to identify changes that might be needed at U.S. nuclear power plants of all designs. For each of the following events that are known to have occurred in Japan, please indicate a) whether the event in question is considered to be a "design-basis event" by the NRC, b) whether NRC inspectors will be required to evaluate whether the U.S. nuclear power plants they are inspecting are capable of preventing or mitigating such an event, c) if not, why not, since the Commission clearly stated that all such events were supposed to be analyzed, d) if not, how regulatory or other recommendations will be developed that ensure that U.S. nuclear power plants are capable of preventing or mitigating such an event, e) whether the findings and observations associated with the inspections designed to evaluate U.S. ability to prevent or mitigate such an event will be made public as part of the NRC's 30, 60 and 90 day reports (and if not, why not), and f) whether the NRC intends to address U.S. vulnerability to the event at all through regulatory or other requirements.

   i) An earthquake that is more severe than the one the nuclear power plant was designed to withstand.
   ii) For coastally-located nuclear power plants, a tsunami that is more severe than the one the nuclear power plant was designed to withstand.
   iii) A loss of operating power that is longer than current regulations are required to address.
   iv) A total station blackout (i.e. loss of operating power and failure of emergency diesel generators) that is longer than current regulations are required to address.
   v) A hydrogen explosion that occurs due to the buildup of hydrogen in the core or other areas of a nuclear reactor due to the failure of mitigation technologies such as hardened vents or hydrogen re-combiners, and the causes of such failures.
   vi) A hydrogen explosion that occurs due to the buildup of hydrogen in the spent fuel storage area of a nuclear reactor due to the absence of mitigation technologies such as hardened vents or hydrogen re-combiners.

vii) A breach in the containment vessel of a nuclear reactor core caused by a hydrogen explosion.

viii) A breach in the structure of a spent nuclear fuel storage area due to an earthquake or hydrogen explosion.

ix) The failure of the recirculation pump seals within the reactor pressure vessel which may prevent cooling water from fully filling the pressure vessel and thus covering and cooling the nuclear fuel rods contained therein.

x) The failure of one or more safety relief valves within the primary containment area that could enable the transfer of radioactive core material between the drywell and the torus.

xi) The potential melting of core material through the pressure vessel and into the drywell or torus of the nuclear reactor.

xii) The failure of the isolation condenser and/or reactor core isolation cooling systems and subsequent inability to provide cooling function to the nuclear reactor cores.

xiii) The failure of the primary containment vessel spray cooling and core spray systems.

xiv) The failure of systems used to cool spent nuclear fuel storage areas, including areas that contain varying amounts of spent nuclear fuel of varying ages.

xv) The failure of diagnostic equipment to accurately monitor temperature, water levels, hydrogen/oxygen concentrations, pressures and radiation onsite, both during a total station blackout and after basic electricity function is restored (such as if the devices have been damaged by water, radiation or other events).

xvi) The absence of a source of fresh cooling water with which to cool the reactor core and spent nuclear fuel storage areas.

xvii) The absence of a means by which to store large quantities of highly radioactive water that has leaked or spilled after being used to cool the core and spent nuclear fuel storage areas.

xviii) Repeated earthquake aftershocks that further threaten the integrity of the already-compromised reactor core, spent nuclear fuel storage areas, and emergency operations.

xix) The ability to manually repair or restore function associated with any of the above failures or events when faced with extremely high levels of radiation that may threaten the health and safety of those both on and offsite.

4. The Commission directed its staff to obtain external stakeholder input as part of both its near-term and longer-term work. Please fully describe all plans to solicit such input. Specifically, will any licensee or other nuclear industry personnel be accompanying inspectors during these inspections at nuclear power plants? If so, will NRC also ensure that appropriate non-industry individuals that possess the appropriate expertise and security clearances are also provided such an opportunity?

5. Why have inspectors only been provided with 40 hours (or 50-60, in the case of a multi-unit nuclear power plant) with which to complete their work? Why does the Commission have confidence that the necessary knowledge with which to inform our own safety efforts can be obtained in such a short period of time?

Thank you very much for your attention to this important matter. Please provide your response no later than Friday April 29, 2011. If you have any questions or concerns, please have your staff contact Dr. Michal Freedhoff of my staff at 202-225-2836.

Sincerely,

Edward J. Markey

Edward J. Markey