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From: WILLAM HARRIS [williamrharris@yahoo.com]
Sent: Monday, August 23, 2010 5:33 PM
To: Susco, Jeremy
Cc: Plasse, Richard
Subject: Corrected: Scoping Environmental Review for Seabrook Station No 1 Operating License Renewal - Preliminary Comments

----- Forwarded Message -----

From: WILLAM HARRIS <williamrharris@yahoo.com>
To: Jeremy Susco NRC <jeremy.susco@nrc.gov>
Cc: Rick Plasse NRC <richard.plasse@nrc.gov>
Sent: Mon, August 23, 2010 4:57:39 PM
Subject: Scoping Environmental Review for Seabrook Station No 1 Operating License Renewal - Preliminary Comments

Mr. Jeremy Susco
Environmental Project Manager
Division of License Renewal
Office of Nuclear Reactor Regulation
Nuclear Regulatory Commission
Washington, D.C. 20555

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Re: Environmental Scoping review - Preliminary Comments - Nextera Energy Seabrook LLC Application for Operating License No. NPF-86 Renewal, Docket No. 50-443 & NRC-2010-0206.

Dear Mr. Susco:

Thank you for the opportunity to participate in one of NRC's Environmental Scoping Review public meetings held in Hampton, NH on August 19th regarding the Application for an Operating License Extension for the Seabrook No. 1 Unit from year 2030 to year 2050.

Although my background is in international and national security law, in the 1970's I supervised a research program on nuclear energy and nuclear non-proliferation at the RAND Corporation, and served on federal advisory committees to evaluate the relative proliferation resistance of alternative nuclear energy fuel cycles (Energy Research and Development Administration) and the International Nuclear Fuel Cycle Evaluation (INFCE) of the U.S. Department of State & ERDA. Thereafter, under NSC tasking I performed research on the protection and reconstitution of critical national infrastructure systems; and under a Congressional mandated review in the 1990s assessed capabilities of the forerunner DOD agency to the Defense Threat Reduction Agency (DTRA), including that agency's evolving capabilities to model radioactive plume dispersals and evacuation modeling relevant to protection of civilians and the national economy under emergency conditions.

On leave from RAND I performed inter-agency assessments of arms control treaty compliance for a SALT/START verification and compliance committee of the National Security Council, and participated in redrafting treaties and inspection protocols relating to the Treaty on Intermediate Nuclear Forces (INF - 1987), START I (1991), and START-II (1993). Under Congressional mandate, I participated in reviews of DTRA performance of the Nunn-Lugar initiatives to safeguard, purchase, and decommission various international nuclear facilities and materials with unacceptable levels of proliferation or terrorist-related risks.

These are my preliminary comments on scoping the environmental review for re-licensing of the Seabrook Station No. 1 nuclear plant and associated facilities:

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Cdd = J. SUSCO (JSSI)

It is, I believe, in the national interest that the scoping review for this re-licensing application be broader than is the usual scope for a re-licensing application. The Nuclear Regulatory Commission has an opportunity to improve significantly, and at relatively low cost, both the *consequences assessments* and the *emergency evacuation capabilities* for Seabrook Station and the potentially impacted communities within NRC's Region I area.

I note that it is the usual practice for NRC not to consider emergency evacuation capabilities for a licensed nuclear plant when that license is re-considered with an application for license extension. This would be a huge and potentially fateful omission for both the Nuclear Regulatory Commission and the nation, if the NRC were not to include options for emergency evacuation planning and mitigation as a part of the Seabrook Station No. 1 license renewal.

When Seabrook Station No. 1 was licensed the primary risks were of an accidental nature,. Evidence from the 9/11 Commission and other official sources indicate that Seabrook is now primarily at risk from intention attack by malevolent adversaries. This energy facility is situated near a major population center and summer-surging beach traffic; it is accessible from low flying aircraft passing over the Atlantic Ocean; it is now less well protected by Air Defense capabilities following closure of Pease Air Force Base nearby; and it has a containment system designed before the era of terrorist hijackings of wide bodied jets. These are fundamental changes of circumstances and assumptions since this plant was licensed in year 1990.

On the one hand, if NRC decides to exclude consideration of options to improve planning, modeling and procedures for emergency evacuation and re-licenses without these mitigation measures, and this facility then suffers either a terrorist attack or an accident involving significant radiation dispersal, this would be a tragedy not only for the region surrounding Seabrook Station but also for the entire civil electric nuclear industry. And indirectly for both national energy policy and an evolving effort to reduce greenhouse gases (GHGs) as part of a global environmental commitment of the U.S. government.

On the other hand, if NRC seizes a significant opportunity to improve at relatively low cost the planning, modeling, regional sensor network, and evacuation planning for Seabrook-related emergencies, the outcome would be to assure that, if a radiation release of significance occurs, whether by accident or by terrorist initiative, loss of life, harm to public health and safety, and regional economic disruptions are minimized responsibly.

These proactive initiatives would provide essential reassurance, not only for the re-licensing of the Seabrook Station No. 1, but for potential follow-on licenses for additional nuclear energy facilities at a preexisting nuclear energy complex with ready access to cooling ocean waters. It is notable that the Seabrook energy complex was initially designed and planned for at least two reactors. A broad scope for environmental risk assessment and mitigation planning. for the Seabrook No. 1 station, could be confidence building, hence create opportunities for follow-on licensed facilities at this same energy complex.

Broad based environmental assessment, should include, within mitigation strategies, initiatives that can: improve emergency planning; monitor in near-real-time radiation dispersals; design and implement phased, zonal, evacuation strategies; and build in, as field data indicate, *in situ* no-evacuation options for those in sub-zones not at risk.

Technologies to incorporate within *consequences assessments* and *evacuation strategies*, should include: plume modeling linked to near-real-time meteorological data; embedded software override capabilities within traffic signalization & traffic synchronization systems for evacuation arteries; *contraflow traffic designs* based on lessons learned from hurricane evacuations across interstate highway systems; backup batteries or renewable signal systems, designed for operability during electric grid outages; encryption capabilities to defeat

unauthorized "capture" of light signal evacuation algorithms; and regional coordination among transportation and law enforcement entities within the affected region.

Opportunities to improve emergency planning, modeling, regional radiation sensor networks and evacuation management are now present, with capabilities far greater than were available when Seabrook Station was licensed in year 1990:

- In 1990 the main risks related to component and system failures through natural occurring accidents, based on WASH-1400 and other fault-tree modeling;
- Over the past two decades, models for nuclear-related emergencies have developed greater capabilities to project risks of volitional attacks -- such as declassified information indicates to have been under consideration specifically for the Seabrook No. 1 station before 9/11/2001 and since that tragedy.
- In particular, the Defense Threat Reduction Agency has significantly improved its plume & dispersal modeling capabilities for radioactive clouds and related meteorological projections; and
- Upon request of NRC, the Defense Threat Reduction Agency would be capable and willing to model radiation plume dispersals and hazards as a function of (a) seasonal weather patterns, and (b) terrorist optimization to place at risk maximal regional populations when attacking the Seabrook reactor itself, or (c) attacks on spent fuel assemblies stored in on-site swimming pools.
- Of great potential to minimize loss of life, harm to public health and safety, and economic productivity in the region, a non-profit group operating in northern Massachusetts, the C-10 Foundation, now operates a near-real-time network of eighteen (18) regional radiation monitoring stations throughout northern Massachusetts. The Commonwealth of Massachusetts funds these sensor stations, which constitute a significant regional resources in event of radiation release(s).
- Of critical importance for an Incident Commander (whether based in the Department of Homeland Security, or the Nuclear Regulatory Commission, or under more dire circumstances, within STRATCOM) (under military auspices) would be the enlargement of the regional radiation sensor network to include communities in southern New Hampshire, presently not included in the C-10 Foundation radiation sensor network.
- A total of about 50 radiation sensors, a low cost investment for the re-licensing and potential expansion of nuclear reactors at the Seabrook facility, would provide an Incident Commander the capability to stage evacuations (and *in situ* population holds) by zones assigned, with DTRA near-real time plume analysis, by levels of radiation intensity, and traffic evacuation capability modeling.
- A primary goal should be to reduce expected loss of life and harm to public health and safety, and not the total clearance of human populations from the entire region within a specified period of time. Under many circumstances, total clearance of region populations would be counterproductive to protection of life, public health and safety, and the regional economy.
- Without a regional radiation sensor network available to an Incident Commander, excessive evacuations would be likely to expose potential evacuees in stalled motor vehicles with less protection than within their homes or businesses, needlessly aggravating loss of life, cancer incidents, etc.
- Without a regional sensor network, and without any evacuation orders, the communities around Three Mile Island (1979) self-evacuated without any cohesive planning. This resulted in massive transport congestion. Had there been significant radioactive dispersal, which was not present, loss of life would have been needlessly aggravated.
- In contrast, the failure of prompt notification and coordinated evacuations in the region surrounding Chernobyl (in the Ukraine, 1986) resulted in epidemiological estimates of radiation-related losses of approximately 92,000 lives -- most resulting from failures to design orderly, zonal evacuations.
- The 18 existing C-10 Foundation sensor sites in northeastern Massachusetts presently lack long-life backup batteries, and redundant telecommunications channels, so a (federal) Incident Commander could be reliably informed despite the potential (likely) loss of regional power across the regional electric grid. The cost of these network improvements (backup batteries, dual telecomm channels) is so minimal, relative to potential for life saving and potential to improve public confidence supporting additional

plant licensing, that this mitigation measure should be considered essential to any emergency plan and to mitigation measures to enhance emergency evacuation capabilities.

- The extension of this regional sensor network to Southern New Hampshire might be facilitated by a grant or grants from the Department of Homeland Security to regional communities or a non-profit Foundation operating within the State of New Hampshire. It is essential that southern New Hampshire communities be included in near-real-time radiation monitoring and reporting to assure a cost-effective emergency evacuation (and non-evacuation) system is developed as part of the re-licensing process for Seabrook Station No. 1.
- Since the licensing of the Seabrook plant in year 1990, NOAA has developed weather modeling capabilities that could be utilized for regional emergency/consequences assessment/evacuation planning and mitigation plans.
- It is my understanding that the C-10 Foundation commissioned a study of seasonal weather patterns in the region of Seabrook Station by a trained meteorologist. These localized studies should be combined with NOAA databases to develop threat scenarios that account for potential terrorist initiatives designed to maximize population at risk, as with timing an incident while winds flow from north to south over densely populated land areas.
- The Emergency Transportation Operations staff within the U.S. Department of Transportation has developed modeling capabilities to optimize *contraflow* evacuations; these models have utilized empirical data from Florida, Louisiana, Texas and other hurricane episodes, and might assist NRC in developing a 21st century emergency evacuation and management model, thence a regional emergency plan for Seabrook Station.
- The National Research Council (Transportation) has a variety of findings for emergency evacuation management on its websites. These include design into construction contracts for Interstate highways and other arterial evacuation routes of positive incentives to clear construction equipment from all operable lanes of highways in advance of *contraflow* traffic implementation. There need to be financial bonuses for compliance, and significant contract penalties for noncompliance, so *contraflow traffic* is not impeded by leftover construction equipment as has happened during all too many recent hurricanes.
- The "Intelligent Transportation" program of the U.S. Department of Transportation has developed traffic signalization / signalization synchronization that can automate traffic signals for major evacuation arteries, and on-ramps/off-ramps with (reversed) *contraflow* evacuations. These capabilities can be designed to accept, with encryption protection, wireless signals to implement evacuation software algorithms.

Even if some of the "best practices" emergency evacuation capabilities are beyond the responsibility of the NRC license applicant, or of the NRC itself, NRC's environmental scope for mitigation planning should be broad-based in identifying cost-effective mitigation measures, some fundable by the U.S. Department of Transportation, or by the Department of Homeland Security, or by state governments.

A separate component of mitigation planning, within the scope of environmental review, should include the Applicant's participation, whether voluntary or mandatory, in critical infrastructure control system monitoring programs, such as the recently announced "PERFECT CITIZEN" research program of the National Security Agency. ["Sensors deployed in computer networks for critical infrastructure" will be utilized in cooperative research with energy utility companies. See "U.S. Plans Cyber Shield for Utilities, Companies," *Wall Street Journal*, July 8, 2010.] Older NRC-licensed nuclear plants are likely to have "legacy" information technology systems connected to the internet; loss of service (LOS) attacks can result in harm to public safety if electric power disruptions are controlled by a hostile adversary and not by utility management. Mitigation measures to monitor, prevent, and contain cyber attacks on nuclear-electric systems subject to NRC licensure should be an essential component of any re-licensing review and mitigation for the Seabrook facilities.

Finally, the environmental review should consider the consequences of continued availability of Seabrook Station No. 1, its degradation as a base-load generator, or its total loss if its license is not to be renewed. The life cycle costs per kilowatt hour of electric power for rate payers of southern New Hampshire and rate payers of northern Massachusetts should be projected. As of the present writing, it appears that the cost per kWh of electric production at Seabrook Station No. 1 is substantially lower than the recently projected costs of Cape Wind electric power (including downtime for disrupted production) derived from projected offshore wind turbine systems.

For Massachusetts electric rate payers, wind energy is either a projected financial burden for electric ratepayers, or perhaps an acceptable experimental beginning (at higher per unit costs, for now) that is ameliorated by the concurrent delivery of lower cost electric power from the Seabrook Station No. 1 facility. Without concurrent availability of the Seabrook Station No. 1 for baseline load generation, some of the renewable energy alternatives might be assessed as too expensive to add to the grid costs passed on to ratepayers. And disruption costs, when wind and solar systems produce little or no net electric power, could cause system-wide outages if the baseload power of Seabrook is to become unavailable. Seabrook's role in reducing average electric costs and reducing incidents of ISO New England system outages should be included within any environmental assessment.

Sincerely,

William R. Harris

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