

DATE: May 22, 2006

SUBJECT: Facts and Conclusions Relating to the Repeated Downpowering of Seabrook Station

TO: The Hudson Light and Power Department ("HL&PD") Board and Department Management

FROM: Edward A. Brown, Retired President and Chief Executive Officer of New Hampshire Yankee, Retired Chairman and Chief Executive Officer of Yankee Atomic Electric Company, former Chairman and CEO of New England Power Service Company, and the current Stow Advisory Representative to the HL&PD Board.

Between October 19, 2005 and April 20, 2006, the Independent System Operator, New England ("ISO-NE"), mandated downpowers of Seabrook Station from full output of 1,220 MW to a level of 1,200 MW net electric output on 27 occasions. ISO-NE mandated these downpowers at the request of New York ISO ("NYISO") in response to reliability concerns in the NY Central East region.

In this paper I will express the facts as I see them, the conclusions that are supported by the facts and I will recommend several alternatives for the Board.

FACTS:

1. NYISO has requested ISO-NE to back down its "single largest contingency" operating above 1,200 MW to a maximum of 1,200 MW. This "Single Largest Contingency" is a protocol developed by three northeast power pools some time in the 1980s to "preserve system stability and reliability". According to the Senior Vice President of FPL Energy, this protocol was not filed and is not on file with any federal or state agency.
2. ISO-NE, at the request of NYISO has directed Seabrook Station to reduce power to 1,200 MW 27 times between 10/19/05 and 4/20/06.
3. There were 4 days in which two downpowers were ordered.
4. There were 3 days in which three downpowers were ordered.
5. Excerpt from the Seabrook Station "Summary of Events":
"2/24/06 – Operations reduced net electrical output (under 1,195 MW) three

times at the request of ISO-NE due to “transmission deficiency” (emphasis added by E. Brown). Clearance to return to power from the first reduction was rescinded 12 minutes after issuance, extending the first reduction. The unit had already started to increase power when this order was given. The second power reduction request was made just as the unit was returning to full power operation from the first power reduction. The third power reduction was requested approximately two hours after the plant returned to 100% from the second request.”

6. Each nuclear unit licensed for operation by the Nuclear Regulatory Commission has stringent Technical Specifications that it must abide by and any violation of these “techspecs” is a reportable event, requiring a stringent analysis of the root cause(s). These “techspecs” include such items as the chemistry of the water in the primary (reactor) loop and the secondary (steam) loop, the reactor core power distribution parameters, the equilibrium state of the reactor and, literally, hundreds of others.

7. Excerpt from the Seabrook Station “Summary of Events”:
“Operational Impact:these downpowers have an adverse effect on the operation of the reactor. These events put the reactor in a non-equilibrium state, which requires the operations staff to perform additional control actions to ensure that core power distribution parameters are maintained within operational limits. Because the timing, duration and frequency of these events are unknown, the parameters necessary to make well informed control decisions do not exist. Furthermore the effects of these downpowers are present long after the power transient is complete. The multiple downpower requests between 2/21 and 2/24 have been particularly challenging to the operations staff in that the effects of a previous transient are still being experienced when a subsequent ISO-NE downpower is directed. The nature of these events is inconsistent with reactivity management principles which require a deliberate and systematic approach to power changes as well as having the information available to anticipate the response of the reactor in order to develop appropriate control strategies.”

8. Nuclear units are designed and constructed to operate as base load units. They are not designed to cycle as Seabrook Station has been required to do. The tolerances that are built into nuclear units are extremely tight so that each BTU can be utilized to contribute to kWh generation. There are units in New England that were specifically designed and built to operate as cycling (intermediate) units; Salem Harbor Unit #4, Brayton Point

Unit#4 and the Bear Swamp Pumped Storage Hydroelectric Station being examples. If there is a problem with system stability that requires 20 MW to be dropped in New England, any intermediate unit can do it.

9. A 20 MW drop by Seabrook Station on the NH seacoast, 130 miles from the New York border, would have no affect whatsoever on a stability problem in the Central East New York area. A 20 MW downpower on the NH seacoast within a 20,000 MW New England Power System would have no affect whatsoever on the tie between New York and New England. The effect on the 60 Hz standard frequency by such a 20 MW change on the NH seacoast could only be measured to the third or fourth decimal place at the New York transmission ties.

CONCLUSIONS:

1. Seabrook Station was not designed, built nor placed in operation with technical specifications that allow it to be operated in the cycling downpowers that have been ordered by ISO-NE at the request of NYISO. It is clear from reading the FPL Energy Summary of Events that the orders to downpower and power up are being given by individuals who have no experience in operating a nuclear plant or who do not give any thought to the potential consequences of their orders. Reading Fact #7, above, leads me to believe that the actions of the ISO's are almost designed to stress the plant operators and equipment.

2. I do not know enough about the "largest single contingency" protocol that was put into effect in the 1980s, but I do know that reducing Seabrook Station's output by 20 MW could not solve any system instability in New York. The New York plant operators and NYISO say that the protocol is implemented when Central East (Oswego) is "constrained" by the number of units in operation in the Oswego complex. When 4 units are operating there is a sufficient margin that does not require the implementation of the 1,200 MW limitation in New England. If only one unit is operating, then Central East would be "constrained". NYISO has not completed its study of the 2 or 3 unit cases, which sounds incredible that they would be calling on Seabrook Station to cycle repeatedly without knowing if the protocol would need to be implemented if NY brought on line some of its own generation.

3. FPL Energy states that the protocol itself is seriously flawed. The protocol was put into effect approximately 20 years ago with a limit of

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1,200 MW at a time when New England Power Company was planning to import 2,000 MW from Hydro-Quebec. Seabrook Station was not yet in operation and it was planned to begin operation as a 1,150 MW unit, and the 1,200MW limit did not affect the operation of any nuclear unit. The protocol should be changed so that the limit is no lower than the largest single unit in the system. The protocol should also be changed so that it requires NYISO to dispatch additional units in the Central East area of NY before it calls on ISO-NE to take any measures.

4. The owners of Seabrook Station (especially the non-FPL Energy owners) have very serious financial stake in the successful and continued operation of Seabrook Station. If the plant suffers nuclear or mechanical problems, it could be shut down for an extended period of time. If an operator makes the wrong call during a transient and serious reactor damage occurs, the shut down could result in a very serious financial problem. I believe that the Board of the Hudson Light and Power Department has an obligation to do everything within its power to stop this very cavalier manner in which NYISO and ISO-NE is cycling Seabrook Station.

Finally, I believe the HL&PD Board must take some action to express its fears, because if the Board fails to do so and a shut down of the plant occurs, the Board would be open for legitimate criticism that it knew of this dangerous practice and did nothing. Hudson gets 40% of its electricity from Seabrook Station and it will be very cheap power in not too many years. In my opinion, the Board must do something and do it quickly to "get on the record" its opposition to a senseless practice that endangers the most valuable asset Hudson owns.

Edward A. Brown