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Lessons from the Fukushima Daiichi Nuclear Accident

By Arnie Gundersen
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Fairewinds and GRTV

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This week Fairewinds Chief Engineer Arnie Gundersen participated in two panel discussions in Boston and New York City entitled "The Fukushima Daiichi Nuclear Accident: Ongoing Lessons" Other panelists included Ralph Nader, Peter Bradford, Naoto Kan, Gregory Jaczko and Jean-Michel Cousteau.

The video above is a recording of Arnie's speech entitled "Forty Good Years And One Very Bad Day."

To watch the entire NYC presentation, visit:
http://new.livestream.com/FukushimaLessons/newyork

Transcript

Special thanks to the Samuel Lawrence Foundation for creating and underwriting these post Fukushima Daiichi events.

More importantly, today's gathering would not be necessary if Federal and State policy makers and business executives believed that Fukushima Daiichi really happened. If they had believed what they saw on television, they would understand that nuclear accidents happen. Nuclear accidents are inevitable. They would understand that "Sooner or later, in any foolproof system, the fools are going to exceed the proofs!"

Indian Point presents an interesting dichotomy. The Nuclear Regulatory Commission (NRC) claims that the chance of a meltdown is one in a million. With 400 operating nuclear reactors worldwide, the NRC data means one meltdown would occur every 2,500 years. The NRC bases this analysis on a technique called Probabilistic Risk Assessment (PRA- pray for short). On old plants like Pilgrim and Indian Point, the NRC uses data from newer plants to show how reliable these plants will be to continue if they operate for the next 20-years. That's like my doctor telling me how long I will live based on the heath statistics for 25-year-olds. If we apply the NRC's methodology, the probability of what happened at Fukushima Daiichi is one million x million x million (a 1 with eighteen zeros) to one.

But that is not what has happened in real life. Instead, history shows us that there have been five meltdowns during the last 35 years: TMI, Chernobyl, and Fukushima Daiichi 1, 2, and 3 (apologies for not including Windscale, Santa Susana, and about a dozen more reactors). The real numbers show that there is a seven-year frequency between meltdowns. Policy makers and business interests are ignoring history as they attempt to force the relicensure of Indian Point.

While demanding that taxpayers cover the risk of a nuclear accident by paying for the Price-Anderson nuclear insurance, it seems that the NRC and every major politician and nuclear fabricator actually believes that A Nuclear Accident Can't Happen at Indian Point or Pilgrim. When someone's brain reasons in a way to justify support for what it wants to be true, psychologists call it "Motivated Reasoning".

Recently I was asked to testify to the Canadian Nuclear Safety Commission because the Pickering Nuclear reactors have applied to operate beyond their useful life. Pickering is located only 20 miles away from the heart of Toronto. At the hearing in Toronto, speaker after speaker implored the CNSC to keep this aged nuclear plant running because it is a major employer that pays its taxes. They said that Pickering Nuclear Power Plant has great employees who live in town, who are on the school board, on the soccer teams, or sing in local church choirs. The statements suggested that surely, such nice people would know if their plant was unsafe.

This situation reminds me of Garrison Keillor and his tales about Lake Woebegone, where he would say, "…all the women are strong, all the men are good looking, and all the children are above average." Every town I visit that has a nuclear plant believes its nuclear plant is better than average. If history has taught us anything, it's that nuclear accidents happen despite the best intentions of the men and women who work there.

I knew the operators at Three Mile Island, they were active in their community and they lived near the plant, yet an accident happened. Nuclear Power is a technology that can have 40 good years and one bad day.

After the Chernobyl accident, I got to know some of the operators there, and they were brilliant engineers who were very safety conscious. They and their families lived very near to the Chernobyl reactor, and still an accident happened. This is a technology that can have forty good years and one bad day.

After I wrote my book Fukushima Daiichi: The Truth And The Future, I got to know some of the Fukushima Daiichi operators. Like the operators at TMI and Chernobyl, they too were meticulous and knew their reactor like a book. They also lived right near the Daiichi plants with their families. And yet, another accident happened. Nuclear Power is a technology that can have forty good years of operation and one very bad day.

Policy makers and business interests clearly want to believe the "forty good years" part of that sentence, but choose to ignore the "one very bad day"!

Companies like Entergy claim that their nuclear plants are "safe". What does this mean??? This means that the Nuclear Regulatory Commission (NRC) has reviewed 5% of that plant's paperwork and checked off in boxes that the paperwork existed. However, those same companies did not tell you that the nuclear industry lobbying group has vetted every NRC Commissioner for the past twenty years before they allowed Congress to approve those Commissioners. And, did you know that those same lobbyists worked with the NRC to write those power plant regulations? So safe to Entergy and other nuclear power plant owners means that plants like Indian Point comply with the minimum acceptable criteria established by a compliant regulator.

Let's talk specifically about the corporations that own nuclear power plants, especially merchant plants.

1. The NRC has allowed many nuclear power plants to become Limited Liability Corporations (LLCs): corporations that are separate from the companies that own them. Why is that an issue or concern to the rest of us?

1.1. Did you notice that Indian Point 2 is a separate LLC from Indian Point 3? Two entirely separate legal entities. Why is that? It allows the Entergy to keep one plant running if the other one has a serious radiation release. It allows one unit to be declared bankrupt, while the other units continue to generate cash that can't be spent on the radiation cleanup.

1.2. Entergy wouldn't do such a thing, would they? One only has to look at New Orleans after Hurricane Katrina to see that Entergy has already used this legal maneuver. While the people of New Orleans where bailing out their city, Entergy's New Orleans LLC subsidiary declared bankruptcy, and applied for federal disaster relief. The US government moved cash that had been destined to help New Orleans poor community through a Community Development Block Grant and gave it to Entergy. Entergy gave its executives bonuses.

2. What is the condition of these aging nuclear plants that have been operating 30 to 40-years and have reached the end of their design life?

2.1. According to the Indian Point Independent Safety Evaluation Report July 31, 2008: The physical condition of the plant …is visibly deficient… the care and maintenance of some other plant systems and structures do not meet the standards of high-performing plants… it is the Panel's view that the maintenance and preservation of non-critical plant systems, equipment and structures is important, because it communicates to employees and the public alike the owner's and operators' commitment and professionalism. (Indian Point Independent Safety Evaluation Report July 31, 2008, page 11)

2.2. The Vermont Yankee Oversight Panel, convened by the State of Vermont, uncovered similar issues: "The issue of inadequate application of resources takes on heightened importance given Entergy's status as an aging plant. Over the remainder of Entergy's operating life, the possibility of shutdown within a few years can never be ruled out and will become a near certainty at some point. If the events of the last few years are any guide, Entergy has a tendency to focus expenditure on safety systems and systems of obvious reliability importance while withholding resources from systems that it deems of secondary reliability importance." [Emphasis Added] "Limited resource allocation for non-safety systems might, therefore, be systemic within Entergy."

2.3. Most recently, Entergy announced across the board staff cutbacks of five percent, euphemistically called its Human Capital Management Initiative. So, in spite of two independent panels determining that Entergy is not spending enough money, Entergy has decided to cut its staff at all of its aging and most vulnerable nuclear power reactors.

What you may ask is the NRC doing about this? Nothing, absolutely nothing. Instead, Neil Sheehan, the NRC Region 1 PR spokesperson said, "… the NRC has the ability to determine whether there are any adverse impacts through our Reactor Oversight process." "If we observe any negative trends via inspection findings and/or performance indicators, we could determine if there was any linkage to human resource changes."

To me, Sheehan's quote says that after an accident, the NRC might determine that Entergy had cut too much staff.

For that matter, staff reductions have become the nuclear industry's approach to make more money when electricity prices are down as they are now. The Millstone nuclear power plant in Connecticut "reduced staff to approach industry average". The NRC allowed them to reduce staff. But if Millstone was above the industry average, then other plants must have been below the industry average. Why hasn't the NRC approached those plants to increase the number of employees in order to measure up to the industry average? The industry only puts downward pressure on its reactor staffs, and the NRC is unwilling to put on the breaks.

Every day we at Fairewinds Energy Education receive questions asking us how American nuclear power plants compare with those that melted down at Fukushima Daiichi. Is Indian Point or Pilgrim really any different from Fukushima Daiichi? No! Actually both plants have many worse features:

1. Population centers are much closer to Indian Point and Pilgrim. And, before the Daiichi accident people believed that the emergency planning in Japan was far better than in US. Even Japan's strong emergency plan failed because every safety system at Fukushima Daiichi failed.
2. The spent fuel pools at both Indian Point and Pilgrim holds five times more nuclear fuel that Fukushima Daiichi and they hold more cesium than all the atom bombs dropped in above ground testing. And, that is just cesium… think about all the other radioactive isotopes.
3. Indian Point and Pilgrim are the same age, first generation designs. Daiichi 1 started commercial operation in 1971 and had just received its authorization to run an additional 10 years only one month before the tsunami hit. Daiichi 2 started operation in 1974.
4. Fukushima Daiichi experienced an earthquake and tsunami, but what really knocked them out were the Loss of Offsite Power and the Loss of the Ultimate Heat Sink. Both could happen at Indian Point and Pilgrim. LoUHS can be created from a terrorist attack on the intake structure.
5. What about earthquake frequency? Indian Point has the highest probability of its nuclear core being damaged during an earthquake (core damage frequency) of any reactor in the US, according to the NRC by applying USGS seismic hazard curves. Experience at the North Anna nuclear plant in Virginia indicates that the frequency of a severe earthquake is grossly underestimated. The worst earthquake in 10,000 years was expected to be a Richter 6 at North Anna. Yet a Richter 6 happened in 30 years, meaning that the worst is yet to come. Indian Point has an earthquake fault one mile from the reactors that could easily create a quake greater than the plant was designed to withstand.

Let me sum this up. It is easy for the nuclear industry to allow arrogance to set in when one looks at the sheer size of a nuclear plant. I started my career in 1972 with a Master degree in nuclear engineering from RPI. The nuclear engineering department visited Indian Point when it was being completed. Both then and now, it is an impressive building. No one asks why does that building have to be so impressive? What is inside these plants that requires such an impressive structure in the first place?

But now that we have seen first hand that nuclear power safety systems can fail with catastrophic results, we need to ask why we should build such an uncontrollable and unmanageable technology. The forces within these plants are enormous, and must always

be contained 24/7/365. Fukushima Daiichi, Chernobyl, and Three Mile Island proved just how utterly impossible it is to always contain these forces. One operator error or one significant weather event, or one earthquake or one terrorist attack, and all of New York City will face a very bad day, and like Japan, a very sad future.

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The Fukushima-Daiichi Nuclear Accident: Lessons for New York, Tuesday, Oct. 8, 2013

92nd Street Y, 1395 Lexington Avenue, New York, NY 10128 (Theresa L. Kaufmann Concert Hall)

The Fukushima-Daiichi Nuclear Accident: Lessons for Boston, Wednesday, Oct. 9, 2013

Massachusetts State House, 24 Beacon Street, Boston, MA 02133 (Gardner Auditorium)

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