



Y2K Nuclear Concern and Global Warming Update

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1) Nuclear Power Security

While everyone is waiting for the countdown on New Year's Eve, Y2K glitches have already started to appear. Instead of the year 2000, the number 1900 has been showing up on various documents around the country. And on December 15th in Vancouver, British Columbia, a new computerized smoke alarm installed in the city's SkyTrain went off and stopped the whole system. Thousands of commuters and holiday shoppers were stranded. Ironically, the new computerized alarm was supposed to prevent Y2K shutdown problems.



Photograph of Three Mile Island nuclear power plant located in Middletown, Pennsylvania, a few miles south of Harrisburg, the state capital. On March 28, 1979, the worst commercial nuclear disaster in U. S. history occurred when a pump failed in the reactor cooling system. Nearly a million gallons of radioactive water escaped through an open valve onto the reactor building basement floor. Radioactivity was also released into the air. Photograph courtesy U. S. Nuclear Regulatory Commission.

Another Y2K glitch that concerns many citizen "watchdogs" who live near nuclear power reactors is electrical failure. There are 103 nuclear power plants in the United States. If power grids go down, even temporarily, will emergency diesel generators keep nuclear power plants operating safely?

At the Three Mile Island nuclear power plant near Harrisburg, Pennsylvania, a man who was born and raised there named Scott Portzline has been working with other residents to monitor the plant's operations.



Scott Portzline, Former Security Chairman,
Three Mile Island Alert, Harrisburg, Pennsylvania.

For eight years, Scott helped the volunteer civilian Three Mile Island Alert group monitor radiation and security. He has testified before the U. S. Senate, the U. S. Nuclear Regulatory Commission, the Advisory Committee on Reactor Safeguards and before other governmental bodies in an effort to close security gaps that he has found. His research has been cited by the U. S. Department of Energy and various military branches. Portzline also maintains a data base of lost and stolen radioactive materials in the United States. I asked Scott what the consequences might be if a large aircraft or a suicide truck bomber slammed into Three Mile Island.

Interview:

Scott Portzline, Former Security Chairman, Three Mile Island Alert, Harrisburg, Pa: "At the beginning of the year I realized that one of the biggest problems that could happen during Y2K rollover was the loss of the grid and the dependence upon emergency diesel generators. So, I decided to do some research and put together a data base from the Nuclear Regulatory Commission's own documents. And I expected to find a problem with the emergency diesel generators system once per month. Instead, I found four times that amount and it surprised me. And so far, just this year more than half of the plants in the U. S. have experienced a problem with a diesel generator. 53% have had a defect or suspected defect.

Let's clarify that the diesel generator is the back up to provide electricity if the main electrical power fails.

That's right. Now they do have some batteries at the plants that can operate some of the systems in the control room, but it can't do the pumping of the reactor coolant. There are some back up systems that are steam driven, but you definitely want to have electricity at your plant so you can evaluate and analyze all the data that is coming in. Confusion played a major role in the Three Mile Island event."

Mr. Portzline suggests that people living near nuclear power plants in the United States at least put valuable keepsakes in a box that can be easily moved if there is a serious problem and evacuation is necessary, as it was in Three Mile Island. He also suggests that residents have their own Geiger counter with training about how to use it in order to keep an independent check on radioactive levels around nuclear power plants. Nearby residents should also keep a supply of potassium iodide or potassium iodate to ingest during a nuclear emergency in order to protect the thyroid gland.

2) Global Warming Update

NASA launched a new satellite Saturday, December 18th called Terra. The goal is to better observe interactions between earth's land masses, oceans and atmosphere. One of the challenges is to get the latest data into advanced computer models that are trying to project global warming trends over the next century. Last month, The New York Times headlined, "Thinning Sea Ice Stokes Debate on Climate." Scientists at the University of Washington in Seattle reported in the journal Geophysical Research Letters that ice at the North Pole is about 40% thinner now than it was twenty years ago. Is such rapid melting a natural phenomenon? Or the result of manmade greenhouse gasses that have warmed up the lower atmosphere? Or both?

Dr. Drew Shindell, an atmospheric physicist at the NASA Goddard's Institute for Space Studies in New York City, has computer modeling studies that indicate the present situation is "not a natural thing." His models show that temperature

contrasts between the tropics and polar regions are greater, strengthening westerly winds which bring warmer air to the Arctic and melts the ice. Dr. Shindell and his colleagues are also concerned about changes in the North Atlantic Drift that keeps Europe warmer than Canada and Siberia. British scientists say the current is changing and are worried that Europe could face a much colder future. I recently asked Dr. Shindell about the new data and the early December "storm of the century" that blew from the British Isles into Eastern Europe.

Drew Shindell, Ph.D., Atmospheric Physicist, NASA's Goddard Institute for Space Studies, New York City: "Global warming in general has the potential although it's still another uncertainty, but it has the potential to create stronger storms. There kind of more energy in general in the lower atmosphere, so that can easily go into storms and theoretically it makes perfect sense that you could get stronger storms in the greenhouse world. And you also see this trend toward changing atmospheric circulation which is related to what you were just mentioning the stratosphere cooling and the lower atmosphere warming which you would expect to change the westerly flow in the Northern Hemisphere and increase that which will affect storm tracks.

Storms generally move across the Atlantic and into Europe and you expect those to shift a little bit over time. So, you do expect all these kinds of changes. But something really drastic like the shut off of the North Atlantic deep water that would really plunge Europe into a much colder climate it's such a non-linear process that it's really hard to tell if we are approaching that. I mean, it will be impossible to tell pretty much until it happens.

Even if we were creeping up to that, it's something that is going to happen in days? A month? When would we know?

Well, I'm not sure anybody really knows the answer to that either. I would think it would be a matter of years it could happen, as opposed to decades or centuries. In climate scales, that's very fast.

If this winter in Europe, it was especially cold and the spring did not come until very late, then the winter came early again and such extremes occurred every year afterward, that might indicate the beginning of a colder age taking hold?

Yes. If it happened several years in a row, I think people would begin to wonder. But we do have ways to measure the deep water formation and what is going on at present has actually been a little bit confusing because there are two main regions of deep water formation in the North Atlantic. One is over in to the east of Greenland and one is in the Labrador Sea to the west. And we've seen a decrease in deep water formation which is kind of the north end of the conveyor belt, bringing heat up and then going down and coming back at low levels in the ocean. We've seen a decrease of that going on in the Greenland Sea, but an increase in the Labrador Sea. So, it's not that clear that there's been any net change overall and so far it looks like more of a shift. If you just look in a region like Scotland or something or closer to the Greenland Sea, then you might not be getting the whole picture of what's going on with the whole system. But more of a regional aspect.

If it is only a regional shift in Europe, is that something you've seen before in data and that's why you and other scientists are not very concerned?

No, we are still quite concerned. We haven't seen a shift like this before. We don't have very long records of either of these regions. We just don't have very long records of deep water formation in general. But there is no way to tell if this shift is just kind of a prelude first that decreases in the Greenland Sea and moves over to the Labrador Sea and then moves out of the Atlantic completely and is gone. Or, this could lead to something terrible. But thus far, it's a shift that we really don't understand that well.

Does it suggest to you as a scientist who has had great concerns about the impact of global warming on climate patterns that we might be seeing an important change in the North Atlantic Drift if these measurements continue to hold up?

Oh, yes. I think that's certainly true. Given it's qualified by saying we MIGHT be seeing an important shift. There is no guarantee. But these are pretty major shifts. And the same thing with the Arctic Sea ice. And the new measurements have shown the depth, the thickness of the sea ice layer has decreased by about 40% since the 1960's. That's huge in another 30 or 40 years, it will just be gone. There will be no ice whatsoever.

No North Pole.

Yeah, the North Pole would just be an ocean. Instead of how it's always been a big ice pack. And now it would just be gone. So, these are really enormous changes. It's not like a 2% change and maybe in another several decades it will be up to 4% and we should worry. This is *huge*!

If this does persist and the melting continues, would all that ice melt neutralize the salinity in the ocean water? Do computer models project what impact so much ice melt in the oceans and seas will have on climate in another 30 or 40 years?

The computer models are starting to do that. And this is really kind of something nobody was doing at all even just a few years ago. So, there is a recent model that was able to simulate, to reproduce the observations over the past few decades of this big decrease of ice in the Arctic, in both the extent and thickness of the sea ice. And our model was able to reproduce the change in the atmospheric circulation pattern. But in general climate models don't include any of these things.

What do the current computer models project?

The current models are just really beginning to work on individual pieces of this. Our model has said we can reproduce the atmospheric circulation patterns and we project those will continue. But it was only working on a piece of the whole problem and didn't include say the changes in the ice and ocean circulation. And other people have worked individually on the ice and the ocean, but nobody has really put it all together yet. So, I don't think there really is any computer model simulation that predicts, that has simulated what is likely to occur over the next few decades that really includes all these processes. ... And as we push the system farther and farther, if there really is this non-linearity like this on-off switch in the Atlantic current built in, and we keep pushing farther and farther, if it's there, eventually we're going to hit it. Then, we could get one of these really drastic changes we're talking about where Europe suddenly plunges into a Siberia or Canada temperature.

Could large global superstorms erupt in a short period of time out of such a climate shift?

I don't know if large "super storms" are feasible. We would get stronger storms, but I don't know if we would get any global type storms. We've never seen anything like that as long as we've been around looking at the planet. And like I was mentioning, there have been some studies that say in the last glacial maximum, the North Atlantic Drift current was really much reduced. So, there is evidence that this has happened in the earth's history, but it hasn't really happened in human history. So we really don't know what it would be like."

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