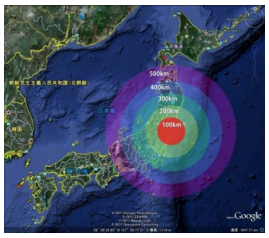
Exclusive Arnie Gundersen Interview: The Dangers of Fukushima Are Worse and Longer-lived Than We Think

Friday, June 3, 2011, 3:54 pm, by Adam



"I have said it's worse than Chernobyl and I'll stand by that. There was an enormous amount of radiation given out in the first two to three weeks of the event. And add the wind blowing in-land. It could very well have brought the nation of Japan to its knees. I mean, there is so much contamination that luckily wound up in the Pacific Ocean as compared to across the nation of Japan - it could have cut Japan in half. But now the winds have turned, so they are heading to the south toward Tokyo and now my concern and my advice to friends that if there is a severe aftershock and the Unit 4 building collapses, leave. We are well beyond where any science has ever gone at that point and nuclear fuel lying on the ground and getting hot is not a condition that anyone has ever analyzed."

So cautions Arnie Gundersen, widely-regarded to be the best nuclear analyst covering Japan's Fukushima disaster. The situation on the ground at the crippled reactors remains precarious and at a minimum it will be years before it can be hoped to be truly contained. In the near term, the reactors remain particularly vulnerable to sizable aftershocks, which still have decent probability of occuring. On top of this is a growing threat of 'hot particle' contamination risk to more populated areas as weather patterns shift with the typhoon season and groundwater seepage.

In Part 1 of this interview, Chris and Arnie recap the damage wrought to Fukushima's reactors by the tsunami, the steps TEPCO is taking to address it, and the biggest operational risks that remain at this time. In **Part 2**, they dive into the health risks still posed by the situation there and what individuals should do (including those on the US west coast) if it worsens.

Click the play button below to listen to Part 1 of Chris' interview with Arnie Gundersen (runtime 36m:31s):

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Chris Martenson: Let's just briefly review – if we could just synopsize – I know you can do this better than anybody. What happened at Fukushima – what happened and I really would like to take the opportunity to talk about this kind of specifically, like where we are with each one of the reactors. So first of all, this disaster – how did it happen? Was it just bad engineering, was it really bad luck with the tsunami? How did this even initiate – something we were told again and again – something that couldn't happen seems to have happened?

Arnie Gundersen: Well the little bit of physics here is that even when a reactor shuts down; it continues to churn out heat. Now, only five percent of the original amount of heat, but when you are cranking out millions of horsepower of heat, five percent is still a lot. So you have to keep a nuclear reactor cool after it shuts down. Now, what happened at Fukushima was it went into what is called a "station blackout," and people plan for that. That means there is no power to anything except for batteries. And batteries can't turn the massive motors that are required to cool the nuclear reactor. So the plan is in a station blackout is that somehow or another you get power back in four or five hours. That didn't happen at Fukushima because the tidal wave, the tsunami, was so great that it overwhelmed their diesels and it overwhelmed something called "service water 2" But in any event, they couldn't get any power to the big pumps.

Now, was it foreseeable? They were prepared for a seven-meter tsunami, about twenty-two feet. The tsunami that hit was something in excess of ten and quite likely fifteen meters, so somewhere between thirty-five and forty-five feet. They were warned that the tsunami that they were designed against was too low. They were warned for at least ten years and I am sure that there were people back before that. So would they have been prepared for one this

big? I don't know, but certainly, they were unprepared for even a tsunami of lesser magnitude.

Chris Martenson: So the tsunami came along and just swamped the systems and I heard that there were some other design elements there too, such as potentially the generators were in an unsafe spot or that some of their electrical substations all happened to be in the basement, so they kind of got taken out all at once. Now, here's what I heard – the initial reports when they came out said, "Oh, nothing to fear, we all went into SCRAM," which is some kind of emergency shutdown and they said everything is SCRAMed and I knew that we were in trouble in less than twenty-four hours, they talked about how they were pumping seawater in. Which I assume, by the time you are pumping seawater you have a pretty clear indication from the outside that there is something really quite wrong with this story, is that true?

Arnie Gundersen: Yes. Seawater and as anybody who has ever had a boat on the ocean would know, saltwater and stainless steel do not get along very well. Saltwater and stainless steel at five hundred degrees don't get along very well at all. You are right, they had some single points of vulnerability – the hole in the armor and the diesels were one of them. But even if the diesels were up high, they would have been in trouble because of those service water pumps I talked about. And they got wiped out and those pumps are the pumps that cool the diesels. So even if the diesels were runnable, cooling water that runs through the diesels would have been taken out by the tsunami anyway. So it's kind of a false argument to blame the diesels.

Chris Martenson: Okay, so take us through. Reactor number one, it was revealed I think about a week ago now that they finally came to the revelation that I think some of us had come to independently, that there had been something more than a partial meltdown, maybe even a complete meltdown. What is your assessment of reactor one and where is it right now?

Arnie Gundersen: When you see hydrogen explosions, that means that the outside of the fuel has exceeded 2,200 degrees and the inside is well over 3,500 degrees. The fuel gets brittle, it burns, and then it plops to the bottom of the nuclear reactor in a molten blob like lava. It was pretty clear to a lot of people, including apparently to the NRC, but they weren't telling people back in March, that that had occurred in reactor one. There was essentially a blob of lava on the bottom of the nuclear reactor. So I have to separate this – a nuclear reactor - and that is inside of a containment. So there is still one more barrier here. But the problem is that the reactor had boiled dry and they were using fire pumps connected to the ocean to pump saltwater into the reactor. Now, if this thing were individual tubes, the water could get around the uranium and completely cool it. But when it's a blob at the bottom of the reactor, it can only get to the top surface and that would cause it to begin to meltdown. Now, on these boiling water reactors, there are about seventy holes in the bottom of the reactor where the control rods come in and I suspect that those holes were essentially the weak link that caused this molten mass. Now it's 5,000 degrees at the center, even though the outside may be touching water, the inside of this molten mass is 5,000 degrees. It melts through and lies on the bottom of the containment.

That's where we are today. We have no reactor essentially, just a big pressure cooker. The molten uranium is on the bottom of the containment. It spreads out at that point, because the floor is flat. And I don't think it's going to melt its way through the concrete floor. It may gradually over time; but the damage is already done because the containment has cracks in it and it's pretty clear that it is leaking. So you put water in the top. And the plan had never been to put water in the top and let it run out the bottom. That is not the preferred way of cooling a nuclear reactor in an accident. But you are putting water in the top and it's running out the bottom and it's going out through cracks in the containment, after touching directly uranium and plutonium and cesium and strontium and is carrying all those radioactive isotopes out as liquids and gases into the environment.

Chris Martenson: So this melting that happened, is this just a function of the decay heat at this point in time? We're not speculating that there has been any sort of re-criticality or any other what we might call a nuclear reaction – this is just decay heat from the isotopes that are in there from prior nuclear activity – those are just decaying and giving off that heat. That's sufficient to get to 5,000 degrees?

Arnie Gundersen: Yes, once the uranium melts into a blob at these low enrichments, four and five percent, it can't make a new criticality. If criticality is occurring on the site - and there might be, because there is still iodine 131, which is a good indication - it is not coming from the Unit 1 core and it's not coming from the Unit 2 core, because those are both blobs at the bottom of the containment.

Chris Martenson: All right, so we have these blobs, they've somehow escaped the primary reactor pressure vessel, which is that big steel thing and now they are on the relatively flat floor of the containment – they concrete piece – and you say Unit 2 is roughly the same story as Unit 1 – where's Unit 3 in this story?

Arnie Gundersen: Unit 3 may not have melted through and that means that some of the fuel certainly is lying on the bottom, but it may not have melted through and some of the fuel may still look like fuel, although it is certainly brittle. And it's possible that when the fuel is in that configuration that you can get a re-criticality. It's also possible in any of the fuel pools, one, two, three, and four pools, that you could get a criticality, as well. So there's been frequent enough high iodine indications to lead me to believe that either one of the four fuel pools or the Unit 3 reactor is in fact, every once in a while starting itself up and then it gets to a point where it gets so hot that it shuts itself down and it kind of cycles. It kind of breathes, if you will.

To read the rest of the transcript to Part 1, **click here**.

Click here to access Part 2 of this interview.

Arnie Gundersen is an energy advisor with 39 years of nuclear power engineering experience. A former nuclear

industry senior vice president, he earned his Bachelor's and Master's Degrees in nuclear engineering, holds a nuclear safety patent, and was a licensed reactor operator. During his nuclear industry career, Arnie managed and coordinated projects at 70-nuclear power plants around the country. He currently speaks on television, radio, and at public meetings on the need for a new paradigm in energy production. An independent nuclear engineering and safety expert, Arnie provides testimony on nuclear operations, reliability, safety, and radiation issues to the NRC, Congressional and State Legislatures, and Government Agencies and Officials throughout the US, Canada, and internationally.

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Comments

Fri, 06/03/2011 - 18:19 #1

PastTense
Offline
Full Member
Posts: 30
Joined: 12/13/2010

I have a very negative view

I have a very negative view that Part 2 (Protecting Yourself if the situation worsens) is only available to Premium Members.

While I think there is a consensus here that people who play in the stock market can easily afford to spend $30/month for investment advice and thus have no problem with Chris charging $30 for investment advice in a Premium section, I wonder how many other people here support Chris charging for life and death health information.

Fri, 06/03/2011 - 20:59 #2

Poet
Online
Platinum Member
Posts: 735
Joined: 01/21/2009

Yeah, Well...

PastTense

To a certain extent, I can sympathize with your view. But at the same time, just because I'm one of the people who contributes to this site as well as takes from it, I can't say I "deserve" free stuff. We already get a lot of free stuff on this site and Dr. Martenson deserves to make some money to support the workers that make their living and feed