

Rulemaking Comments

ANPR 50 and 52  
(77FR23161)

DOCKETED  
USNRC

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Sent: Thursday, June 07, 2012 6:17 PM  
To: Rulemaking Comments  
Subject: Docket ID NRC-2012-0031

June 8, 2012 (10:45 am)

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

.Docket ID NRC-2012-0031

As suggested I hereby make a public comment

First and foremost the suggested rules and regulations omit a fundamental fact

In an emergency persons on the spot have to make decisions that they have never made before and are very different from those made in ordinary operation. I mention two and address in some detail the first.

- (1) Should an evacuation be ordered of persons who MIGHT be affected by the accident and if so, how big an evacuation?
- (2) What radiation dose should be permitted to workers at the plant?

(1) The Evacuation decision

At Fukushima I contend that the plant operator TEPCO and various members of the Japanese government made incorrect decisions aided and abetted by an outlandish comment by the Chairman of the NRC on Wednesday March 14th repeated by President Obama on Thursday March 15th. Various semi official reports made statements such as : "Radiation releases caused large evacuations, concern about food and water supplies, and treatment of nuclear workers" (reported in Wikipedia). That statement is an inaccurate statement of causation. The evacuations were caused by unnecessary and undesirable understanding of the proper comparison of risk and benefit.

I have written down many of these concerns in a paper being published in the journal "Dose-Response" published by the International Dose Response society. It is presently available in electronic format.

<http://dose-response.metapress.com/app/home/contribution.asp?referrer=parent&backto=issue,37,38;searcharticlesresults,1,1>; A prepublication version is available in word perfect at <Http://physics.harvard.edu/~wilson/publications/pp932.doc>

The errors came about because no one seems to have learned from history.

I outline the important items.

The effects of exposure to radiation are both acute (prompt within a few weeks) and Chronic (long term) If an exposed person survives the acute effect he can still be damaged by chronic effects. The effect is usually small but of exposure continues over a long term the effect can arising from exposure integrated over a long term This distinction is similar to effects of chemical pollutants.

It follows that in an accident, or nuclear bomb explosion, evacuation should be immediately considered if there is likely to be enough exposure to cause an acute effect but can be delayed a few days (to enable more careful consideration) without causing an appreciable increase in chronic effects.

At Fukushima radiation levels at site boundary were promptly made available. I made a quick integration of these levels at site boundary and it was evident that they were much smaller than the level;s for acute radiation sickness. Subsequent reports agree that the highest exposed plant worker only got an exposure much smaller than could cause acute radiation sickness.

Template = SECY-067

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It follows that there was NO IMMEDIATE need for evacuation of anyone beyond site boundary., A two day , wait would have had no serious adverse effects and a very positive one of preventing panic .

In any decision it is desirable to compare risks of alternative actions. In this case Evacuate or Dont evacuate. It appears that no one, neither TEPCO nor any government official and sad to say, not the Chairman of the NRC, ever made such a comparison. This was a grave mistake and one that caused many unnecessary deaths.

I contend that in this case even the effects on health of the evacuation were far larger than the (calculated) effects on health of staying in place.

I contend that the most important change in regulations that is necessary is to require the following  
WHENEVER A SITUATION GOES BEYOND NORMAL OPERATION

(A) an assessment of radiation levels and whether or not they will cause acute radiation sickness. Only in the very unlikely event order an evacuation SOLELY TO AVOID ACUTE EXPOSURE ( I say VERY unlikely because this level was not reached at Windscale or Chernobyl or TMI for ANY member of the public)

(B) Start at once at all levels a careful evaluation of the risks of alternates. I suggest as a start they should ask each other the following questions. (I attcah my answers

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- there an immediate reason to evacuate to avoid Acute Radiation Sickness? The measured doses give the answer NO. Indeed a subsequent independent report by INPO (2011) shows that the highest exposed worker received a dose 1/6 of the LD50
- Would there be an appreciable increase in long term radiation dose by waiting a few days to analyze? Again the realization that Cesium was the problem would demand the answer NO.
- In retrospect was it sensible to evacuate people beyond three miles from the reactor, bearing in mind the competitive risks? I submit that here again the answer is NO.
- Would it have been wise to inform everyone and prepare for a voluntarily evacuation for those who wished it, which preparation could avoid the chaos that occurred in New Orleans after Katrina? Here the answer is definitely YES.
- Is there an adverse effect on health in evacuation? Here the answer is definitely YES although such effects are often ignored.

(C) Immediately (within minutes) abandon allowable radiation levels that are appropriate for regular operation when an alternate action has few downside effects and revert to the (older) higher levels of 20 Rems (0.2 Sv) per accident and 80 Rems (0.8 Sv) for any life saving action or for an astronaut.

All plant operators and plant personnel should be trained to institute these at once.and widely promulgated It is important that these actions which seem reasonable to many people in retrospect should be mandated IN ADVANCE to avoid panic actions by individuals (often those in government) not familiar with radiation exposure issues.

.Comments can be submitted through the regulations.gov website by searching for files under the Docket ID. Comments can also be e-mailed to [Rulemaking.Comments@nrc.gov](mailto:Rulemaking.Comments@nrc.gov);

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Radiation releases caused large evacuations, concern about food and water supplies, and treatment of nuclear workers. Physics is Fun: memoires of a life in Physics <http://www.physicsisfun.net>  
<http://physics.harvard.edu/~wilson>