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Comment On: NRC-2012-0246-0456
Waste Confidence - Continued Storage of Spent Nuclear Fuel; Extension of Comment Period

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Comment on FR Doc # 2013-26726

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General Comment

See attached file(s)

Attachments

NUREG Nov 23

Commentary on NUREG-2157, Docket ID NRC-2012-0246

My name is Herb Robinson. I graduated from the Engineering College at Cornell in the top quarter of my class. I am a year shy of 40 years experience developing complex, reliable, systems.

I am going to begin my comments by quoting the executive summary at the beginning of the document: "The Court identified deficiencies in the 2010 Waste Confidence rule and supporting decision related to the NRC's environmental analysis of spent fuel pool fires and leaks, and the environmental impacts should a repository not become available." Let me repeat the last part of that sentence. "and the environmental impacts should a repository not become available". In the document, this is called the indefinite timeframe. Nowhere in the document does it mention that the indefinite time frame is one million years (according to the EPA).

This document doesn't adequately address the environmental impacts of the indefinite time frame. Section ES.9 of the executive summary states that the indefinitely timeframe is "highly unlikely". This would appear to reflect a myopic and naïve assumption that a repository will become available in the face of mounting evidence to the contrary. Let's face reality. The Yucca Mountain team consisted of the best people we have and they had essentially unlimited resources. Yet, they failed. They didn't fail due to incompetent management. Nor did they fail for lack of resources. They failed because they were given an impossible task.

There is a parallel situation here. The document doesn't properly address the environmental impact of the indefinite time frame, because that is an impossible task. We should be using proper engineering methodology – and we had better be talking engineering here – not experimental science projects. Proper engineering methodology uses proven technology to achieve a practical result. There is no proven technology to sequester something for a million years. Not for 100,000 years… Not even for 10,000 years. The longest-lived man made structures I know of are the pyramids. They been around for very roughly 5,000 years and they failed at their intended purpose in prehistoric times.

And yet this document is making the assumption that government will remain unchanged, that everyone will follow the rules and that there will be no accidents: For a million years. This reminds me a lot of Lilly Tomlin asking for a dime on Saturday Night live. It's a joke – and a rather bad one. There is this little thing called Entropy (or Murphy's law if you prefer the colloquial term) and that isn't addressed by this document.

Just how stupid is this? Let's spot-check the document. The document concludes in section 4.1.3 that the impact of indefinite storage on land use will be SMALL. How does that jive with real world engineering experience? We don't have many examples in this area, but we do have one rather significant one: Fukushima Daiichi. This is the best real world data we have, now. That says every 50 years we will have a major leak of high-level nuclear waste that will render a 250Km^2 area unusable for a million years. That works out to be 5 million Km^2 – About $1/30^{th}$ of the land area of the entire world! I claim that is "CATASTROPHIC", not "SMALL". My estimate is based on straightforward, real world, experience and EPA requirements. Of course, this estimate is high. When one engineers a solution properly, one doesn't just come up with a single predicted outcome, one comes up with a range of predicted outcomes: This is basic error analysis. The goal is to design a system such that the entire range of predicted outcomes is acceptable. In this case, the high end of the predicted range of outcomes is clearly unacceptable. I don't have the time to look through the entire document for other inaccuracies (I am not getting paid to produce this commentary), but it doesn't bode well that there is a glaring deficiency in the first place I chose to spot check.

It should be becoming clear by now that the "bury it and forget about it" approach to dealing with high-

level nuclear waste cannot be safely engineered. To put things on a more positive note, I think there is a good chance we will eventually learn how to safely recycle high-level nuclear waste. For example, there is this proposal:

ACCELERATOR DRIVEN SYSTEMS

D. Vandeplassche and L. Medeiros Romão, SCK•CEN, Mol, Belgium
http://accelconf.web.cern.ch/accelconf/IPAC2012/papers/moyap01.pdf
From the Proceedings of IPAC2012, New Orleans, Louisiana, USA.

I have seen other proposals in the popular media that use fusion as the neutron source to accomplish this. These ideas do look promising, but they currently aren't viable solutions. Also, the time frame for recycling is still going to be on the order of a thousand years, because any real recycling process has to release the remaining energy stored in the high-level waste and it will take that long to use the energy! So, the best advice I could give at this time would be to plan for 1000 years of interim storage. And that we can't be confident there will be a way to dispose of high-level nuclear waste. That story might change in the next 10 to 20 years, but right now, the confidence just isn't there.

Remember, the wisdom to understand what we don't know is the most important part of the problem.