

## Response to Draft Report from Obama's Blue Ribbon Commission (BRC) on America's Nuclear Future dated July 29, 2011

### **Most Commissioners Were Not Qualified**

Some conclusions and suggestions are finally emerging from the work of this commission assembled by President Obama and Secretary of Energy Chu. After studying the qualifications of the members on this commission when it was formed, I did not think that anything new or useful would come as a result of their two years of deliberations. Unfortunately, I was right.

I read with great interest the qualifications of the 15 Blue Ribbon Commissioners that were charged with the responsibility of recommending how America was to manage its so-called nuclear "waste" which in turn will likely determine America's nuclear future. Frankly, I was extremely disappointed. I found that while all are well credentialed, and likely outstanding performers in many fields of study, most were not sufficiently qualified technically to sit on this most important commission dealing with what is likely the most important issue of this century.

Based on their findings it appears that many of the commissioners were selected more for their political alignment than for their nuclear knowledge. My question is, "Where were the nuclear scientists on this commission, the likes of Charles Till, George Stanford, Ray Hunter, Len Koch, William Hannum or Yoon Chang? Where were the experienced economic and risk assessment experts that could have given the commission the economic consequences of decisions taken and advise on the all important risk of delay? The time for a new dose of RD&D as suggested by the commission just kicks the problem down the road. We desperately need direction and action now because further delay could be the biggest mistake of all. But alas, it does not appear that this commission has provided either. What they did give us was more subjective bureaucratic mish-mash—nothing quantified, nothing urgent, nothing new, only the same old subjective rhetoric we've heard for decades. I give them a resounding "F" for their effort. They did not even acknowledge or properly consider what many of our best nuclear scientist believe is the answer—recycling of our current "waste" for use in Gen. IV fast nuclear reactors.

If the country doesn't fix its energy problem in a timely manner, nothing else will matter much. Consequently what is really scary is that the future of our children, and in fact the planet, could very well be defined by this commission's 'findings'.

### **Time and Opportunity Wasting Away**

The commissioners themselves should have realized that the U.S. and the world could ill afford the two years this commission was given to complete their task. Final findings are not due until January 29, 2012.

Fixing America's energy problems over the next 30 years would add approximately 2% per year to the country's GDP. The multiplier effect could raise this to as much as 10%-- **jobs galore**. This prospect should have excited politicians and bureaucratic on the commission. Few major initiatives promise such a robust return. Of course, the most important benefits would be abundant clean energy to support the economies of the world and for our children a clean and healthy environment and energy security.

## **An Unbelievable Omission**

As an alternative to long term storage (300,000Yrs.) of so-called nuclear “waste”, the commission should have presented the alternative of recycling this “waste” along with all the advantages recycling provides. They chose to ignore this elegant technology, but we won’t. Let’s take a look.

So-called nuclear “waste” is not really a waste: The energy value that can be recovered from the U.S. stockpile of approximately 62,000 tons of nuclear waste and 600,000 tons of depleted uranium is equivalent to 4.5 trillion barrels of oil. That is 4 times the known global oil reserves.

This vast source of carbon free energy can be unlocked from this waste with technologies that were successfully developed in our own U.S. National Laboratories over a 30 year period at a cost of more than \$3 billion dollars. The technologies referenced are Generation IV Integral Fast Reactors (IFRs) and the pyroprocessing of nuclear waste which reduces the volume of waste and provides fuel for use in IFRs.

When the original waste produced from today’s Light Water Reactors (LWRs) is recycled and burned in IFRs the volume of waste is reduced by 95%, and needs to be stored for only 300 years instead of 300,000 years required today. Another advantage is that through the recycling process and the use of IFRs, more than 100 times more energy is extracted from the original uranium fuel.

Abundant information regarding recycling nuclear waste and IFRs was provided by me and others to the commission. It is difficult to understand why full consideration was not given to these important, advanced technologies. This may be the result of simply unqualified individuals being on the commission.

## **What We Knew Before Convening the Commission**

While conservation and renewables (wind and solar) may be a significant part of the solution, they cannot alone solve the nation’s or the world’s energy problems--- certainly not in the time frame needed. Our future energy regime must include more than 40% nuclear, or continue the use of fossil fuels which of course is the problem.

It is no wonder that Generation IV Integral Fast Reactors (IFRs) make the most sense to most nuclear experts. Why? Because this technology would solve two very big problems at the same time. Our existing serious nuclear “waste” problem would be solved and at the same time we would completely solve the nation’s energy problem. What’s not to like about this picture except, of course, the proliferation question? So, what about proliferation?

IFRs were purposely designed to be proliferation resistant. Once plutonium or uranium enters an IFR facility it would never be separated into material suitable for weapons at any stage of either the reactor operation or on-site recycling process. Separation of actinides for use in weaponry is a process that requires purposeful short-term exposure and a dedicated aqueous reprocessing facility very different from the recycling facility at an IFR.

IFRs will be economically competitive with all other major energy sources. These reactors are significantly smaller and lighter than LWRs and can therefore be factory fabricated. Unlike LWRs they operate at near atmospheric pressure and so require no pressure vessels. The number of valves and pumps are also greatly reduced.

Another significant plus would be the fact that Yucca Mountain would be an ideal repository for IFR waste. This would save the country's 10 billion dollars plus already invested in this site. One scientist who was totally opposed to using Yucca Mountain as a Light Water Reactor waste repository, said it would be a perfect repository for Generation IV IFR waste. He said, "Like an old cliché, it's like turning a pig's ear into a silk purse."

As proposed by many nuclear experts, a commercial IFR pilot plant complete with recycling must be built now. We need to build this pilot plant immediately because of the growing realization of the serious limitations to all other clean energy sources. Furthermore a large majority of American scientists and engineers who understand nuclear systems believe IFRs when compared to other reactors make the most sense and must be part of any rational future energy mix. The sooner we have Generation IV IFRs ready for prime time, the fewer stop-gap light water reactors (LWRs) we will have to build. This would also put the U.S. in an early position to take advantage of a huge export market.

### **A Red, White and Blue Opportunity?**

**A closing suggestion from the commission:** "A well designed federal RD&D program will enable the United States to retain a global leadership position in nuclear technology innovation, Public and private RD&D efforts should focus on two distinct areas of opportunity."

- Near term improvements in the safety and performance of existing light-water reactor technology, as currently deployed in the United States and elsewhere as part of a once-through fuel cycle and in the technologies available for storing and disposing of spent nuclear fuel and high-level waste. **No kidding?**
- Longer-term efforts to advance potential "game-changing" nuclear technologies and systems that could achieve very large benefits across multiple evaluation criteria compared to current technologies and system. **What? See above. Don't they know about the "game changers" we already have? They are IFRs and pyroprocessing.**

Contrary to the commission's declarations on the matter, the U.S. is in danger of losing its once strong nuclear leadership. As a result we would have less to say about how nuclear materials are to be managed in the world and that could expose the U.S. to some inconvenient if not downright dangerous consequences. China is now building a large pilot plant said to be identical to our successful EBR-II plant that proved the design of the IFR. Meanwhile in the U.S. after complete success, EBR II was shut down, not for technical reasons but for political reasons during the Clinton administration, a decision destined to be one of the worst in our nation's history.

Much of the world is already committed to a nuclear future with some countries eagerly waiting to license the American version of Generation IV Fast Reactors—the IFR. We still have the best IFR technology in the world but have squandered much of our lead, partly by allowing a largely unqualified commission two years of useless deliberation. What we really did was give our competitors an additional two years to catch up.

Energy is not a single issue, since it weaves its way through just about every aspect of our lives. Our economy and our way of life are dead in the water without adequate, clean, reliable, inexpensive energy. Historians will look back at the early decades of the twenty-first century and know that energy was by far the most important issue of the time. What we do now will have a profound impact on how the rest of history will be written. Will

our inaction cause the United States and the world to slip into another dark age shackled by poverty, economic ruin, and war? Or will we choose to take aggressive action now for a better world?

### **Call to Action**

Scrap the Blue Ribbon Commission's report in its entirety since it tells us nothing and could cause more confusion requiring yet another commission.

Convene our best scientists (10 to 20) on all aspects of nuclear energy—fuel, fuel recycling, reactor processes, safety, and waste storage and management. Allow them 60 days to come up with a quantified direction and a plan to move forward immediately. Included to assist them should be energy economists and risk assessment professionals.

I do not see a bright energy future for the U.S. unless we can convince our politicians and bureaucrats to finally turn to our best energy experts for our energy solutions. They are the only ones that can rescue us. Even now it might be too late.

Respectfully offered,

JOSEPH SHUSTER

September 7, 2011

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*Energy Independence Day, July 4<sup>th</sup> 2040*

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