

**Summary: Limiting Future Proliferation and Security Risks – Panel #3**  
**By: Robert L. Gallucci**  
**Statement Before the Blue Ribbon Commission on America’s Nuclear Future**  
**12 October 2010**

My principal concern here is less about nuclear proliferation writ large, that is, about how America’s nuclear energy choices will impact the likelihood that additional countries will acquire nuclear weapons, and more about the danger of nuclear terrorism.

My purpose is to argue that:

- (1) The probability that an act of nuclear terrorism will occur is directly related to the availability of fissile material for the manufacture of an improvised nuclear device (IND).
- (2) The introduction of mixed oxid (MOX) fuel into any country’s nuclear fuel cycle increases the risk that Pu will be acquired by a would-be nuclear terrorist.
- (3) Wide-spread adoption of Pu recycle in thermal reactors would make it impossible to adequately account for Pu in the nuclear fuel cycle.
- (4) Any decision that the U.S. makes about Pu recycle, for whatever purpose, should take account of the impact of that decision on nuclear terrorism.
- (5) There is not now, nor will there be in the foreseeable future, any gain to be won by the introduction of Pu fuels into the nuclear fuel cycle that is not substantially off-set by the loss that would be sustained to national and international security by such introduction.

Nuclear energy should continue to be part of, and probably a growing part of, the energy mix in the US and in a number of other countries around the world.

For more than a decade, American Presidents have said that the greatest threat confronting our country is that a terrorist will detonate a nuclear device in one of our cities. But nuclear terrorism is still a “high consequence, low probability” event.

The most plausible scenario for nuclear terrorism is the manufacture of an improvised nuclear device (IND). The biggest obstacle to the manufacture of an IND is the acquisition of the necessary fissile material. The challenge to the Commission is to make very sure that its recommendations on nuclear energy do not increase the likelihood of nuclear terrorism.

It should be obvious that were any country – the U.S., China, Russia, Japan, India, the Rok or France for example – to engage in large scale recycle of Pu, to use mixed oxide fuel widely in

the current generation of reactors, the vulnerability to theft at a fuel fabrication facility, a nuclear reactor, or in transport would increase the likelihood of terrorist acquisition of fissile material.

It should be just as obvious that were many countries to follow that course, it would put thousands of tonnes of Pu oxide fuels in transport from reprocessing plants to fuel fabrication facilities to reactors, destroying any hope of achieving material accountancy at the kilogram level. Nuclear terrorism would no longer be such a low probability event.

One assumption here is that there is no safe reprocessing technology; not COEX, not UREX+, not pyroprocessing. If a MOX fuel can be used in a thermal reactor, it can either be used directly to make an IND, or the obstacles to purifying it sufficiently to make a bomb would not stop a determined terrorist.

A second assumption is that a terrorist could manufacture an IND – not just a radiation dispersed device (RDD) – using a Pu core. Designing a Pu IND may be more difficult than a HEU IND, but the incrementally greater challenge should not be regarded as prohibitive for a determined terrorist.

Many arguments have been advanced for Pu recycle in the US and elsewhere: to facilitate radioactive waste management; to save uranium and SWUs; to gain experience in preparation for the coming age of fast reactors; and for the US to regain technical credibility and international leadership in nuclear energy.

But it is not at all clear that recycle will ease radioactive waste management. Indeed, it may well exacerbate the challenge. Moreover, safe spent fuel storage is at hand in local dry storage, arguably good for hundreds of years.

The economic arguments for recycle, which depend on the price of uranium and the cost of enrichment and reprocessing, are weak and have gotten weaker with experience. Large scale adoption of fast reactors is hardly inevitable or even likely for a very long time.

And finally, it is bizarre to argue that we should adopt a policy that we believe to be politically dangerous, economically unwise, and technically unnecessary, just so we can be out front, leading other countries in precisely the wrong direction.

U.S. policy needs to respect the sovereignty of other nations and acknowledge the right of responsible countries to make their own energy choices. But our policy should also reflect our judgment about the risks associated with those choices, for our own security and that of the rest of the world. It would not be enough for us to say only that recycle is economically unjustified at this time. It is essential that we make clear that, since we regard the risks of Pu recycle in thermal reactors as simply too great, the US believes it unwise and unsupportable for even the most advanced countries to follow that course.

These views are my own and do not necessarily reflect those of the MacArthur Foundation.