

ASNO INFORMATION SHEET

December 2006 (revised August 2008)

REACTOR-GRADE PLUTONIUM: USE IN NUCLEAR WEAPON TESTS

In the publication “An Illusion of Protection” the Medical Association for the Prevention of War (MAPW) and the Australian Conservation Foundation (ACF) claim that reactor grade plutonium has been used in nuclear tests. This claim is used as a basis for arguing that by exporting uranium Australia is contributing to nuclear weapons proliferation.

In making this claim MAPW/ACF ignored evidence to the contrary presented to the Inquiry into the Development of the Non-Fossil Fuel Energy Industry in Australia by the House of Representatives Standing Committee on Industry and Resources in response to similar assertions by one of the authors (Jim Green).

To quote from the supplementary submission of 18 November 2005 to that Inquiry from John Carlson, Director General, ASNO:

“In 1962 the US conducted a nuclear test using what was described as “reactor-grade” plutonium. I pointed out in my Annual Report for 1998-99 (page 58):

“There is some confusion over [this test, because] at that time “reactor-grade” was much closer to weapons-grade than is currently the case. While the US has never revealed the quality of the plutonium used in that test, there are indications that it was of “fuel-grade”, an intermediate category between weapons-grade and reactor-grade, which has been recognised as a separate category since the 1970s”.

I also stated:

“While [the technical difficulties of using reactor-grade plutonium] could possibly be overcome, to some extent at least, by experienced weapons designers (e.g. from the nuclear-weapon states, with experience from hundreds of tests to draw upon), ASNO is not aware of any successful test explosion using reactor-grade plutonium, typical of light water reactor fuel”.

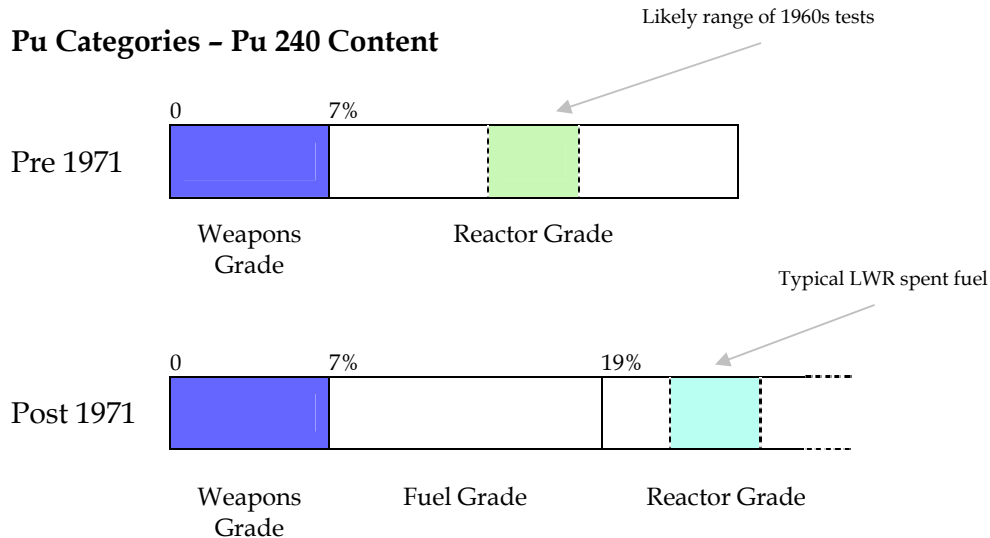
While FOE’s submission asserts my comments are a “gross distortion of available scientific evidence”, FOE representative Green himself quotes US sources as indicating the plutonium used in the 1962 test was fuel-grade rather than reactor-grade (Jim Green, newsletter of May 2005). One of the authors cited by Green was Dr Alex De Volpi, who was a senior scientist in the US weapons program. To quote Green:

“De Volpi (1996) is sceptical that the plutonium used in 1962 the test (sic) would be classified as reactor grade using current classifications, but states that it was below weapon grade, i.e. it was fuel grade plutonium”.

Thus Green is castigating me for expressing views similar to those he repeated, without disapproval, in his own publication. I note Green did not mention that De Volpi’s article was titled “A Coverup of Nuclear-Test Information”, and that De Volpi has described the US government’s position on the 1962 test as “deceptive”.

FOE also attack me for denying that “below-weapon-grade” plutonium could be used in nuclear explosions. What I actually said (quoted above) was that ASNO was not aware of reactor-grade plutonium of the isotopic composition typical of light water reactor spent fuel being so used. The only “gross distortion” here is FOE’s misrepresentation of what I said.”

It is unhelpful to informed public discussion of these issues that MAPW/ACF have ignored information that does not accord with their views. They should read the writings of De Volpi, who was a senior scientist in the U.S. nuclear weapons program.



MAPW/ACF also quote, amongst others, the then Director General of the IAEA, Dr Hans Blix, on the IAEA’s practice of regarding plutonium of any isotopic mix (other than plutonium comprising 80% or more Pu-238) as “direct-use material”. This issue was addressed in ASNO’s Annual Report for 1998-99 (pages 58-9):

“The confusion in the public mind regarding the suitability of reactor-grade plutonium for nuclear weapons appears to arise from the fact that, **for the purpose of applying IAEA safeguards measures, all** plutonium (other than plutonium comprising 80% or more of the isotope Pu-238) is defined by the IAEA as a ‘direct-use’ material, that is, ‘nuclear material that can be used for the manufacture of nuclear explosives components without transmutation or further enrichment’. In order to understand what this actually means, it is important to appreciate the following:

- The IAEA is not saying that all plutonium is suitable for nuclear weapons. The IAEA has chosen its terminology very carefully, and refers to ‘nuclear explosives’, rather than nuclear weapons. While this distinction might seem a fine one, in fact it is very important. It can be shown by theoretical studies that reactor-grade plutonium could be made to explode under certain (technically demanding) conditions. For this reason it is clearly prudent to adopt a conservative approach, and the IAEA applies safeguards measures to all grades of plutonium.

- Theoretical calculations relating to reactor-grade plutonium however do not indicate what happens in real life. There are several characteristics required for a practical nuclear weapon, including reliability, useful yield, a deliverable size and storage life. These requirements would be adversely affected by the difficulties associated with reactor-grade plutonium, mentioned above. It is for good reason that those countries that have made nuclear weapons have done so with plutonium specially produced for the purpose.
- The IAEA definition of ‘direct-use’ material also applies to plutonium in spent fuel, and to MOX—yet clearly the IAEA is not saying that nuclear explosives can be made from spent fuel or from MOX (i.e. without processing to separate the plutonium). ‘Direct-use’ and ‘weapons-useable’ are not synonymous.”

These are just two points out of a number of misunderstandings and inaccuracies in this MAPW/ACF publication. It is important to have informed public discussion on nuclear issues – but “informed” is the operative word, it is essential for the public to have factual information, and for opinions to be presented as such.