EDUCATION, SCIENCE AND TRAINING

SENATE LEGISLATION COMMITTEE - QUESTIONS ON NOTICE
2003-2004 ADDITIONAL ESTIMATES HEARING

DEST Question No. E1016_04

Senator Carr provided in writing.

Question:

In answer to question E391_04 ANSTO notes that "in preparation for the 2003 shipment, ANSTO analysed the probability and consequences of a range of events during the transport of spent fuel from Lucas Heights to a Sydney port."

Can you provide all documents relating to consequences analysis conducted in 2002 and 2003?

Has ANSTO provided ARPANSA with all these documents, including the "note" referred to in E391?

What scenarios did you consider in your analysis?

For example, what about armour piercing shells?

What is a "High Energy Density Device"?

Given that you do reach the conclusion that ANSTO casks could be ruptured, where does that leave your claims such as those in the media release of 20 October 2003 or Dr Cameron's statement in the Australian, 27 October 2003, both of which argue that the casks could not be ruptured?

Given the number of times in recent months that the defence department has expressed concerns at the greater availability of shoulder fired missiles, was the use of these considered in the consequences analysis.
If yes, with what conclusions?
If no, why not?

Answer:

ANSTO has provided the following response:

Transport of spent fuel from Lucas Heights to a Sydney port

The analysis undertaken in 2003 was attached to the response to question E391_04. That analysis was subjected to review by ARPANSA before approval for the October 2003 shipment was given by that body and by the Australian Safeguards and Non-proliferation Office (ASNO). No analysis was undertaken in 2002, given that there was no shipment of spent fuel undertaken that year.

As indicated in the response to question E391, the analysis undertaken by ANSTO was based on earlier analysis undertaken by Sandia National Laboratories of the consequences of an attack on a shipment of spent fuel in the United States using an armour piercing missile. Such missiles are described in the Sandia analysis as High Energy Density Devices,

and encompass all weapons which the authors of that analysis believed could be available to terrorists. The Sandia studies included a full scale test using an armour piercing weapon and an actual spent fuel transport cask. The Sandia studies made a number of conservative assumptions, including:

- No security measures were in place; and
- The weapons would be employed at a distance from these containers that would result in maximum damage to the container and that the weapon would strike the container dead centre; if the missile were to strike higher or lower, it could be deflected by the cylindrical shape of most containers, and penetration of the container would be lessened or not occur at all (see United States General Accounting Office, "Spent Nuclear fuel: Options Exist to Further Enhance Security", July 2003).

ANSTO's analysis took the results of the Sandia study, and modified them to fit the particular circumstances of ANSTO's shipments, particularly the different type and greater age of the fuel. The ANSTO analysis did not conclude that casks could be ruptured; rather, it started with the improbable (very conservative) assumption that they had been ruptured, and analysed the consequences thereof. The conservative assumptions adopted by Sandia formed the basis for the ANSTO analysis.

Dr Cameron's statements about the robustness of the spent fuel casks used by ANSTO to transport spent fuel were based on the rigorous testing which these casks must survive in order to be certified by relevant regulatory bodies. The casks are classified as type B packages, and as such must be able to withstand the effects of a severe accident without releasing their radioactive contents. The casks must meet stringent leak tightness provisions and satisfy specific mechanical, thermal and water immersion tests. These include:

- a drop test from a height of nine metres onto an unyielding surface;
- a puncture test onto a steel bar;
- a thermal test that subjects the package to a hydrocarbon fuel/air fire with an average flame temperature of 800 degrees C for 30 minutes;
- a water test where package is immersed under a head of water of at least 15 metres for a period of not less than eight hours, and at 200 metres for not less than one hour.

Type B packages have survived some extreme tests, the most spectacular being a British demonstration in which a diesel locomotive pulling three carriages was smashed into a nuclear fuel cask at 165 kilometres per hour. The cask suffered only minor damage and no significant leakage. The locomotive was destroyed.