NRC 18ᵗʰ Annual Regulatory Information Conference
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Bethesda North Marriott Conference Center

Session Title: Security Program Update and Path Forward
Thursday, March 9, 2006

Question to Daniel H. Dorman, D/Division of Security Operations/NSIR/NRC:

With the US utilities sharing information with foreign utilities on a regular basis, how are the ITAR's met and enforced?

Answer:

The Departments of Commerce (DOC) and State (DOS) have special processes for commodity classification and commodity jurisdiction determinations. DOC provides a commodity classification for proposed exports which would involve identifying in which category an item falls on the Commerce Control List (CCL). DOS determines if an item proposed for export is specifically designed for military use and does not have a predominant civilian application, that would be called a commodity jurisdiction determination, and its export would be administered by the DOS under the International Trafficking in Arms Regulations (ITAR).

The ITAR export controls administered by DOS for munitions are separate from – and do not apply to – other controls for exporting nuclear materials and equipment which are administered by NRC under Title 10, Code of Federal Regulations (CFR) Part 110, and for transferring nuclear technology-related information under Title 10, CFR Part 810, which are administered by the Department of Energy.

Session Title: Plenary Session - Research
Wednesday, March 8, 2006

Question to Carl J. Paperiello, Director of Nuclear Regulatory Research, NRC:

Your statement that calculating the reactivity of irradiated fuel is too hard is disappointing. If NRC cannot do this - then what can be done?

Answer:

The context of the question regards burn-up credit for spent fuel.

Calculating the reactivity of irradiated fuel is not necessarily "too hard" but determining the bias and uncertainty of the calculation is difficult because of the lack of data to benchmark the calculation method. Also, the uncertainty in the cross section data for some of the isotopes used in the burn-up credit calculation causes further uncertainty in the final calculation of keff even after the isotopic inventory (concentrations) of the spent fuel has been estimated.

Uncertainties in the predicted isotopic concentrations in spent nuclear fuel represent one of the largest sources of overall uncertainty in criticality calculations that use burn-up credit. The methods used to propagate the uncertainties in the calculated nuclide concentrations to the uncertainty in the predicted neutron multiplication factor (keff) of the system can have a significant effect on the uncertainty in the safety margin in criticality calculations and ultimately affect the potential capacity of spent fuel transport and storage casks employing burn-up credit. Methods that can provide a more accurate and realistic estimate of the uncertainty may enable increased spent fuel cask capacity and fewer casks needing to be transported, thereby reducing regulatory burden on licensee while maintaining safety for transporting spent fuel.

A report prepared by Oak Ridge National Laboratory (NUREG/CR-6811, Adams number ML032130638) surveys several different best-estimate strategies for considering the effects of nuclide uncertainties in burn-up credit analyses. The potential benefits of these strategies are illustrated for a prototypical burnup-credit cask design. The sub-critical margin estimated using best-estimate methods is discussed in comparison to the margin estimated using conventional bounding methods of uncertainty propagation. The bounding method, while easy to implement and clearly easy to defend as conservative, results in limiting and unrealistically large margins to account for nuclide variability. The method of propagating the effects of nuclide uncertainties in the bounding method overestimates the real importance of nuclide uncertainties on the predicted keff and precludes a realistic evaluation of the real, but more difficult to determine, sub-critical margin.