

EDITOR'S NOTE

The first article in this issue, by Alexander Glaser, sets forward an imaginative analysis of the proliferation potential of uranium fuel for research reactors. In an article in the journal in 2004 (Vol. 12, No. 3), Frank von Hippel argued for the elimination of all highly enriched uranium (HEU) in reactor fuel cycles, with special emphasis on research reactors. He pointed to efforts to convert reactors now using HEU to use uranium fuel enriched to less than 20 percent, the long-established dividing line between low and highly enriched uranium. However, though the dividing line is indeed long established, its origins are somewhat obscure. Is there something special about 20 percent? It is this question that Glaser addresses and concludes that in fact the 20 percent figure is reasonable, an enrichment level too low to build a crude nuclear device and yet high enough to make inefficient its use in a reactor to produce plutonium. Although the “optimum” enrichment to discourage nuclear proliferation will naturally depend to a degree on specific scenarios, Glaser makes a strong case against plans to use uranium with enrichments beyond 20% for new research reactor projects.

The two next articles in this issue also deal with the issue of using HEU as fuel—this time in Russian icebreakers. The first article, by Oleg Bukharin, sets out some background information on Russian icebreakers and their use of HEU. The following article by Diakov, Dmitriev, Kang, Shuvayev, and von Hippel, building upon data first collected by a group of Norwegian analysts, shows that the Russian reactors could be fueled with LEU without loss of core life.

The final article, by Piksaikin, Pshakin, and Roschenko of the Institute of Physics and Power Engineering at Obninsk, provides an up-to-date and comprehensive review of analytical techniques which can potentially be used in the measurement of environmental and swipe samples for the purpose of detecting clandestine activities or uncovering undeclared histories involving nuclear materials. The authors pay special attention to the sensitivities of the different analytical techniques. An understanding of such techniques is critical to any evaluation of the effectiveness of safeguards and verification measures for a wide range of arms control agreements.

Finally, we include a short reflection by the Russian editor of the journal, Stan Rodionov, on Ted Taylor who died in October 2004.