The most recent impasse in closure proceedings nearly caused a meltdown in Lithuania's relations with Brussels. In the course of the October 2004 parliamentary elections, Prime Minister Algirdas Brazauskas announced he would keep the plant's first reactor working beyond its closure deadline at the end of the year. Voters rewarded him by returning him to the country's most powerful office.

Only after the European Commission coldly reminded Brazauskas that the decommissioning was "enshrined in Lithuania's accession treaty" did the prime minister retract the statement he made weeks before.

Arturas Dainius, the state secretary at Lithuania's Economy Ministry, which is in charge of plant closure, said that "the elections didn't play the least significant role" in the government's stance. "You know," he added, "all sorts of 'interesting' ideas can pop up from the political arena."

Yet the conditions that instigated the eleventh-hour crisis over closing the first reactor will be dwarfed by the potentially catastrophic issues Lithuania will face as it prepares to close the second reactor by the end of 2008—another theoretically "enshrined" date. The energy produced by the first reactor was almost all sent abroad, but the final closure will leave Lithuania able to produce only 25 percent of its current electrical output, leaving a massive void in the country's energy supply.

With government officials admitting they have no definite plan to replace the supply from the second reactor, the hoped-for on-time closure seems doubtful. Casual proposals abound, but precious few official ideas have surfaced on how to use the aid from Brussels. "We'll either have to become an energy importer or build another plant, in which case we'll have to decide what type of plant that will be," said Dainius. Only nebulous suggestions have been discussed so far.

Lithuania's power grid has yet to be connected to the rest of the EU, meaning imported electricity would have to come from Russia—an unpopular move in a country sensitive to the giant bear's long reach. And the prospect of bringing a new nuclear reactor online in less than four years seems dim given the government's sluggish pace of decision making. "Sooner or later the reactor is going to have to close, so why don't we make sound plans for its closure now?" Jasiulionis asked.

In the meantime, even government officials do not sound confident that the second reactor will be closed. "We'll live, and we'll see," Dainius told me.

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LASER ENRICHMENT

Separation anxiety

By Jack Boureston & Charles D. Ferguson

On November 2004, the environmental group Greenpeace accused the Australian government of condoning nuclear proliferation by supporting the work of a laser uranium enrichment company named Silex Systems Limited. "If any other country, be it Iran, Syria, or Iraq was involved in this research it would be taken as a sign of a covert weapons program," a Greenpeace spokesperson told reporters.

Nations have been developing laser isotope separation methods to enrich uranium for years, but most have yet to convert research into commercial success or have abandoned laser enrichment altogether. The recent accusations and the diffusion of laser enrichment technologies and know-how as part of peaceful nuclear programs nonetheless again raise the question: How much of a proliferation risk does laser isotope separation present?

Analysts have paid relatively less serious attention to the use of laser isotope separation (LIS) to enrich uranium than to the spread of gas centrifuge enrichment and reprocessing technology. But certain features of laser enrichment facilities would seem to make them ripe for proliferation—they are typically smaller, use less energy, are more easily concealed, and may one day be cheaper to operate than both gas centrifuge and diffusion plants. Still, there are formidable obstacles to their development.

Some analysts have regarded laser isotope separation as too difficult to master by nations lacking highly advanced technical infrastructures.

One exception is Stanley Erickson, an analyst at Lawrence Livermore National Laboratory. In an October 2001 paper Erickson warned, "As technology advances, this will not remain so." This observation proved prophetic in August 2002, when the dissident group National Council of Resistance of Iran announced at a Washington, D.C., press conference that Iran had started an LIS program and developed a laser enrichment facility at Lashkar Ab'ad.

The Iranian laser research program, which enriched only milligrams of uranium, had surprisingly managed to escape detection by the International Atomic Energy Agency (IAEA). In February 2003, IAEA Director General Mohamed ElBaradei acknowledged that the IAEA would continue having problems detecting similar "research and laboratory activities" in the future. But ElBaradei hastened to add that the IAEA's improved technological capabilities would make it "highly unlikely" that an industrial-scale LIS program would go undetected.

Is laser enrichment a proliferation risk? Greenpeace says "yes" at this September 2003 protest in Australia.

AFP

Another hidden research effort using laser enrichment came to light in September 2004, when the IAEA exposed South Korean experiments (for more on this, see "South Korea's Nuclear Surprise," January/February 2005 *Bulletin*). In 2000, scientists at the Laboratory for Quantum Optics at the Korea Atomic Energy Research Institute (KAERI) separated about 0.2 grams of uranium 235, an isotope useful in nuclear fuel or weapons, and enriched them to levels between 10 and 77 percent. While 20 percent is the dividing line between low-enriched and highly enriched uranium, enrichment levels close to 90 percent are sought for the purposes of making weapons. Sufficient amounts of uranium enriched to 77 percent could fuel a nuclear bomb.

Scientists need tens of kilograms of enriched uranium, more than 100,000 times the amount enriched, to make a weapon, and analysts drew clear conclusions about Seoul's intentions. "If the question is, could KAERI have enriched a significant amount of uranium using the facility they had in that laboratory, I'm highly confident the answer is no," Jeffrey Eerkens, a leading American laser enrichment expert, told *Nucleonics Week* (September 9, 2004). Yet, scientists wouldn't need a commercial-scale LIS plant to enrich enough uranium for a single nuclear weapon if they had one or two years to do so.

This is perhaps why South Korea's laser enrichment activities were of some concern to the U.S. government. In November 2001, Eerkens gave a presentation on laser isotope separation techniques at a scientific conference in South Korea. The next year, he proposed to the Energy Department that he work with a KAERI scientist to investigate laser separation of zinc isotopes and other isotopes useful in medical applications. Energy denied the proposal "because it was too close to uranium enrichment," Eerkens told *Nucleonics Week* and confirmed for us.

Although the IAEA has reprimanded South Korea for not reporting its uranium enrichment activities in a timely fashion as required by its Safeguards Agreement, the United States has not expressed serious concern. In early November 2004, before the IAEA Board of Governors meeting, Secretary of State Colin Powell said, "I'm quite sure that the IAEA will see it as a minor problem with experimentation."