Routine shipments of small quantities of highly enriched uranium to two companies that produce molybdenum-99 were suspended without warning in late February by Oak Ridge National Laboratories' Y-12 plant, the only distributor of the material in the United States (US).

The suspension of supply to Cintichem, Inc., Tuxedo, New York, a subsidiary of Medi-Physics, Inc., was lifted on April 7 after approximately five weeks. The embargo continues, however, on shipments to Atomic Energy of Canada Ltd. (AECL), Ottawa, supplier of molybdenum-99 to most of the free world, including three US companies—Mallinckrodt, Inc., Squibb Diagnostics, and the Du Pont Company—that depend on AECL for their molybdenum supply.

The reason for the embargo is unclear, but it appears related to concerns about the security of highly enriched uranium during transit.

Molybdenum-99/technetium-99m radioisotope generators are used to produce sodium pertechnetate (Tc99m). This preparation is used as is or with various kits in an estimated 70% of all nuclear diagnostic procedures worldwide.

No disruption in the supply of molybdenum-99 for medical purposes occurred or is anticipated.

Observers in the nuclear industry believe AECL has a supply of enriched uranium for manufacturing sufficient to fill generator orders for about the next four months, and shipments to Cintichem have resumed with no break in the production cycle.

When the suspension of shipments was first noticed, however, there was concern within the Society of Nuclear Medicine (SNM), at Cintichem and later at the Washington, DC-based US Council for Energy Awareness (USCEA), an electric-industry group that promotes peaceful uses of nuclear medicine.
“I think Oak Ridge is where the question was raised, but I don't think it's fair to say that the decision was made at Oak Ridge.”

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ar energy, about the possibility of a supply disruption. In a letter to Theodore Garrish, assistant secretary for nuclear energy at the US Department of Energy (DOE), John Siegel, vice president for technical programs at USCEA, said that Cintichem had come “within one day of breaking the [production] chain” for generators.

Two explanations for the suspension have been cited. According to Jim Alexander, a spokesperson for DOE based in Oak Ridge, the suspension and its timing were “a function of a general review to see where improvements can be made” in security, environmental safety and health protection generally at the Oak Ridge facilities. Management changes in 1983 and 1984 have prompted many similar programs to be reviewed, he added. Joe Parks, deputy assistant manager for enriching operations with DOE, pointed out that “there is sensitivity within the public over the movement of radioactive materials” and that it behooves Oak Ridge to ensure that the public safety is well protected. The embargo was designed to give the facility time to review its procedures.

Alleged Diversion Cited as Cause

Some observers outside of Oak Ridge, however, believe that the suspension was precipitated by unconfirmed reports that highly enriched uranium had been diverted to Pakistan and Libya. DOE officials vigorously deny any connection, calling the reports “speculation,” but the timing of events was suggestive. When asked why he thought Oak Ridge suspended shipments, Frank Graham, senior consultant for USCEA, said flatly, “It had to do with the Nukem problem in Germany.”

The Nukem problem first surfaced in December, when the operating license of Nukem's nuclear materials transport subsidiary, Transnuklear, was suspended for alleged irregularities in the cross-border transport of nuclear wastes.

In January, Nukem's operating licenses to handle and process nuclear wastes were suspended by the West German government because of accusations that the company failed to properly inform authorities about the contents of 50 drums of waste ashes containing natural and slightly enriched uranium, according to documents prepared by Nukem. At that time German officials announced that they were investigating "serious rumors" that fissionable material may have gone from Belgium and Germany to Sweden, Libya and Pakistan, which would be a violation of the Treaty on the Non-Proliferation of Nuclear Weapons.

While Libya has not been thought capable of producing a nuclear weapon, US government reports say that Pakistan has the enriched uranium and the technical capability to produce an atomic bomb, according to articles in The New York Times. The prospect is particularly worrisome because of long-standing tensions between Pakistan and India. Last December a Canadian citizen acting on Pakistan's behalf was convicted in Philadelphia of trying to purchase 25 tons of a specially strengthened steel alloy, which is used in nuclear weapons plants, and of trying to illegally export beryllium, which is used in weapons manufacture.

'Totally Unfounded'

Nukem company documents said the accusation of uranium diversion "was based on unproven information from journalists" and that neither it nor its subsidiary "has ever violated the Non-Proliferation Treaty: this has also been publicly declared by the International Atomic Energy Agency (IAEA), EURATOM and the Department of Public Prosecution, which recently declared these accuses [sic] totally unfounded."

While he notes that nothing has been proven, Mr. Graham of USCEA believes the US decided to suspend the shipments for security review because there was "enough smoke" to justify it. Moreover, the quantities of enriched uranium shipped for medical purposes are not great, not at all near the 15 pounds of weapons grade necessary to make a bomb. "There are so few shipments [of enriched uranium] and it's such a little bit, a few hundred grams at a time, that it's not really much of a business, other than it's critical to nuclear medicine," he said.

Where the decision to suspend shipments was made has also been an issue; early reports said it was made unilaterally at Oak Ridge. But Oak
"We have no enrichment capabilities here in Canada; we’re dependent on the US."

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Ridge-based DOE officials deny that was the case. "I think Oak Ridge is where the question was raised, but I don’t think it’s fair to say that the decision was made at Oak Ridge," said Steve Wyatt, a spokesperson for the department.

Embargo Confirmed

Cintichem wasn’t given advance notice of the embargo, but instead discovered it when it attempted to place an order with Oak Ridge. Capt. William H. Briner (Ret.), director of radiopharmacy at Duke University Medical Center in Durham, North Carolina, and chair of the SNM Government Relations Committee, said he first heard about the embargo on April 4, which he confirmed the next day. In the evening of April 6 he received a call from a DOE official who said the embargo affected not only Cintichem but "the whole free world" as well.

Capt. Briner met with David Nelson, PhD, executive director of DOE’s Office of Energy Research. In his discussions with Dr. Nelson on April 7, Capt. Briner was told that every effort would be made to ensure that the supply of highly enriched uranium for medical manufacturing would not be disrupted. Indeed, Capt. Briner said Dr. Nelson confirmed that shipments to Cintichem had been resumed earlier that day. "They [DOE] responded when we screamed, and that very quickly," Capt. Briner noted.

Shipments of highly enriched uranium to Cintichem are proceeding with a special release on a shipment-by-shipment basis, according to James J. McGovern, plant manager, and DOE officials.

‘A High Priority’

The resumption of shipments to AECL is "a high priority," according to Mr. Parks, but because the Canadians require larger quantities per shipment, higher levels of protection are necessary. No date for resumption of shipments has been set. Hal Tracey, public affairs officer with Chalk River Nuclear Laboratories in Chalk River, Ontario, a division of AECL, agreed that if the suspension continues too long, production of molybdenum-99 there could be affected. "We have no enrichment capabilities here in Canada; we’re dependent on the US," he said. The company has begun experimenting with low-enrichment uranium because the US has told them that it won’t be shipping highly enriched uranium to Canada indefinitely, he added.

While Cintichem has a back-up agreement with AECL, it wasn’t immediately known at Cintichem that enriched uranium was available from Canada, said Henry Kramer, PhD, vice president of research and development at Medi-Physics, Inc., Paramus, New Jersey. The company also didn’t know about the existence of the embargo at first, Dr. Kramer said, as Oak Ridge shipments sometimes arrive late. "They refused to talk to us until we got Bill [Briner] into the act," he added. Dr. Kramer has since been assured that shipments will continue. "DOE is supportive of nuclear medicine, ensuring that the shipment of uranium for such purposes will not be impeded in any way," he said.

Karla Harby

Material Sought For Archives

Material of historical interest is being sought by the historian of the Society of Nuclear Medicine for inclusion in the permanent archives.

Relevant materials include photographs, tape recordings, notes, monographs and old advertisements, particularly those depicting obsolete equipment or radiopharmaceuticals. Old instruments are also welcomed.

The material will be indexed and filed under the direction of Frank DeLand, MD, Society historian and chief of staff at the VA Medical Center in Syracuse, New York. Those who prefer to retain possession of their materials could still enrich the archives by providing a list of documents or instruments held, so that they could be accessed when needed. Any donations that are duplicates or otherwise inappropriate will be returned to the donor.

The archives are used to construct historical displays and in writings about the history of nuclear medicine.

[For further information, contact Frank DeLand, MD, Chief of Staff, VA Medical Center, 800 Irving Ave., Syracuse, NY 13210, (315) 476-7461 ext. 2226.]