

DOE'S SUSPENSION OF ENRICHED URANIUM SHIPMENTS AT SAVANNAH RIVER PUTS MO-99/Tc-99m SUPPLY IN JEOPARDY

"We are looking at the overall Atomic Energy Act to see if there are any provisions that would allow us to receive the shipments. . . . If Cintichem and the medical community demonstrated a negative impact, the department would be obligated to try to solve that problem."

The only domestic commercial supplier of several radioisotopes critical to nuclear medicine has been unable to ship enriched target uranium to the Department of Energy (DOE) reprocessing facility in Savannah River, South Carolina, since January 1, 1989. This situation is causing storage problems that could eventually prevent the company from continuing production of these important radioisotopes.

Cintichem, Inc., a subsidiary of Medi-Physics, Inc., based in Tuxedo, New York, has been unable to ship out the target uranium it uses to produce molybdenum-99, xenon-133, and iodine-131 for use in nuclear imaging, due to the expiration of a DOE policy under which reactor fuel and irradiated components are reprocessed. DOE is currently performing an environmental assessment of the policy to determine whether the reprocessing of reactor fuel and target uranium is harmful to the environment.

This is the second time in the past year and a half that the supply of medical radioisotopes has been jeopardized (see *Newsline* June, 1988, p. 1003). Last winter, DOE embargoed shipments of enriched uranium out of Oak Ridge National Laboratory (ORNL) because of concerns about security during transport. Both Cintichem and Nordion, International Inc.,

(formerly a division of Atomic Energy of Canada, Ltd.), — together which supply the majority of North America's supply of these radioisotopes — were affected by the embargo.

Close to 75% of the estimated 8 million in vivo radiodiagnostic tests performed in the US each year employ ⁹⁹Mo, ¹³³Xe, or ¹³¹I as the radiotracers, estimated James J. McGovern, plant manager at Cintichem. According to The Society of Nuclear Medicine, technetium-99m is used in up to 90% of all nuclear medicine studies. Furthermore, Barbara Y. Croft, PhD, assistant professor of medicine/radiology (nuclear medicine), University of Virginia Hospital, immediate past president of The Society, told *Newsline*, "we are working to increase our dependence on technetium rather than decrease it, so in no way would we want our supply to be threatened."

"As I see the consequences," Mr. J. McGovern, told *Newsline*, "there will not be enough technetium in the hospitals to continue supporting the practice of medicine as it is now." He further predicted that since Cintichem also markets internationally, the result could be "a shortage here and also in Europe and Japan. . . . I doubt very seriously if Canada could pick up the slack—there'd be a shortage." He noted that in addition to the US and Canada, other countries such

as Australia, Belgium, and some Eastern Block countries produce these radioisotopes, but in far too limited quantities to supply the US. Mr. McGovern said Cintichem has storage space to last approximately through November, but after that ". . . I think we would see a shortage being imminent."

David Drummond, product manager, radiochemicals at Nordion, told *Newsline* that the Canadian supplier could provide for the US needs in the event of a shortage. "We would be able to pick up the slack — we have excess capacity. . . even in the long term, the capacity is there." Mr. Drummond explained that while Nordion obtains enriched uranium from ORNL, the company's "target material and [spent] reactor fuel are processed and disposed of within Canada" by AECL and Chalk River Nuclear Laboratories, so Nordion does "not have to rely on Savannah River." In addition, Nordion is constructing a new reactor that will be used exclusively for isotope production, according to Mr. Drummond. This, he said, makes Nordion "confident of [its] ability to supply the nuclear medicine community well into the next century."

But depending on Canada for virtually the total US supply of these radioisotopes puts the nuclear medicine community in a precarious posi-

tion, said Dr. Croft. "We don't want to be reliant on foreign suppliers, we have no control over what their regulatory agencies are going to do." In addition, she noted that in such circumstances Nordion could essentially monopolize the market. "We do not want any supplier to be embargoed on either end of the production cycle, except when they have clearly violated the regulations."

Cintichem's Production Cycle

To produce these medical isotopes, Cintichem obtains 93% enriched ^{235}U in the form of uranium oxide from ORNL and uses it as the target material. They irradiate the target material for about ten days, a period they consider long enough to produce useful quantities of short-lived radioisotopes, but short enough to minimize production of long-lived radioisotopes. Next, they separate the isotopes of interest from the uranium fission products. The company salvages most of the target material used during the radioisotope production process and sends it to the DOE facility in Savannah River for reprocessing and credit towards future shipments of uranium oxide from ORNL.

This is essentially a closed fuel cycle, which relies on the functioning of all its parts for continuing operations. In a February 6th letter to John Ford, director of the DOE's operations division, Mr. McGovern wrote, "This closed cycle allows Cintichem to operate without maintaining large inventories of special nuclear material, however, it requires close management of inventory and shipments at Cintichem and the DOE. Any interruption in this supply cycle could have a serious negative impact on the continuity of radioisotope supply." If Cintichem cannot send out the enriched target uranium, not only are they filling up their storage capacity, which prevents them from receiving more uranium unless some is re-

moved, but also they are not getting credits toward future shipments. So, even if they have storage space for additional uranium, the costs of buying a new supply for each time they want to generate radioisotopes could become prohibitively expensive, according to Mr. McGovern. "It's costing us more to buy more inventory and keep more inventory," he said. "Eventually, we're going to run out of space."

Cintichem has received a licensing amendment from the Nuclear Regulatory Commission (NRC) that enables them to store target material for a longer period on site. But, said Mr. McGovern, "This does not give us that much time; it will not allow us to go on indefinitely."

Target Material Vs. Reactor Fuel

Cintichem maintains that the enriched target material they send to Savannah River is not the same as spent reactor fuel and should not be treated the same way. Mr. McGovern told *Newsline*, "The target material is only irradiated for days as opposed to years for spent reactor fuel." In the letter to Mr. Ford, Mr. McGovern wrote, "...the significant difference between the spent fuel and irradiated target uranium, relative to environmental concerns, is that the target uranium is irradiated to a burnup of less than 1% compared to the 50% burnup in the spent reactor fuel. This lower burnup causes the long-lived fission products and transuranic products to be at significantly lower concentrations in the irradiated target special nuclear material."

Dr. Croft agreed that since very little amounts of long-lived fission products and transuranic products are created in the radioisotope production process, it does not pose the security and health hazard of reactor fuel and should not be viewed the same way.

Savannah River receives the target material under a DOE policy called the Receipt and Finance Settlement

Provision for Nuclear Radiology Reactor Fuels, which has provided for the reprocessing of research fuel and irradiated components since 1968, according to Barry Smith, chief of the processing branch in the DOE's office of nuclear materials production. The program initially was set up "to foster beneficial research and development using nuclear reactors" primarily in the free European countries, he explained, but "now it is more associated with the government's non-proliferation objectives," enabling the DOE to get back the enriched uranium it gives out. Target material was assessed as reactor fuel when Cintichem joined the program in 1980 and that is why it is included in the suspension, said Mr. Smith.

The National Environmental Policy Act, passed in 1969, requires that an environmental assessment be performed evaluating the reprocessing operations at Savannah River to determine if a more thorough environmental impact statement must be pursued. The assessment was scheduled to be completed by the end of June, according to Mr. Smith. To make the assessment, DOE is evaluating the potential impact of the policy extended over the next ten years, "trying to establish some upper bounds" for the amount of material that could be received over that period, added Mr. Smith. "[Because] there is variation in the amount of material received in a given year — 99% of the material comes from overseas or Canada... the analysis has gotten complicated." However, he noted that the department "hoped to try to have all the issues resolved... [and] to try to reinstate that policy [by the end of June]."

Capt. William H. Briner, (ret.), director of the radiopharmacy at Duke University Medical Center, chairman of the SNM government relations committee, told *Newsline* that "SNM/ACNP continues to inter-

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act with DOE and continues to support Cintichem very strongly on this issue." Regarding the timetable DOE has set forth for the assessment, he added, "If Cintichem can live with this, then it's not an immediate problem. But we've got to follow this very closely. . . . We may have to go to the White House."

Whether DOE sticks to the schedule or not, the suspension could continue for months if the results of the assessment, positive or negative, must be circulated for public comment or even over a year if the assessment is negative and a full impact statement must be carried out. However, according to Mr. Smith, DOE is not about to let that happen. "We recognize the importance [of Cintichem's operations] to the radioisotope community, since they are the sole domestic source [of these radioisotopes]," he said. If DOE must do the impact statement, he added, "we would maybe pursue making the distinction" between spent reactor fuel and target material. "We are looking at the overall Atomic Energy Act to see if there are any provisions that would allow us to receive the shipments. . . . If Cintichem and the medical community demonstrated a negative impact, the department would be obligated to try to solve that problem."

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scanning and data analysis techniques need to be optimized to increase sensitivity and specificity of detecting areas of functional activation in a single patient." He recently received the Radiological Society of North America Research Scholars Award for a proposal related to this goal.

In a relatively short time, Dr. Mintun has established himself as a dedicated researcher in the field of nuclear medicine. In addition to his academic and research responsibilities, Dr. Mintun holds a consulting position with Mallinckrodt, Inc., for which he provides clinical problem solving support services; he is a reviewer for the *Journal of Nuclear Medicine*, *Radiology*, and the *Journal of Cerebral Blood Flow and Metabolism*; and he has recently served as a site visit review member for the National Institutes of Health. His Society memberships include The Society of Nuclear Medicine, the American College of Nuclear Physicians, the American Medical Association, and the Radiologic Society of North America.

His efforts have earned him the respect of his colleagues and peers. Dr. Ter-Pogossian concluded in his letter of support, "Mark Mintun will produce lasting contributions to the field of nuclear medicine."

Sarah M. Tilyou

Board Elects JNM Editor

The Board of Trustees elected H. William Strauss, MD, as the Editor of *The Journal of Nuclear Medicine*, for a five-year term to commence January 1, 1990. In electing Dr. Strauss, director of the division of nuclear medicine at Massachusetts General Hospital and professor of radiology at Harvard Medical School, the Board accepted the unanimous choice of a subcommittee of the Publications Committee that was formed to recommend a candidate for editor.

Thomas P. Haynie, MD, chairman of the department of nuclear medicine, James E. Anderson Professor of Nuclear Medicine, and professor of medicine at the University of Texas M.D. Anderson Cancer Center, will continue his editorship through the December, 1989 issue, but as of July 1, 1989, all manuscripts submissions should be sent to Dr. Strauss at *The Journal of Nuclear Medicine*, Room 5406 Massachusetts General Hospital East, Building 149, 13th St., Charlestown, MA 02129. ■

- The 125% is to be decreased to 120% in 1990, and 115% in 1991 and thereafter.

Medicare/Patient Cost Share— 80/20 Percent

The Medicare amount paid is not

the allowed amount by Medicare, but only 80%, with 20% copay by the patient. Similarly, the new Medicare fee schedule represents the same ratio; that is, 80% will be paid by Medicare, with 20% copay for participating physicians.

Also remember that if, for example, the practice bills Medicare \$60 for a procedure, the allowed may be \$40, of which the carrier pays \$32 (or 80 percent), if the radiologist participates. Don't confuse billing amounts, allowed amounts, and paid amounts.