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INTRODUCTION

Dear Nuclear Medicine professional

As part of our ongoing support through the Mo shortage, we are pleased to send you the third edition of the Molybdenum Supply Review. This third edition reveals the disrupted weeks that we have ahead of us. While we are still suffering from the long-standing shutdown of the HFR (The Netherlands) and NRU (Canada) reactors, the other reactors which have up to now provided alternative supply are planned to stop irradiation on a number of upcoming weeks. This will result in a global shortage of Molybdenum where minimal quantities only will be available for manufacturers of generators.

Despite the recent measures taken by our company to secure new sources of supply, we will be impacted by the global shortage. We plan to experience critical situations during 4 weeks between now and the end of July, where some orders may not be fulfilled. We provide here a tentative Technetium supply forecast for the next 4 months. This forecast translates the quality of the Molybdenum supply into an estimation of our capacity to fulfill your orders for generators.

Besides the re-engineering of our manufacturing and service process that we have put in place to mitigate the impact of the shortage, we have also worked pro-actively in making available radiopharmaceuticals that are suitable alternatives to the Tc99. By the time the critical weeks occur, we will be providing the nuclear medicine community with Sodium Fluoride and Thallium as alternative to Technetium scans. These products will help you perform your examinations and maintain activity within your departments in the critical weeks ahead.

In the long term, driven by our unique commitment to the Nuclear Medicine, we remain active in the investigation and promotion of new source of Molybdenum to ensure the perennity and development of our speciality.

Our teams remain at your disposal to help your organization overcome the consequences of the shortage in the weeks ahead.

LATEST NEWS

HOME

INDUSTRIALS

EUROPE

Dutch High Flux Reactor to restart in August

March 29, 2010, Health Imaging

The repair of the High Flux Reactor (HFR) in Petten, the Netherlands, is progressing well and the restart of the reactor is planned for the second half of August, according to the Nuclear Research and Consultancy Group (NRG) of the Netherlands.

CANADA - USA

U.S. FDA and Health Canada Approve Use of Molybdenum 99 From Maria Reactor Approvals Will Help Ease Critical Shortage

March 12, 2010, AuntMinnie

The U.S. Food and Drug Administration (FDA) and Health Canada have approved the use of the Maria Research Reactor (Maria) in Poland as a site to irradiate highly enriched uranium targets for molybdenum-99 (Mo-99) production, according to healthcare technology firm Covidien of Dublin, Ireland. Covidien will use the Mo-99 from Maria to manufacture technetium-99m (Tc-99m). Patients should begin to benefit from Maria-produced Mo-99 in the U.S. and Canada later this month, the company said.

Reactor shutdown may intensify medical isotope deficit

March 17, 2010, Google alert

Canada's medical isotope shortage could be exacerbated in April when all five major international reactors will be shut down. The NRU in Chalk River, Ontario, was closed for repairs in May 2009 and will remain closed until April of this year. However, the Dutch reactor has also been closed for scheduled maintenance since February. The other three major reactors in Belgium, South Africa, and France will also be shut down for scheduled maintenance on March 17.

Recommendations for Dealing with the Isotope Shortage

March 10, 2010, SNM

In the short term, for the benefit of patients who urgently need these procedures, SNM recommends that facilities take the following steps to modify their processes in order to maximize the available isotope supply.

1. Coordinate with the generator provider or the central radiopharmacy to align scheduled patients with Tc-99m availability.
2. Perform imaging studies throughout the entire week.
3. Lower the administered dose and extend the time of imaging in order to continue to collect images with the same statistical robustness. This may also require some adjustment in patient scheduling.
4. Where possible, use alternative radiopharmaceuticals for imaging studies, including:
 - Thyroid scintigraphy (with I-123)
 - Myocardial perfusion imaging with (Tc-99m SPECT stress-only imaging when appropriate, TI-201 SPECT, Rb-82 PET, Coronary CTA, Stress echocardiography)

Leading Molecular Imaging Society Warns Patients About Imaging Test Delays Caused by Worldwide Shortage of Mo-99

March 19, 2010, SNM SmartBrief

From March 21 until April 11, the medical community will experience one of the most significant disruptions ever in the supply of Mo-99. The remaining three reactors will not be able to produce enough Mo-99 to justify production of radioisotope generators during this period.

New restart delay of Canada's Chalk River reactor

March 11, 2010, Google alert

Restart of the Chalk River medical isotope-producing nuclear reactor has been delayed until at least May because of the complexity of ongoing repairs, Atomic Energy of Canada Ltd said on Wednesday. MDS has estimated it takes a \$4 million a month hit to earnings before interest, taxes, depreciation and amortization, or EBITDA, because of the shutdown.

AECL facing ongoing challenges with restart of Chalk River's NRU reactor

March 07, 2010, Google alert

Repairs to Chalk River's NRU reactor are nearly half way complete, but ongoing challenges in the work may delay its restart to later in the spring. In its latest update on the repair process, Atomic Energy of Canada Limited's (AECL) reported that since repair work began in earnest Dec. 12, 2009, some 46% of the repair activities and post-repair examinations have been completed.

AECL says Chalk River should be able to resume isotope production by end of July

March 29, 2010, SNM SmartBrief

Atomic Energy of Canada on Thursday announced that the Chalk River nuclear reactor's return to service would likely be by the end of July. AECL said 56% of the repair work is done. "The new schedule has built in prudent contingency reflecting the difficulty inherent in these final repairs", AECL said.

Covidien warns of 'extreme' Mo-99 shortage in May

March 31, 2010, AuntMinnie

In a March 26 update, healthcare technology firm Covidien warns customers of an "extreme shortage" of molybdenum-99 (Mo-99) in May, as two key nuclear reactors remain offline. The company expects to manufacture generators derived from Maria Mo-99 again this week for distribution in the Americas, and expects to double the original projected volume.

ASIA

S. Korea to use research reactor to deal with radioactive isotope shortage

February 18, 2010, Google alert

South Korea has set up a contingency plan to use its High-flux Advanced Neutron Application Reactor (HANORO) to cope with any shortfalls in global radioactive isotope supply.

The science ministry said there is no immediate concern of shortages, but announced it is prepared to use the 30 megawatt reactor to produce up to 10 curie (Ci) of Technetium-99m (Tc-99m) per week in emergency situations.

AFRICA

S.African firm aims for 60% rise in isotope sales

March 01, 2010, Reuters.com

South Africa's NTP Radioisotopes, a producer of the molybdenum-99 medical isotope, said it plans to increase isotope sales to more than \$130 million annually by 2013. NTP is the largest global producer of the isotope as problems have reduced production at other nuclear facilities. The company, which also produces iodine-131, is a unit of the South African Nuclear Energy Corporation.

RESEARCH

\$300M earmarked for AECL

March 05, 2010, Google alert

The Canadian government has unveiled plans to invest \$300 million Canadian (\$291 million U.S.) in Atomic Energy of Canada (AECL) to cover commercial losses and support operations.

Canada plans C\$35 mln in medical isotope funding

March 07, 2010, SNM SmartBrief

Canada's federal budget agency said it will allot \$34 million over two years to support research and development of new methods for producing medical isotopes, following extended production issues at the Chalk River reactor. Additional funding also will be given for clinical studies and related research.

Canada Continues Firm Commitment to Science & Technology Budget 2010 investment in TRIUMF keeps the knowledge economy moving forward

March 07, 2010, Google alert

TRIUMF, Canada's national laboratory for particle and nuclear physics, is owned and operated as a joint venture by a consortium of 15 Canadian universities with core operations overseen by National Research Council Canada. TRIUMF acknowledged the continuing support provided by the Government of Canada in its proposed budget for fiscal year 2010, providing \$222 million over the next five years.

EXPERTS OPINIONS

Chalk River could run for a decade: expert**February 09, 2010, SNM SmartBrief**

Jean Koclas, a Canadian professor of engineering physics, estimates that once the nuclear reactor in Ontario, Canada, resumes operation, it probably will be able to produce medical isotopes until 2021. That estimate, which was based on the structural tests and extensive repairs being done at the reactor, would mean that the Canadian government could possibly have a decade to determine an alternative way for producing isotopes.

Precious medical isotopes could be shipped overseas**March 08, 2010, Google alert**

Christopher O'Brien, the president of the Ontario Association of Nuclear Medicine, said the medical community has been aware for some time of the difficulties in the negotiations between Lantheus and Nordion. The deal to privatize Nordion included a commitment for AECL to supply isotopes to the new company, but allowed Nordion to market them on a fully commercial basis.

Reason for optimism even in latest Mo-99 supply challenge**March 12, 2010, AuntMinnie**

There is reason for optimism, as nuclear medicine departments learn from previous experiences and when inspiration came from desperation.

- At Brantford General Hospital in Brantford Dr. Christopher O'Brien, medical director of nuclear medicine also has moved to weekend shifts with the possibility of working longer hours to image patients when the medical isotope is available.
- Thallium demand is up 30%, with GE distributing approximately 1,000 vials a week, and doesn't expect demand to wane until more Mo-99 becomes available.
- Last month, Covidien signed an agreement with the Institute of Atomic Energy in Poland (IAE Polatom) to augment Covidien's supply of Mo-99.
- Lantheus, meanwhile, has finalized an arrangement with the Australian Nuclear Science and Technology Organisation (ANSTO) in December to receive Mo-99 produced from low-enriched uranium (LEU) targets in ANSTO's new Open Pool Australian Lightwater (OPAL) reactor.

By Wayne Forrest

USERS

Doctors plan to work around isotope shortage**February 13, 2010, Google alert**

Doug Abrams, director of the Edmonton Radiopharmaceutical Centre, aid with the closure of Petten and the delayed restart of Chalk River, Edmonton's supply of molybdenum isotopes used in diagnostic imaging procedures will be significantly reduced.

"I will hazard a guess of 30 per cent to 40 per cent, and that is an optimistic range," he said.

Looming Isotope Shortage Has Clinicians Worried**February 16, 2010, Medpagetoday**

U.S. clinicians, so far, have been able to cope with the ongoing medical isotope shortage through various strategies, but many say they are worried that the situation will worsen when a Dutch reactor shuts down later this month for repairs. Combined medical isotope production at the reactors in Belgium, France and South Africa will be between 30% and 40% of normal total production while the Dutch and Canadian reactors are offline, estimates Robert Atcher, SNM past-president and isotope committee chairman.

There's a lot riding on Cyclotron**February 01, 2010, SNM SmartBrief****20100201**

St. Joseph's Hospital in London, Ontario, has unveiled a cyclotron that will be used to produce isotopes for PET imaging. The cyclotron will also be used as part of a research initiative to explore the potential of the equipment to produce the isotopes previously made by the downed nuclear reactor in Chalk River.

SCIENTIFIC PUBLICATIONS

Unconventional nuclides for radiopharmaceuticals**Holland JP Williamson MJ Lewis JS****Molecular imaging: official journal of the Society for Molecular Imaging, 2010, 9 (1): 1-20**

Rapid and widespread growth in the use of nuclear medicine for both diagnosis and therapy of disease has been the driving force behind burgeoning research interests in the design of novel radiopharmaceuticals. Until recently, the majority of clinical and basic science research has focused on the development of ¹¹C-, ¹³N-, ¹⁵O-, and ¹⁸F-radiopharmaceuticals for use with positron emission tomography (PET) and ^{99m}Tc-labeled agents for use with single-photon emission computed tomography (SPECT). With the increased availability of small, low-energy cyclotrons and improvements in both cyclotron targetry and purification chemistries, the use of "nonstandard" radionuclides is becoming more prevalent. This brief review describes the physical characteristics of 60 radionuclides, including beta+, beta-, gamma-ray, and alpha-particle emitters, which have the potential for use in the design and synthesis of the next generation of diagnostic and/or radiotherapeutic drugs. As the decay processes of many of the radionuclides described herein involve emission of high-energy gamma-rays, relevant shielding and radiation safety issues are also considered. In particular, the properties and safety considerations associated with the increasingly prevalent PET nuclides ⁶⁴Cu, ⁶⁸Ga, ⁸⁶Y, ⁸⁹Zr, and ¹²⁴I are discussed.

Questionnaire survey of hospitals in Saitama Prefecture regarding the shortage of (99m)Tc-labeled radiopharmaceuticals and (99)Mo/ (99m)Tc generators.**Kosuda S, Tomita H, Hayashi K, Kita T, Koike K, Arai T.****Department of Radiology, National Defense Medical College, 3-2 Namiki Tokorozawa, Saitama, 359-8513, Japan, nucleark@ndmc.ac.jp.****Ann Nucl Med. 2010 Mar 4. [Epub ahead of print]**

OBJECTIVE AND METHODS: A questionnaire survey was conducted at all 32 hospitals in Saitama Prefecture to investigate the current difficult situation in terms of nuclear medicine management in the face of the (99m)Tc shortage due to insufficient supply, and 29 hospitals (90.6%) replied. RESULTS: Of the 29, 15 (51.7%) reported a reduction in the number of nuclear medicine studies performed due to the shortage of supply, although the reduction was small. The decrease per month was less than 20 studies in 73% of the institutions. Of the nuclear medicine studies that involve the use of (99m)Tc, the studies whose reduction in number most seriously affected patient management were, in decreasing order: (99m)Tc-MAA lung perfusion scans, (99m)Tc-MAG(3),

(99m)Tc-DTPA, or (99m)Tc-DMSA renoscans, (99m)Tc-MDP bone scans, (99m)Tc-HMPAO or ECD brain SPECT studies, (99m)Tc-MIBI or tetrofosmin myocardial SPECT studies, (99m)Tc-radiocolloid sentinel lymphoscintigraphy, (99m)Tc-HSA-D or pyrophosphate bleeding scans, (99m)Tc-GSA hepatic function reserve scans, and (99m)Tc-MIBI parathyroid scans. The reduction is probably ascribable to factors such as cancellations of emergency studies, absence of substitute studies, sequential studies using the same radiopharmaceutical, and higher cost of the syringe-type products than the vial-type products. Substitutes for (99m)Tc studies were performed at 52% (15/29) of the institutions. Myocardial perfusion imaging with (201)Tl chloride was the most common substitute study. CONCLUSIONS: The results of this survey suggested the several procedures to resolve the issues related to the shortage. The staffs at all institutions except one gave the impression that their nuclear medicine ordering systems had been greatly affected by the shortage of supply. This adverse circumstance, however, may provide a good opportunity to educate the public about nuclear medicine studies that use (99m)Tc and SPECT, with which citizen are now unfamiliar.

Myocardial Perfusion Imaging with 201Tl.

Pagnanelli RA Basso DA

Journal of nuclear medicine technology, 2010, ():

The object of this review is to provide information about (201)Tl-thallous chloride in radionuclide myocardial perfusion imaging. This technique has experienced a recent resurgence because of the shortage of (99m)Tc. After reading this article, the technologist will be able to describe the properties and uptake mechanism of (201)Tl, the procedure for myocardial perfusion imaging with this agent, and the advantages and disadvantages of thallium, compared with the technetium agents.

TECHNETIUM SUPPLY FORECAST

ISSUE, 2010-04

TECHNETIUM SUPPLY FORECAST



Key

Secure supply, all generators should be delivered according to order requirements.



Light disturbance of supply, generators could be delivered with up to one day less of calibration.



Strong disturbance of supply, generators could be delivered with 2 or 3 days less of calibration.



Critical disturbance of supply, generators could be delivered with 4 days less of calibration or delivery could be postponed.



Disclaimer: The forecast provided here is only tentative and reflects the information available at time of the publication. Actual supply could be higher or lower than documented due to unforeseeable changes in the supply conditions.

IBA Molecular.

Society of Nuclear Medicine.

European Association Of Nuclear Medicine.

Sociedad Espanola de Medicina Nuclear.

Société Française de Médecine Nucléaire.

Société Belge de Médecine Nucléaire.

Nederlandse Vereniging voor Nucleaire geneeskunde.

Associa Italiana di Medicina Nucleare ed Imaging Molecolare.

British Nuclear Medicine Society.

Deutsche Gesellschaft für Nuklearmedizin e.V.

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