WORLD COUNCIL ON ISOTOPES WCI
www.wci-ici.org
Newsletter
WORLD COUNCIL ON ISOTOPES

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1. 2016 New Year's Message from the President of the WCI

Van Zyl de Villiers

The beginning of a new calendar year always presents the opportunity to reflect on the state of affairs and to consider new actions to be undertaken. In this regard I wish you a highly successful year filled with new opportunities. I would like to highlight a number of important matters relating to the World Council on Isotopes in the year to come

Preparations for 9 ICI

We have had eight very successful International Conferences on Isotopes since 1995. Prof. Ilham Al-Qaradawi and her team are working hard in preparing for 9ICI to be held in Doha, Qatar in November 2017. In addition, we are looking forward to receiving expressions of interest from potential organizers of 10ICI during this year. Hopefully we can take 10ICI to a part of the world that has not yet hosted conferences in the ICI series, such as the Latin American region.

Upgrade of WCI Homepage

The WCI Homepage was established as a platform for the exchange and dissemination of information of interest to the global isotope-related community, in line with the WCI mission to promote safe and environmentally sound isotope technologies for global wellbeing, to share information on peaceful uses of isotope technologies, and to stimulate cooperation between international isotope role-players. We have noticed some shortcomings in the WCI website that are now being addressed by the Secretariat under Mr. Nam Ho's leadership. You will be able to enjoy the newly upgraded homepage before the end of the first quarter.

Establishment of online information exchange system

In addition, the Secretariat has initiated a feasibility study on mechanisms for enhanced exchange of information through the WCI homepage. This is envisaged to include profiles of isotope related organizations and companies in addition to information on the use of isotopes in agriculture, medicine, industry, environmental protection and other fields.

WCI Newsletter

Currently the newsletter is the WCI's most important communication channel for the dissemination of information to members and other interested parties. In addition to the existing sections of the newsletter, as published in recent times, we would like to add a section "My Biz on Isotopes" dealing with business opportunities in the field of isotope related technologies. In this regard we are looking forward to receiving such news from the WCI family. We also plan to highlight the work of WCI committees in special issues of the newsletter or in feature articles in some issues.

Expanding linkages and membership

As mentioned in the December 2015 newsletter, the WCI signed MoUs with RCA RO and SungKyunKwan University for cooperation in areas of mutual interest. Currently a Practical Arrangement with the Department of Nuclear Sciences and Applications of the IAEA is under review. Under the strong leadership of Mr. Nam Ho, the WCI membership has grown to 103 member organizations in 50 countries. With your kind assistance we will continue to expand the membership by involving other important organizations and companies in the isotope community.

Seeking ideas and suggestions for expanding WCI activities

It is important to grow the WCI's impact, especially in those areas straddling the boundaries between isotope stakeholders focusing on specialized applications, specific production issues or policy matters. The WCI Secretariat will continue to engage with the international isotope community to obtain views, inputs and contributions in this regard.

Improving the WCI Secretariat working environments

Currently there are two staff members working for the WCI Secretariat that is hosted by the Korean Association for Radiation Application. As the WCI expands its services, we are expecting to recruit more staff. The WCI project budget is formulated on a yearly basis and provided by the Korean government, for which we are extremely grateful.

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2. Special Report on Advances in Medical Radiotherapy

By Alan E. Waltar and James C. Katzaroff***

It has been over ten years since the book, "RADIATION AND MODERN LIFE: Fulfilling Marie Curie's Dream" was published (1) in 2004. This was one of the earlier efforts to increase public awareness of the mammoth contributions by the commercial use of radioisotopes to agriculture, medicine, industry, electricity, transportation, space exploration, terrorism prevention, arts and sciences, and the environment. The book highlighted that an astounding two-thirds of the elements in the Periodic Table had already produced at least one commercially utilized radioisotope. At that time 63 documented radioisotopes were commercially harnessed for medicine, 27 for industry, 31 for environmental protection and 21 for the others mentioned above. For the 63 radioisotopes used in the field of medicine, over half were noted to have therapeutic potential. However, the total volume of nuclear medical applications for therapy was only about 10%,with the remaining 90% employed in the diagnostic arena. Important as the medical diagnostic realm is known to be, there was excitement and curiosity regarding the potential to utilize radioisotopes more effectively in the treatment of diseases.

Alan E. Waltar
Author of "Radiation and Modern Life: Fulfilling Marie Curie's Dream"

James C. Katzaroff
Chairman and CEO of Advanced Medical Isotopes Corporation

As we revisit the topic of radioisotopes for medical uses over ten years later, it is inspiring and gratifying to have the opportunity to discuss major advances in the field of medical radiotherapy. The first two technologies for review are based on cesium-131 and yttrium-90, both having been developed in our "home town" of Hanford, Washington, as spinoffs from the Pacific Northwest National Laboratory (PNNL).

The Hanford area was established as a center of nuclear research and production in support of the Manhattan project back in 1943 and was the site of the first full scale plutonium production reactors in the world. Over the years, the work done at the Hanford site and PNNL has made many significant contributions to a wide range of commercial uses of radioisotopes beneficial to society, including the medical use of radioisotopes.

Brachytherapy, the practice of placing radiation sources in or near malignant tissue, is one of the earliest forms of cancer therapy, dating back to the early 20th century. In the 1920's permanent interstitial brachytherapy was introduced with the advent of gold seeds filled with Radon-222. Over the years, other isotopes have become commercialized, including iodine-125, palladium-103, cesium-131 and yttrium-90. A variety of tumors have been treated by brachytherapy, including prostate cancer, liver cancer, lung cancer, and brain cancer.

One author of this review (Dr. Waltar) is a recipient of I-125 brachytherapy, received in the year 2000, and this "wonder treatment" has worked marvelously. However, it has been recognized for some time that radioisotopes of a shorter half-life may be preferred, in many cases offering the potential for greater safety and efficacy. Palladium-103 came along as a major contribution to that quest with a half- life of 17 days, which is 43 days less than I-125. Cesium-131 treatments followed, offering a product with an even shorter half-live of 9.7 days. These products have been joined by products with yttrium-90, which has the shortest half- life of the group, just 2.7 days. (see Table 1 below).

Table 1. Isotope Dose Delivery Over Time

	Cs-131	I-125	Pd-103	Y-90
Primary Emissions	Auger x-rays	Auger x-rays	Auger x-rays	Beta rays
Half-Life	9.7 days	60 days	17 days	2.7 days
Energy	30.4 Kev	28.5 Kev	20.8 Kev	934 Kev
90% Delivered Dose	33 days	204 days	58 days	9 days

Soft X-ray Irradiation: Cesium-131

Dr. Paul Harper published on the possibility of using Cs-131 circa 1951. Don Lawrence wanted to use Cs-131 in the early 60's, but settled on I-125 due to the difficulty of making Cs-131 and Pd-103. Lawrence maintained an interest in Cesium-131, but there remained a serious technical difficulty in obtaining clinically pure Cs-131. Fortunately, an eminent chemist from PNNL, Lane Bray, was able to crack the code and his patented process paved the way for a new public company, IsoRay.

The purported advantages of Cs-131 for treating prostate cancer are 1) optimal dose coverage without the overdosing, and 2) more rapid resolution of urinary side effects. Brachytherapy puts more radiation dose into the planned treatment volume, and less into surrounding healthy tissue. It is the radiation oncologist's decision on which isotope to use in brachytherapy. Informed patients may also control the choice of therapy modality.

Though relatively new on the market, Cs-131 has already been used for over 7,000 cancer cases—including prostate, lung, brain, head & neck, eye plaque, vaginal, pelvic floor, and posterior abdominal wall. There have been some very positive results published for brain and recurrent vaginal cancer.

Isoray provides multiple ways to combat brain cancer. Three distinct techniques have been used for implanting radioactive seeds. Two methods use IsoRay's seeds to implant the resection bed during surgery to remove the tumor. One of those is primarily used in brain metastases, and the other has been used for metastases, anaplastic meningioma, and glioblastoma multiform (GBM). The third technique was the implantation of a few high activity seeds into the center of an inoperable GBM in a little girl. IsoRay also offers the GliaSite® balloon catheter that may be implanted during surgical resection, and later filled with either I-125 Iotrex ®or Cs-131 Cesitrex® liquid solution. The use of the GliaSite® catheter permits deeper treatment margins.

It is well known that both beta and alpha emitters can provide a potentially stronger radiation source to the targeted tumor than the Auger x-rays of standard brachytherapy as well as enabling a more sparing of nearby healthy tissues due to the finite path length of the beta emissions. But neither beta nor alpha sources can be encapsulated within a metallic shell because of the severe radiation absorption of the shell itself. New delivery systems were necessary to enable use of the alpha and beta emitters in brachytherapy.

Beta Irradiation: Yttrium-90

Yttrium-90 is an ideal medical isotope with a short physical half- life (2.7 days) and is a pure beta-emitter with a high average beta energy (934 Kev). It is approved as a therapeutic agent as a part of traditional delivery systems, specifically on a monoclonal antibody for targeting cancer cells, (Zevalin®, 2002) and as the active ingredient in glass or resin microsphere for use in treating liver tumors (TheraSphere®, 1999 and SIR-Spheres®, 2002).

A next-generation method for injecting these powerful radioisotopes into malignant tumors has been developed by Dr. Darrell Fisher. He invented a radionuclide polymer composite that may be directly injected into a tumor that cannot be surgically removed or treated using standard therapies. After injection, the polymer gels within the extracellular tissue matrix and confines the radioisotope yttrium-90 to the tumor. In this process, only the tumor tissue receives high radiation doses, without side effects elsewhere.

This technology is being commercialized by a Kennewick, Washington-based company, Advanced Medical Isotope Corporation (AMIC). AMIC's lead yttrium-90 brachytherapy delivery system is the Y-90 RadioGel™ device. AMIC is in the late stages of testing and has indicated they intend to file for FDA approval in 2016. Once it is cleared by the FDA, this approach has essentially unlimited potential for treating malignancies anywhere in the body. In addition, this patented gel delivery system approach may also be used for other beta emitters as well as other alpha emitters.

Alpha Irradiation:

Considerable efforts have been expended within the past few decades to potentially harness alpha particles for cancer therapy. The main driving force is the incredible destructive power of an alpha particle, relative to beta particles or soft x-rays. With a mass some 7000 times greater than a beta particle, alpha particles deliver about 100 Kev/um—producing massive amounts of ionization of the target and inducing double strand breaks in the malignant tissue. The challenge is to find ways to deliver the alpha particles directly to the tumor while sparing damage to nearby healthy cells.

Alpha particles are of considerable interest for radio immunotherapy applications since their short range in soft tissue is limited to only a few cell diameters. The delivery of such high energy in such a small volume, or high-linear-energy-transfer (LET), makes alpha particles especially well-suited for targeting micro metastatic disease and single tumor cells such as leukemia and other blood-borne

disease. Several alpha emitters with significant potential for radiotherapy are documented in a recent IAEA report. (2)

Radium-223:

Whereas the brachytherapy techniques discussed above have demonstrated remarkable effectiveness in successfully arresting prostate cancer, there are cases where the cancer has advanced to the state of leaving the prostrate and metastasizing in surrounding bone areas. About 90% of the patients in this condition have what is called metastatic castration-resistant prostate cancer. It is a particularly difficult situation to reverse, with patients often dying within only a few months.

Radium-223 is a special case among the alpha emitters since it may be used in ionic form as simple chloride salt. Although Radium-223 is basically an alpha emitter (95.3% alpha), 3.6 % of the emissions are beta, and 1.1% of the emissions are gamma or x-ray. The small fraction of beta emissions provides a very effective way to assay the material to be injected, and the soft gammas (or x-rays) allow for monitoring the placement of the radiopharmaceutical.

With a half-life of only 11.4 days, Ra-223 effectively decays to Pb-209. The landmark paper of Dr. Chris Parker, et. al. (3) documented the ALSYMPCA double-blind trials with the conclusion that sufficient success was obtained with the Ra-223 (injected in the form of radium chloride) that the placebo patients in mid-trial were then offered this new radiopharmaceutical to prolong their life and reduce the pain that is so characteristic of bone cancer.

Algeta of Oslo, Norway, the primary sponsor for Ra-223 development, successfully shepherded this radioisotope through the FDA approval process to make it the first alpha emitter to be licensed for human therapy. Algeta was subsequently acquired by Bayer HealthCare Pharmaceuticals. The trade name is Xofigo® (radium-223 chloride). The active ingredient in Xofigo® is radium-223, which mimics calcium and forms complexes with the bone mineral hydroxyapatite at areas of increased bone turnover, such as bone metastases. The high linear energy transfer of Xofigo® causes double-strand DNA breaks in adjacent cells, resulting in an anti-tumor effect on bone metastases. The alpha particle range from radium Ra- 223 dichloride is less than 100 micrometers, thereby limiting the damage to the surrounding normal bone and marrow tissues.

A number of clinical trials on the treatment of other tumors with Ra-223 are ongoing, including breast cancer and potential use in renal, lung and bladder cancers.

Actinium-225:

Actinium Pharmaceuticals, Inc. is a New York-based biopharmaceutical company developing innovative targeted payload immunotherapeutics for the treatment of advanced cancers. Actimab-A, Actinium's most advanced alpha particle immunotherapy program, is currently in a single arm, multicenter trial Phase 1/2 trial for newly diagnosed AML patients over the age of 60. Actimab-A is being developed as a first-line therapy and it has attracted support from some of the leading experts

at the most prestigious cancer treatment hospitals due to the potential of its safety and efficacy profile.

Actimab-A consists of the monoclonal antibody, Lintuzumab, and the radioisotope, actinium-225. Actinium-225 decays by giving off high-energy alpha particles, which kill cancer cells. When actinium decays, it produces a series of daughter atoms, each of which gives off its own alpha particle, increasing the chances that the cancer cell will be destroyed. Lintuzumab is the humanized version of M195 and is a monoclonal antibody that targets CD33, which is abundantly found on myeloid leukemia cells. Both the alpha particle technology and Lintuzumab were initially developed at Memorial Sloan Kettering Cancer Center.

Lead-212/Bismuth-212:

Lead-212/bismuth-212 is a promising alpha-emitter that has shown effectiveness in treating metastatic ovarian and breast cancer in humans, and melanoma cancer in mice. Pb-212 is a radionuclide derived from the decay chain of U-232 (or Th-228) and decays, with a 10.6 hour half-life, into the alpha-emitter bismuth-212 (half-life one hour).

AREVAMed, the entity focusing on this promising alpha source, is close to commercialization. They have already built an operating plant in the Limousin region of France capable of producing high purity Pb-212 and are planning a larger unit in Plano (Texas, USA) as well as an even larger plant in Caen (France).

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Cancer is a destructive disease and can metastasize from a tissue of origin and spread to other organs and tissues throughout the body, thereby complicating treatment and accelerating the terminal progression of disease. The success of Cs-131 in adding to the body of effective photon emitters for brachytherapy, the breakthrough of a new RadioGel™ device to allow direct injection of more powerful emitters like Y-90, the success of Ra-233 being approved as a powerful alpha emitter in ionic form, and the ability of both actinium-225 and lead-212 to be conjugated to monoclonal antibodies for targeting cancer-cell metastases in the body—all add up to enhanced excitement in the continuing challenge to more effectively harness radioisotopes for curing diseases. It will be intriguing to see what the next ten years of medical radioisotope technologies will bring to curing various diseases.

The authors gratefully acknowledges the useful input and review provided by Bill Cavanagh, Interim CEO of Isoray, Richland, Washington, Dr. Darrell Fisher (Dade Moeller, Richland, Washington), and Dr. Nigel Stevenson (CEO of Clear Vascular, Inc., The Woodlands, Texas).

References

1) Alan E. Waltar, RADIATION AND MODERN LIFE: Fulfilling Marie Curie's Dream, Prometheus Books, 2004.

2) IAEA Report, technical meeting on "Alpha emitting radionuclides and radiopharmaceuticals for therapy," June 24-28, 2013, IAEA Headquarters, Vienna, Austria.

3) Chris Parker, el. al., "Alpha Emitter Radium-233 and Survival in Matastatic Prostate Cancer," The New England Journal of Medicine, July 24, 2013.

*Dr. Alan E. Waltar is Past President of the American Nuclear Society and retired Professor and Head, Department of Nuclear Engineering, Texas A&M University. He helped originate and has participated in all of the World Nuclear University Summer Institutes and Radiation Schools.

**James C. Katzaroff is the Founder, Chairman and CEO of Advanced Medical Isotopes Corporation, Kennewick, Washington

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3. FOR WHOM THE BELL TOLLS

Sun-Ju Choi
Senior Research Scientist,
KAERI

'For Whom the Bell Tolls' is a one of the most world famous novel by Ernest Hemingway published in 1940. It tells the story of a young American caught in the Spanish Civil War. Although it has been a long time since my encounter with Hemingway, I still can vividly feel the moment in my youth when the story deeply moved, touched and inspired me. A remembrance of my experience with Ernest Hemingway tells me there is no difference in any path of life or in being worldly wise: Love, betrayal, survival, courage, despair, hope, happiness and sorrow are the main ingredients in life and I am responsible to face, manage and execute the problem. For the past few years after the radioisotope crisis in 2009, a similar but awkward feeling comes and goes just like the story in the novel. And once in a while, I ask myself, "For whom the bell tolls".

I am a research scientist and happened to be in the radioisotope application fields. For the last 10 years, nuclear medicine was very globally hot and scientists who worked in radioisotope research areas believed that finally it was our turn to achieve great things. Even though Korea was fully depending on the overseas market for importing Tc-99m generators, the 3rd place of publication rate was set by Korea in journal of society of nuclear medicine (SNM). Even anti-nuclear protests put down their guard when it comes to nuclear medicine. Right after the radioisotope crisis in 2009, the situation began to change, starting with confusion in the patient group. There were numerous attempts to solve the 100% dependency of technologies regarding the production of fission moly (FM) and the manufacturing Tc-99m generators, and finally the construction plan for the new reactor was finalized in 2011 in Korea. However, the urgency and anxiety of importing the medical radioisotopes have been remained until our country is fully independent from many aspects. For that reason among many others, I have been participating the several international meetings on radioisotope outage including OECD/NEA HLG-MR with a minimum role.

Recently, I had the chance to read Don Robertson's article entitled "Twenty years of change-not for the faint hearted". Which I found myself reading repeatedly with –indeed– the feeling of a racing heartbeat. Mr. Robertson is obviously not only one of the major experts in the field of radioisotopes but also a thrilling writer and I am both appreciative and thankful for having moved me with such a strong and clear message which I have never had the courage to convey myself. That said, I believe this article should be sent to and read by the mailbox as many radioisotope professionals as possible: this analysis is a "must-read" for all nuclear medicine doctors, radioisotope producers, nuclear chemists, radioisotope distributors, manufacturers, but also, and more importantly, regulators and decision makers and political responsible.

Like many others, my country was affected during the radioisotope supply crisis; this provided me

with an eyewitness experience which totally shifted my standpoint: initially, my interest was that of a scientist focused on application research with reactor based radioisotopes. My one and half decade"narrow" view of the industry was, all of a sudden and further to the radioisotope outage, brought into a wider perspective as I could see and reflect on all the other issues which led to that situation. As Mr. Robertson mentioned in his article, analyzing the industry felt like "Peeling an Onion" with all the issues suddenly pouring into our hands: safety issues, management of reactor aging, radioisotope demand, LEU conversion, c-GMP, government subsidy, FCR, ORC, cost effectiveness, transparency of all inputs and so on. It seems utterly overwhelming and the solution does not appear clearly in light of the uncomfortable feelings of complexity in the direction we all are supposed to pursue.

The bell has been ringing. I however wonder "For whom". Is it for the patients, producers, distributors and scientists, regulators or decision makers? I was not certain then I still do not have a clear cut answer. The only answers I have are more from a personal perspective: I may have to switch my project agenda from nuclear medicine to another area… maybe a biomedicine research which is has a very good public acceptance? Since the crisis, we have suddenly been lost in the radioisotope research fields while patients looked for, and found alternative and readily available modalities which society was more than willing to accept.

I once felt a widespread interest – dare I say love? – towards nuclear medicine; it now seems this field has not lived up to expectations. For the last 5 years of international cooperation through OECD/NEA HLG-MR, the radioisotope crisis appears to be manageable to the extend that one could imagine a future situation of over supply. One can also imagine that the issues of nuclear safety regulation and nuclear promotion can be addressed appropriately and concurrently despite the apparent rivalry between those issues. That said, a number of questions remain open and issues must be addressed. To name a few: Are we so sure that no future crisis can occur? Wasn't the priority to stabilize supply? Are we so sure that we did not miss anything? If the agreed policy is pursued, what are the future (5 – 10 years) prospects for nuclear medicine? I understand the logic in the policies because they do seem to go in the right direction, but I am not yet ready to shout victory and still wonder whether we have properly addressed all open issues….

The president of SNM once heartily emphasized that Tc-99m was and would be the most beneficial and cost effective tool to mankind. I hope we all shall remember his words. An old Korean saying states that a journey of a thousand miles begins with a single step… That is, unless haste makes waste!

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4. Sketches from the Secretariat

Mr. Nam Ho hands over his role to Mr. Song after years of hard work and dedication

Mr. Nam Ho, International Coordinator of WCI, has coordinated daily activities of the secretariat not only from the creation of the Council but actually since 2005, when activities started, leading to inception of WCI shortly after the 5th International Conference on Isotope in Brussels. Furthermore, Mr. Ho has, since 2012, taken charge of the monthly newsletter, ensuring its continual improvement, both at the level of appearance and contents. The newsletter has served as a medium for transmitting to the members official communications from the secretariat, the President, and the committees of the WCI. Its central role in enhancing WCI's reputation is one of the many illustrations of Nam Ho's relentless work to mobilize contributors and coordinate a team.

However, the present January edition will be the last one published under the leadership of Mr. Ho who will hand over his baton to his successor, Mr. Woo Geon Song. Mr. Ho expressed his gratitude to the members and contributors for supporting the secretariat to develop and improve the quality of newsletter.

From February onwards, Mr. Song will take over the role. "The WCI monthly newsletter is a very important channel where we can communicate and develop bond with members. The newsletter has grown substantially in contents and quality thanks to Mr. Ho's hard work and dedication. I will try my utmost to further improve the quality of newsletter. We hope for the support and contributions from members in terms of exchange and dissemination of relevant information", Mr. Song said.

For sharing any information relevant to this newsletter or to WCI in general, please do not hesitate to contact Mr. Song (wgsong@ri.or.kr)

WCI Steering Meeting

The WCI Steering Committee Meeting will be held on January 25th. This meeting will serve to review the final report of WCI projects implemented throughout year 2015. The committee members will provide the secretariat with advice and feedback on how to further improve the final report before it is submitted to the Korean government, strong supporter and single major source of funding for WCI.

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5. Future Conferences

IAEA International Conference on Human and Organizational Aspects of Assuring Nuclear Safety - Exploring 30 Years of Safety Culture

IAEA International Atomic Energy Agency
Atoms for Peace

- Date: February 22-26, 2016
- Venue: Vienna, AUSTRIA
- Website: https://conferences.iaea.org/indico/conferenceDisplay.py?confId=80

The overall purpose of the conference is to provide an opportunity for the nuclear community to reflect on the pivotal role that human and organizational aspects play in assuring safety. In particular, the objectives of the conference will be to:

- Review the experience gained with regard to human and organizational factors (HOF), safety culture and leadership for safety;
- Share and gather experiences related to current developments, approaches, methods and research in the areas of HOF, safety culture and leadership for safety; and
- Identify the future needs for building organizational resilience capabilities in order to further strengthen defence in depth for nuclear facilities and activities.

The special focus of the conference will be on safety culture and the past 30 years of developments in this area.

International Conference on Effective Nuclear Regulatory Systems: Sustaining Improvements Globally

IAEA International Atomic Energy Agency
Atoms for Peace

- Date: April 11-15, 2016
- Venue: Vienna, AUSTRIA
- Website: http://www-pub.iaea.org/iaeameetings/50799/International-Conference-on-Effective-Nuclear-Regulatory-Systems-Sustaining-Improvements-Globally

This conference is being organized by the International Atomic Energy Agency (IAEA) and will be the fourth in a series of conferences on Effective Nuclear Regulatory Systems. Building on the conclusions and deliberations the three preceding conferences (Ottawa 2013, Cape Town 2009 and Moscow 2006), the present event, to be held in April 2016, will play a vital part in the global efforts by senior nuclear safety and nuclear security regulators to review issues that are important to the global nuclear regulatory community, and will focus, in particular, on their key role in ensuring safety and security.

14th International Congress of the International Radiation Protection Association

- Date: May 9-13, 2016
- Venue: Cape Town, SOUTH AFRICA
- Website: http://www.irpa2016capetown.org.za/

The 14th Congress of the International Radiation Protection Association will be held at the Cape Town International Convention Centre, South Africa between 9 – 13 May 2016.
The theme of the Congress is "Practising Radiation Protection: Sharing the Experience and New Challenges".
The Congress will feature a comprehensive scientific and technical program covering all aspects of radiation protection, all-round technical exhibition and technical visits program, and a versatile selection of Refresher Courses

4th International Conference on Radiation and Applications in Various Fields of Research (RAD 2016)

- Date: May 23-27, 2016
- Venue: Niš, SERBIA
- Website: http://www.rad-conference.org/welcome.php

The aim of the Conference is to provide a forum for researchers and professionals from various fields of biology, chemistry, physics, medicine, environmental protection, electronics, etc, involved with ionizing and non-ionizing radiation, as well as other areas connected to them, to exchange and discuss their findings and experiences. The Conference program includes topical invited lectures, a limited number of oral presentations, and poster presentations. The official language of the Conference is English.

16th International Workshop on Targetry and Target Chemistry (WTTC16)

- Date: August 29-September 1, 2016
- Venue: Santa Fe (NM), USA
- Website: http://www.wttc16.us/

The 16th International Workshop on Targetry and Target Chemistry (WTTC16) will be held in Santa Fe, New Mexico, August 29st – September 1st of 2016. The Department of Energy's National Isotope Program and Los Alamos National Laboratory (LANL) Chemistry Division will act as technical hosts for the gathering of international experts to participate in a uniquely collaborative workshop format.

The WTTC16 will emphasize student contributions and a collaborative, discussion-oriented format, in keeping with the history of the Workshop series.

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6. Isotope-related News

Radioactive isotopes business moves forward with plans to locate in Columbia

MARIA KALAITZANDONAKES

COLUMBIA — How many people does it take to produce two milk jug-size bottles of radioactive isotopes?

A company called Northwest Medical Isotopes thinks it will take between 75 and 85 employees to produce molybdenum-99.

Mo-99, as it is known, is used in diagnostic medical testing after it decays into technetium-99. It is used as a radioactive tracer in bone, kidney, heart and lung scans. There's a huge need for it, and it is almost always in short supply. The World Nuclear Association said Mo-99 was used in 16.7 million procedures in the U.S. in 2012.

The stuff is pretty touchy. It's created by bombarding uranium atoms with neutrons. Six percent of what results is Mo-99, which the company then extracts and purifies. After that, it must be transported from where it's made to medical facilities across the country and used within 66 hours, the half-life of Mo-99.

Fowler said he thinks that when Northwest Medical Isotopes opens its plant in Columbia, it will be the only company in the country using university reactors to produce Mo-99 commercially.. According to the International Atomic Energy Agency, there are five major producers in the world — one each in Canada, the Netherlands, South Africa, Belgium and France. The facility in Canada, which produced 40 percent of the world's Mo-99 supply in 2009, is set to close in 2018 because of aging equipment.

Columbia seems to be an ideal location, said Nick Fowler, CEO of the Oregon-based Northwest Medical Isotopes.

The centrality of the city means quick transportation to medical facilities all around the country. Also, Fowler noted that Columbia is home to a "highly skilled and motivated workforce that has a history in nuclear engineering."

The company has applied for a construction permit through the Nuclear Regulatory Commission and is now waiting for the "all-clear." It has already signed a lease with MU at the Discovery Ridge Research Park for a radioactive isotope production facility scheduled to begin work next year.

Ashley Berg, MU funding programs coordinator, said the approval process is time-consuming and that she was unsure if construction would begin on schedule. But progress toward the company's move continues. The U.S. Nuclear Regulatory Commission hosted a public hearing on the environmental impact of the project on Dec. 8.

*MU's Research Reactor, which has been on line in Columbia since 1966, also produces radioactive isotopes. **The reactor is experimenting with Mo-99 and may produce it in the future, Basi said. However, the reactor will supply the company with some inputs.

"The MURR could be one of several university reactors that would help supply the company with the necessary material," MU spokesman Christian Basi said.

Northwest Medical Isotopes will hire employees such as nuclear engineers and technicians. They will be hiring some very technical staff, but there is some question about where this labor will come from.

"At this point, it’s too early to predict any changes in the (MU) labor force," Basi said.

The company began as a brainchild of a cardiologist and a nuclear scientist. The two were swapping frustrations in a Costco in Corvallis, Oregon. The shortage of radioactive isotopes was top of their list. The two then met with Fowler, an investor and entrepreneur, and created the company. After the facility is built in Columbia, the company plans to expand to one other location.

"There's a huge need for production, and we hope to fill it," Fowler said. "Without these isotopes, medical professionals struggle to give quality care."

Source: The Columbia Missourian – Supervising editor Katherine Reed.

http://www.columbiamissourian.com/news/local/radioactive-isotopes-business-moves-forward-with-plans-to-locate-in/article_0875f330-b4ae-11e5-91cd-5bfbaada39d2.html

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