Perspectives on Alternative Technologies from the International Source Suppliers and Producers Association

John J. Miller, CHP Chairman, ISSPA August 18, 2020

ISSPA – Who We Are



The International Source Suppliers and Producers Association (ISSPA) is an association of companies that produce, manufacture, and supply sealed radioactive sources and/or equipment that contain sealed radioactive sources as an integral component of the radiation processing or treatment system, device, gauge or camera.

WWW.ISSPA.COM



17 Members – 8 Countries

in

- o Alpha Omega Services
- o Berthold Technologies GmbH & Co. KG
- o Best Theratronics Ltd
- o Dioxitek S.A./CNEA
- Eckert & Ziegler Nuclitec GmbH
- Endress + Hauser GmbH + Co. KG
- o Gamma-Service Recycling GmbH
- Hopewell Designs

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- o Institute of Isotopes, Co. Ltd.
- o International Isotopes Inc.
- o Nordion Inc.
- NTP Radioisotopes
- o QSA Global Inc
- Source Production & Equipment
- o Studsvik
- o Varian Brachytherapy
- o RAIMS

Member company contacts can be found at isspa.com

ISSPA's Objectives



- Our primary objective is to ensure the use of sealed radioactive sources in medical, industrial, and research applications continues to be regarded as safe, secure, and beneficial to society.
- Strive for continuous improvements in the safe and secure use, transportation and end of life management of sealed radioactive sources.
- Provide technical expertise in the development and implementation of standards, regulations and guidelines pertaining to the safe and secure design, manufacture, supply, use, and end of life management of radioactive sources.



Code of Good Practice



ISSPA Members adhere to a Code of Good Practice that addresses

- Regulatory Compliance
- Quality Management
- Design
- Manufacturing
- Sales and Distribution
- Tracking
- User Support
- Life Cycle Management



ISSPA's Role in the Source Life Cycle

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- Manufacture and distribute radioactive sources
- Source/Device maintenance during use
- End of life management support
- Take back agreements at the initial sale of a radioactive source have become fairly standard,
- One-for-one source exchanges also very common and the most cost-effective way for a user to transfer their disused source to a manufacturer/supplier,
- Several ISSPA members actively recycle disused sources significantly reducing the end of life management costs to the user

Radioactive Source or Alternative Technology

As the name implies ISSPA's focus is on the beneficial use of sealed radioactive sources.

This does not mean that ISSPA opposes the use or development of alternative technologies.

In applications where the effectiveness of the radioactive source and alternative technology are equal, for instance, Cs-137 and X-ray blood irradiation or Co-60 teletherapy and LINAC, the method of choice should be based on reliability, maintenance, overall cost, and user capabilities. This becomes a customer driven decision.

It is important to note that several ISSPA member companies offer alternative technology based products for the same or similar application as their radioactive source based product.

Radioactive Source or Alternative Technology

ISSPA members providing products that utilize alternative technologies:

- Best Theratronics Cs-137 AND X-ray based blood irradiators
- Nordion/Sterigenics Co60 AND E-Beam irradiation sterilizers, (chemical based sterilization as well)
- QSA Global radioactive source AND X-ray NDT systems.
- Endress & Hauser Radiometric AND Ultrasonic and Radar level detection.
- Berthold Radiometric AND Microwave moisture/concentration measurement systems.

Additional information will be presented at a later date.

Radioactive Source or Alternative Technology?

When to use what?

For some applications there is a clear reason to select a specific technology. Radiography of a thick steel pipe is best performed using a Co-60 source and could not be performed using an X-ray based device. Whereas an X-ray based device would be more practicable for the detection of corrosion on insulated pipes.

When the performance of the radioactive source and an alternative technology based device is comparable, it becomes a decision of customer preference, weighing the pros and cons and the life cycle costs associated with the options.

Pros and Cons



Assuming the effectiveness in an application is similar then the pros and cons of radioactive source based device and the alternative technology based device should be considered in the selection process.

For radioactive source based technologies, the upfront cost of the system could be much lower than an alternative based technology, but the end of life decommissioning cost for a radioactive source based technology (assuming a long-lived isotope) could be much greater.

Maintenance cost for a radioactive source based technology is typically lower than the maintenance costs of the alternative technology whereas the costs associated with ensuring safety and security are typically higher for a radioactive source based device.



Pros and Cons – other factors



Radioactive sources can not be turned offed so safety and security requirements must always be in place. This may be considered a "con" as it may increase operational costs.

The not being able to turn off characteristic makes radioactive source technologies less dependent on outside power requirements, which in turn can lead to less down time, and this becomes a "pro".

Regulatory compliance, specifically security requirements associated with higher activity radioactive sources (Cat 1 and 2) is more onerous than alternative technologies.

BUT the use of these devices, regardless of the technology employed, is governed by significant regulation. Treating a patient with a LINAC is as equally regulated as treating a patient with Co-60.

Moving Forward



As an Association, ISSPA will continue to engage with the IAEA, regulators, NAS and other governmental and non-governmental organizations and provide technical expertise in an effort to continually improve the safety and security of radioactive sources throughout their life cycle.

ISSPA does not oppose the use of alternative technologies as evident in the fact that several ISSPA members provide alternative technologies for the same or similar applications as their radioactive source based devices.

Radioactive sources have and continue to be used safely and securely. ISSPA does not believe legislation and regulations should be used as a lever to bias industry towards the use of alternative technologies. The selection of one technology over an other should be made by the user taking into account the effectiveness of the available technologies and any site-specific limitations that user must address.



• Does ISSPA keep a database of how many sources are deployed and their status including repatriation efforts?

ISSPA does not maintain a database on sources distributed.

• Views on needs for alternative technologies nationally (US) and internationally and work of the organization in facilitating use of alternatives.

As an industry association, ISSPA does not facilitate the use of alternative technologies, but several ISSPA member companies do offer alternative technologies.

• Examples of promising alternative technologies being developed for different applications (medical, industrial, other) with emphasis on potential game-changers.

I do not know of anything that would be particularly "new" or "gamechanger".



• Examples of applications without good alternatives and reasons; suggestions on reducing risks linked to those applications.

There are a few applications that utilize Co-60 that would be difficult to effectively replace with an alternative. Radiography of thick steel components, sterilization of single use medical devices, and stereotactic radiosurgery. LINAC and Single Co-60 source teletherapy equally effective and selection becomes a matter of choice. Elekta Gamma Knife, MASEP Infini and the Xcision GammaPod. The GammaPod is an example of a relatively new device for the treatment of breast cancer that uses 25 individual Co-60 sources, (earlier devices had 36 sources).

Security risk reduction would be implementation of security measures consistent with IAEA Nuclear Security Series No. 11, Security of Radioactive Material in Use and Storage and of Associated Facilities, 2019 and IAEA Nuclear Security Series No. 9, Security of Radioactive Material in Transport, 2020.



• Activities related to source disposition including recycling

Several ISSPA members are recycling sources. Take back agreements have become fairly common practices at the point of sale.

• Challenges with adopting alternative technologies nationally (US) and internationally (e.g., costs, other resources, training.

The examples listed cost, resources, training are all challenges in the US and internationally, the customers ability to address those challenges will vary.

• Suggestions on companies or other entities the committee should hear from.

I would suggest ViewRay – ViewRay developed an MRI guided teletherapy device that utilized 3 Co-60 sources in 3 treatment heads. They have since modified the design to utilize LINAC instead of Co60.



• Please provide any additional information or advice that you think is relevant to this committee's work.

None additional at this time.

Thank you



Questions?

