IAEA Scientific Forum 2015

Atoms in Industry

Radiation Technology for Development

Report to the 59th IAEA General Conference

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Mr President, Director General, Distinguished Delegates,

I am pleased and honoured to be given this opportunity to present to the General Conference the report on the IAEA Scientific Forum 2015, *whose theme was Atoms in Industry, Radiation Technology for Development.*

Mr President,

As you know, the annual IAEA Scientific Forums are organised parallel to the General Conference and seek to showcase and advance the peaceful application of nuclear science and technology to contemporary challenges.

This year the Director-General gave priority to Atoms in Industry, to highlight the benefits of radiation technology for development.

The Forum held during the past two days covered a wide range of topics that proved to be of great interest and relevance, as could be seen from the extensive participation of Member State representatives.

The Forum was structured into six thematic sessions and was opened by IAEA Director General Yukiya Amano, who remarked that nuclear science and technology can make a major contribution to economic growth and have an important role to play in support of sustainable development. The key note speakers, Mr Sergey Kirienko, Chief Executive Officer of Rosatom, Russian Federation, and Mr Ratan Sinha, Chairman, Atomic Energy Commission, India, then gave an insight into the various radiation technologies being used in their countries since decades and highlighted the special features and capabilities of these technologies. Mr Taylor Wilson, a young scientist from the USA, spoke at the end of the opening session. He described his passion for nuclear science and conviction on the enormous benefits of nuclear applications, detailing how radiation technology can be used to produce graphene, an interesting and highly valuable material with immense potential in the energy industry.

The first session entitled ‘Battling the Bugs’ showcased the efficacy of radiation to kill germs, bacteria and make medical products sterile and safe for use. In this session, Mr Josef Mittendorfer from Austria explained the basis of use of

radiation in medical sterilization, followed by Ms Celina Ines Horak from Argentina who demonstrated the use of radiation for preservation of tissues and organs for transplants. Mr Justin Davies from Australia concluded the session detailing the use of radiation in the production of vaccines.

The second session ‘Linking the Chains’ touched upon another aspect of radiation – namely how radiation technologies are used to form cross-links between polymer chains (radiation cross-linking) and in this way make materials stronger and more resistant to chemicals and fire, ensuring better safety. In this session, Ms Yuweiei Zhang from China, Mr Wilson Calvo from Brazil and Mr Masao Tamada from Japan explained how radiation processing of polymers such as rubber enables large-scale production of high quality products in a cost-effective manner. They also pointed out the environment-friendly nature of these processes. In their presentations, the speakers mentioned the use of both gamma radiation and electron beam –the latter being a process which involves using electrons, usually of high energy, to treat an object - as sources of radiation and touched upon several examples such as car tires, membranes and floor tiles.

The third session ‘Solutions for Pollution’ highlighted the possibility of breaking tough chemical and biological components, which often pose a

problem in effluents from industries. The use of radiation to break complex molecules and clean up the environment was brought out by Mr Bumsoo Han, from Republic of Korea for waste water and Mr Andrzej Chmielewski from Poland for coal power plant emission treatment. Ms Catherine Hughes from Australia enumerated the use of radiation technology to trace the pathways of pollutants in the marine environment and its role in protecting the coasts from pollution.

The fourth session 'Tracing the Pathways' explained the uses of radiotracers and nucleonic gauges in various industries and their role in optimisation of production processes. Mr Tor Bjørnstad from Norway explained in depth how radiotracers help extract oil from seabed efficiently. He was followed by Ms Haifa Ben Abdelouahed from Tunisia who demonstrated the role of radiotracers in the mining industry. Mr Jean Louis Boutaine from France detailed the use of nucleonic gauges in a variety of industrial processes and Mr Bernard Malherbe from Belgium showed how the radiotracers are important for the management of coast and in dredging. The session ended with Mr Martin Jech from Austria showing how sophisticated techniques such as surface microactivation can provide valuable information to evaluate the wear and tear of machine parts.

The fifth Session entitled ‘Bolstering Safety and Quality’ demonstrated how non-destructive testing (NDT) using radiation provides valuable information which is used in nearly all heavy industries and construction worldwide. NDT is a non-invasive technique that allows us to assess the structural integrity of a material, component or structure without destroying its shape, size, chemical or physical properties. Mr Winfried Petry from Germany gave unique examples of the use of NDT in different industries and emphasised the need for these tests to ensure safety and optimal performance. This was followed by Mr Nassir Bin Ibrahim from Malaysia who provided the examples from petrochemical industries in his country. Ms Loveetah Bhujohory from Mauritius showed how NDT was an important aspect of the construction business in her country with several examples. This session was followed by a panel discussion on human resource development for NDT by experienced members in this field from the UK (Mr Farley), South Africa (Mr Blake), Indonesia (Mr Santoso) and Morocco (Mr Alami). They underlined the need for national, regional and international efforts to improve NDT personnel and establish uniform certification courses.

The last session entitled ‘Rays of Hope’ illustrated the benefits of radiation technology and their huge potential for worldwide use. In this session, Ms Clelia Dispenza from Italy spoke about nanomaterials that can be prepared

using radiation in medicine, followed by Mr Khairul Zaman from Malaysia who spoke about the use of radiation to create useful polymers from waste by-products such as palm fibres and crab shells. Mr Arthur Gareev from the Russian Federation also enumerated the possibility of producing a variety of polymeric products with unique properties and high strength for different applications.

Mr Umesh Kumar from India detailed the use of computed tomography in radiography to look at machine components. The last speaker in this session, Mr Corneliu Ponta from Romania, illustrated how radiation technology has done wonders to the world of cultural heritage by helping museums to preserve century- or even thousand-year old artefacts and pieces.

This session was followed by a panel discussion that looked at the way ahead. In this session, I described the technologies used in my country to produce high-value products from waste and contribute to other areas such as medical sterilization and food irradiation. Mr Paul Gray from Canada and Mr Benoit Mullier from Belgium gave an overview of gamma irradiators and the accelerator-based irradiators such as electron beam accelerators above described. Mr Iqbal Hussein Khan from Pakistan detailed the applications in his country and emphasised the need for training and sustainability. The session was followed by lively discussions. Several member state representatives

indicated interest and shared experiences about the use of radiation technology in their countries.

In the closing session, IAEA Director General Yukiya Amano highlighted the benefits of radiation technology to all Member States, developing and developed alike. Hon. Minister Mr Ayariga of Ghana, Vice Minister Mr Santana Nunez from Cuba and Ms Lydia Parades from Mexico spoke about the various uses of radiation technologies in their own countries, on cooperation with the IAEA and also among countries to prompt their developments.

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In summary, the Forum has contributed to a better understanding that radiation technology helps to improve industrial processes. It can boost productivity. And it does this in an environmentally-sound way. It benefits all countries, not just developed countries.

There are clear links between the work of the Agency in this area and new Sustainable Development Goals that are planned to be adopted next Week at the Sustainable Development Summit, for example hunger, human health, clean water, energy, and climate change.

Thank you for your attention.