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IYNC 2014 Technical Track Chairman

IYNC 2014 has become a meeting point for young people who work in the nuclear field.
The previous congresses have taken place in Slovakia (2000), South Korea (2002), Canada (2004), Sweden/Finland (2006), Switzerland (2008), South Africa (2010) and United States (2012).

How has this congress been organized (plenary and technical sessions, etc.)? Have you followed the structure of the previous congresses?

IYNC2014 was the continuation of previous IYNC conferences. It was designed using the feedback and lessons learned from IYNC2012.

The conference was divided into 4 days of technical program sessions and 1 day of technical visits. Social and Spanish cultural events were organized in parallel.

The technical program was based on 3 pillars: technical tracks, interactive workshops and plenary & panel sessions. In addition, special sessions were organized, such as the projection of the Pandora's Promise movie, a Fukushima special session and the 2014 ENEN (European Nuclear Education Network) PhD Event. Overall, more than 60 technical sessions have been organized by 40 volunteers coming from more than 20 countries.

From a technical standpoint, what are the differential features of this congress with respect to others?

The global theme was "Up to the Challenge". Our objective was to address what we considered the most challenging topics for the future of students and young professionals, for the *next generation* in nuclear energy. We focused on Nuclear Safety; Education, Training and Leadership, Energy & Nuclear Power Development; Decommissioning and Waste Management; Communication in Nuclear; Non-Proliferation; New Energy Markets and Economics; but also the New Nuclear Energy Systems such as Generation IV reactors. Those topics in particular were discussed during IYNC2014 plenary and panel sessions.

With regard to the format, we wanted to give the opportunity to all attendants to be active during the conference. Therefore we have encouraged smaller, interactive sessions with, for example, the interactive workshops.

Globally, we aimed to deliver high quality content to the 400 participants and to continuously improve the scientific and technical quality of IYNC2014. This was one key target for the technical program team. Based on the feedback of participants, lecturers and professors attending IYNC2014, I am proud to say this goal has been reached.

This feedback also showed that the IYNC2014 technical program has been an overall success. This is well illustrated by the numerous all-time IYNC records achieved during the event:

- A record in the number of technical summary submissions and oral presentations;
- A record in the number of technical sessions organized;
- A record participation of delegates coming from Eastern countries, such as China, South-Korea and Japan. In total, more than 50 participants travelled from Asia to Burgos.

Several people contributed to the technical program's success but I would particularly like to highlight the extremely motivated and dedicated technical program team who did an outstanding job. All were volunteers. As you might know, IYNC conferences are organized "by young professionals for young professionals".

Would you mention anyone of particular relevance from among the guest speakers?

More than 70 invited speakers came to Burgos. Some of our plenary speakers made a particular impression on the attendees. I have in mind the speeches by Mike Weightman (UK) and Shunsuke Kondo (Japan) on Nuclear Safety or the address of Donald Hoffman (USA) regarding Leadership and Personal Development. The keynote speeches by Danny Roderick (USA) and Alejo Vidal-Quadras (Spain) were also well received by the participants. Messages from our Chinese, Russian, French and South-Korean plenary speakers on the Future Development of Nuclear Power were also applauded enthusiastically.

Moreover, excellent invited speakers attended smaller sessions, such as the interactive workshops, where the contributions of Yves Peysson (France) on *Fusion: a 50 years Story* and Raquel González Arrabal (Spain) on *Nuclear & Nanotechnologies* were especially appreciated by the participants.

What are the issues in which a greater number of congresspersons have taken part?

The participants had the opportunity to attend more than 200 technical presentations among the 13 technical tracks, 19 interactive workshops and 11 plenary & panel sessions. Everyone could work on many different topics, either to further develop their own expertise or to expand their views and learn on new topics.

Regarding technical presentations, most of the contributions were in relation to the operation, maintenance and design of NPPs (Track 1 and 2); reactors physics: neutron physics, thermohydraulics and materials (Track 3.1, 3.2, 3.3); safety, severe accidents and Fukushima related topics (Track 4); and the fuel cycle back-end, decommissioning and waste management (Track 6).

Furthermore, the participation in transverse-topics, such as *Communication in Nuclear* or *Nuclear Power Development* gathered a very motivated audience engaging in passionate debates while proposing innovative approaches. As for topics related to nuclear safety, participants had no

taboos on the issues discussed and they challenged the invited speakers several times.

Considering that the congresspersons come from a large number of countries, could it be said that the technical program of IYNC 2014 is a true reflection of the current situation of nuclear power on the different continents?

Yes, IYNC2014 was a unique opportunity to get a sense of the worldwide nuclear energy situation from first-hand information: the IYNC2014 participants. With delegates coming from more than 40 countries, the topics presented reflected the most burning issues and trends about nuclear energy around the world.

To enable everyone to capture this, the conference started with the "Country Reports". In this session, one delegate per country introduced the situation of nuclear energy in their country as well as the Young Generation activities. I would like to point out here the participation of delegates from Saudi Arabia and Pakistan in an IYNC conference for the first time.

The 70 invited speakers coming from 25 countries completed the picture by sharing their expert opinion on the worldwide nuclear energy opportunities and challenges.

In your opinion, what are the strategic directions that the nuclear industry is taking based on the papers presented in Burgos?

The nuclear industry is facing very different situations worldwide. The energy market in Europe and North America is "broken". In those countries nuclear power is under pressure and new developments are fragile. On the other hand, Asian countries – starting with China – are quickly developing substantial nuclear fleets and they now export their knowledge, experiences and investments abroad. This gives different opportunities and challenges to the nuclear industry actors. Nonetheless, they have some strategic directions in common.

The complexity of topics will require more interdisciplinary work. From nuclear safety to economics, via reactors physics, the phenomena being investigated are often at crossroads between different fields. This will require more cooperation between companies and R&D centers, between the industry and the academic world.

Complexity also calls for simplification. In this sense, a trend is being observed to design "simpler" systems such as passive reactors or smaller and less risky projects. A continuation of this trend, as well as the need for standardization in design (e.g. SMRs) and in licensing (e.g. CORDEL, UK GDA), should be observed over the coming years.

Regarding new builds, constructions are mostly happening in Asia, which drives a substantial shift of the nuclear industry towards this region. I expect this trend to continue in the next years. Hence the ability to work in international and intercultural environments will be a must. In this perspective, I am convinced that experiences gathered during IYNC events are highly valuable.

In parallel, more and more life time extension projects are emerging around the world. Today the worldwide nuclear fleet is on average about 30 years old. Extending the lifetime of the running units is a proven and economical solution. Extensive R&D and innovations will be needed to successfully complete those programs, e.g. in material science, multiscale simulations or uncertainty quantification.

Among all these challenges, the *next generation* in nuclear energy has a role to play, but also responsibilities. Young professionals should continue to challenge their industry. We have seen during IYNC2014 that safety remains a priority that all generations are committed to. This is encouraging but should continue to be reaffirmed.

Young professionals are keen on fast changes and innovation. This will be needed to enable the nuclear industry to adapt itself to new worldwide energy challenges, either by transforming existing businesses or by developing the future energy systems, like the generation IV technologies, for example.

Last but not least, the *next generation* in nuclear energy is a chance for public acceptance. Young professionals are turned towards society. They are willing to talk about their jobs, to present advantages and challenges of nuclear energy without taboos. They know how to communicate with new technologies and social media. This can play a decisive role in improving nuclear energy acceptance.

The technical visits to ENSA, Juzbado and Tecnatom have made it possible to learn about the capacity of the Spanish nuclear industry. What else have they contributed to the technical program?

The technical visits were an important part of the conference as it enables participants to experience for themselves some aspects of the nuclear industry, such as training or fuel manufacturing. With participants coming from all over the world, those visits were also an opportunity to exchange views on processes and technical topics. The technical visits were well designed and matched the scope of IYNC2014 topics.

I would like to emphasize here the outstanding support of the local organization team, and the role of the Spanish Nuclear Society and its partners, who all contributed to the great success of this conference.