HKIE Nuclear Division - Annual Report of Session 2019/2020

2019 has been an outstanding year for the nuclear power industry in China as the industry moves closer to the targets for capacity installation set for 2020. A total of 47 nuclear power units are in commercial operation in the Mainland at the end of March 2020 with a total installed capacity of roughly 49 GW. We saw the first wave of Generation III+ nuclear power plants (NPPs) at the Sanmen, Haiyang and Taishan sites all successfully connected to the grid and started commercial operation as planned. The completion of the Sanmen and Haiyang NPPs demonstrates the vitality of the Westinghouse's AP1000 reactor technology, while the completion of the Taishan NPP serves as world's first Areva's EPR reactor design in operation. After the completion of the long waiting demonstration units at Sanmen and Haiyang, more AP1000s are expected to break ground in the near future. Also, State Power Investment Company (SPIC) has developed its own design for a larger version of the AP1000, called the CAP14000. The first demonstration unit in Shidaowan, Shandong has already accomplished its First Concrete Date (FCD) milestone, with the second unit to follow soon.

Apart from the above Gen III+ NPPS, another 12 reactors are under construction in the Mainland. They are mostly PWR design, but also showcased with two Generation IV designs of a high temperature gas-cooled reactor and a sodium-cooled fast reactor, as well as the China's indigenous Generation III+ Hualong One (HPR1000) design which will introduce two pairs of demonstration units of HPR1000 at China National Nuclear Company (CNNC)'s Fuquing Nuclear Power Station in Fujian and China General Nuclear (CGN)'s Fangchenggang Nuclear Power Station in Guangxi. There are also the "Integrated Version" of HPR1000 at Zhangzhou NPP in Fujian and Taipingling at Guangdong. We have noted that CNNC's Zhangzhou Phase 1 Unit 2 had its FCD in October 2019, while CGN's Taipingling had been granted its construction permit by the authority in December 2019. There are also another 45 reactor units secured their site approval and are in various stages of pre-construction standby. This rate of growth is phenomenal.

Internationally, in association with the "Belt and Road Initiatives", the construction of the two HPR1000 units at Karachi Nuclear Power Station in Pakistan is going smoothly. The HPR1000 has also been proposed for construction at Bradwell in the UK, where it is now undergoing Generic Design Assessment with the regulator.

In contrast, in other parts of the world, especially in Europe and North America, nuclear power development continues to meet challenges, often with mediocre public acceptance, delays in the construction of new NPPs due at least in part to project complexity and insufficient expertise, and the threat of closure to older and smaller plants in the US owing to their relative lack of

economic competitiveness against natural gas. However, to meet the challenge of global warming caused by increasing carbon dioxide emissions, all clean energy sources should continue to contribute. We believe that the benefit of nuclear power will be recognized by the general public followed the concerted effort of the industry and stakeholders, it will play a more important role in the years to come so as to achieve the targets of the Paris Agreement.

Riding on the opportunity arising from the continuous demand for power and technological developments in the Greater Bay Area, we are working hard to pursue the establishment of the nuclear engineering discipline in the Institution. We have made good progress and have solicited much support from local institutions, organisations and interested companies both in Hong Kong and in the Mainland. We are identifying and resolving key issues including membership needs and structured professional training supported with the use of roadmap, with a view to developing a comprehensive proposal for submission to the Institution for consideration and approval. We shall update you with any timely development.

In this session, we organized technical seminars and visits for our members to keep abreast of the latest development in the nuclear industry particularly in safety. Technical visits to the CGN Nuclear Facilities, the Hong Kong Observatory, the CityU Nuclear Reactor Simulator Laboratory, the EMSD E&M InnoZone and Interactive Learning Centre and the Daya Bay Nuclear Power Base were successfully held in the session and were oversubscribed. We have also offered another professional short course on “Radiation and Radiological Protection in Hong Kong” in December 2019 to enrich the knowledge of our members as an educational initiative. Another technical seminar related to the British Gas-Cooled Reactor Programme met with an overwhelming audience.

The Nuclear Division is committed to promote the understanding and engineering knowledge of nuclear technology for the interest of its members and the public, and for the benefit of the society at large. Finally, we wish to express our sincere gratitude to all those who have helped the Division during the Session 2019/2020 and made it successful in serving the Institution and our community. Members are welcome to visit our website at http://ne.hkie.org.hk or contact us by email to nuclear@ne.hkie.org.hk.

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Ir Prof Vincent Ho
Chairman, 2019/2020
April 2020