


附錄二、WiN Taiwan 分會書面報告

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| WiN Taiwan | |
| Chapter president | Yi-Hsiang CHENG (2016-18) |
| Chapter board members | <p>Yi-Hsiang CHENG, President -- 2014</p> <p>Ruei-Ying LIAO, Vice President -- 2015</p> <p>Mei-Ling TU -- 1996</p> <p>Ling-Wen CHEN -- 2004</p> <p>Szu-Li CHANG -- 1996</p> <p>LI-Fang KAO -- 1993</p> <p>Ju-Chuan HUANG -- 2016</p> <p>Tsuey-Lin TSAI -- 2012</p> <p>Ting-Yi WANG -- 2015</p> |
| Number of members | Local/Global: 166/54 |
| Chapter Contact | Dr. Yi-Hsiang CHEN |
| Chapter accepted by WiN Global | February 1994 |
| Nuclear power infrastructure | <p>The Government's energy policy of phasing out nuclear power by 2025 remains firm; for all existing nuclear power plants there will be no license renewal beyond their 40-year licensed operation. The use and development of renewable energy, such as wind and solar, are expected to increase in the coming years.</p> <p>There are three NPPs at Chinshan, Kuosheng and Maanshan, operated by state-run utility Taipower, with two units at each site. They contributed to about 8% of total electricity generated in 2017, down from 12% in 2016, 14% in 2015, and 16% in 2014. The 40-year operating licenses of these six units will first expire in December 2018 for Chinshan Unit 1, followed by Unit 2 in July 2019, then Kuasheng Units 1&2 in December 2021 and March 2023, and finally Maanshan Units 1&2 in July 2024 and May 2025, respectively.</p> <p>Taipower submitted Chinshan Plant's decommissioning plan to the AEC for review in November 2015. The plan was approved by the AEC in June 2017. A permit for decommissioning is still pending approval of the second-phase environmental impact assessment by the EPA.</p> <p>To comply with the government's policy of phasing out nuclear power by 2025 which has been stipulated in the Electricity Act amended in January 2017, Taipower has been assessing alternative uses of the two ABWRs at the fourth plant, Lungmen,</p> |

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| | <p>which have been mothballed since 2015. These include resale of nuclear fuel and components, on-siting planning for fossil fuel power units, among other possibilities. The decision of mothballing the long-troubled Lungmen's 2 ABWRs was made in 2014, in response to growing public concerns over the safety of nuclear power following the Fukushima nuclear accident of 2011.</p> |
| Nuclear medical applications | <p>The Proton and Radiation Therapy Center at LinKuo Chang Gung Memorial Hospital has been in full operation since 2015. A test run is underway for the PRTC at KaoHsung CGMH. The PRTC at NTU Hospital is still under construction, and a fourth one in the application process. In addition, there are 11 cyclotrons at a research centre and 9 hospitals for pharmaceuticals manufacturing, as well as large numbers of various medical equipment and facilities, such as Gamma Knife and Cyber. Comprehensive quality assurance programs have been implemented for mammography equipment, CTs and various radiotherapy facilities.</p> <p>The Institute of Nuclear Energy Research (INER) has engaged in the new radiopharmaceutical research for more than 20 years. Tc-99m Trodat-1 was the first Tc-99m-labeling radiopharmaceutical for dopamine-transporter imaging in the world which could be used for the diagnosis of Parkinson's and related diseases. Since the drug licensed out for Tc-99m Trodat-1 to the local industry in 2015, INER has been transferring necessary techniques and documents to the licensee. Re-188 MN-16ET/Lipiodol developed by INER is another potential radiopharmaceutical for hepatoma treatment; the clinical trial with National Taiwan University Hospital will start this year. DOLOCAGA kit, labeling with Ga-68, is a brand-new radiopharmaceutical developed by INER for liver residual functional assessment. In January 2018, INER just received the approval of Phase I clinical trial from FDA. In the mid-year, we will submit the investigational new drug document for clinical trial application in Taiwan.</p> <p>INER's Radiopharmaceutical Manufacturing Centre has obtained 17 radiopharmaceutical drug licenses from the Department of Health in Taiwan. The centre received the approval of PIC/s-GMP certification which is the newest manufacturing standard in Taiwan, and an NDA (new drug application) of I-123 MIBG Injection was filed to TFDA in September 2017. We hope the new drug licence of I-123 MIBG will be used as a new diagnostic tool for heart failure and Lewy body dementia in Taiwan's Nuclear Medicine. The centre regularly supplies the radiopharmaceuticals to fulfil domestic hospital needs, but also supports the clinical application for international cooperation.</p> |

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| <p>Nuclear applications in other fields</p> | <p>There have been extensive uses of nuclear technology in various non-medical fields in Taiwan. For example, static elimination and ion implantation are widely used nuclear applications in the semiconductor manufacturing process. Such instruments are mostly imported. Domestically manufactured static eliminators became available in recent years, but only account for a small share of the market.</p> <p>Radiation sterilization processing services have been commercially available for 30 years in Taiwan to healthcare, laboratories, pharmaceuticals, food, packaging, cosmetics and other related industries. ISO/OHSAS certifications have been obtained to help products accepted in the international market.</p> <p>Non-destructive testing (NDT) is another widely used nuclear application in evaluating material integrity and construction process. A not-for-profit organization on NDT has existed for nearly 40 years in Taiwan which provides education and training, conducts qualification examinations, and manages personnel qualification and certification in NDT.</p> <p>As far as nuclear applications close to our daily life, a good example would be gold purity analysers or karatmeters using X-Ray fluorescence technology. The device is available at nearly every gold jewellery shop, as collection and gift-giving of pure gold jewellery and ornaments is a tradition in Taiwan.</p> |
| <p>Waste management philosophy</p> | <p>The strategies for Low-level waste (LLW) management are “volume reduction, safe storage and final disposal.” Since a volume reduction strategy program was launched in 1990, Taipower has successfully reduced its annual output of solidified LLW to about 175 (55-gal) drums in 2016, which is only 1.4 % of over 12 thousand drums in 1983. Currently, the accumulated amount of LLW is about 225 thousand drums; roughly half stored at NPPs, half at Lanyu, and about 7% at INER.</p> <p>In order to lay down a legal process for site selection of a LLW final disposal facility, the “Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility” was promulgated in 2006. The Ministry of Economic Affairs (MOEA) selected two locations as Recommended Candidate Sites in July, 2012. Local referendum is required by law, however, local governments have not been cooperating with the central government in conducting such referendum due to significant pressure from antinuclear groups. Communications among all stake holders are much needed in order to move forward.</p> <p>The strategies for spent fuel management are “storage in spent fuel pools for the near term, onsite dry storage for the medium term, and final disposal for the long term”. Currently, all spent nuclear fuels are stored in NPP storage pools.</p> <p>For onsite dry storage, the first phase (small scale) storage</p> |

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| | <p>projects at Chinshan and Kuosheng plants have both been delayed, pending approval by the local government on water & soil conservation and waste water reduction requirements, respectively. An indoor storage strategy as favoured by public opinion will likely be adopted for the second phase (large scale) onsite dry storage developments.</p> <p>As to the final disposal, Taipower submitted the "Spent Nuclear Fuel Disposal Program - 2017 Progress Report (SNFD 2017 report)" to demonstrate the technical capability of spent nuclear fuel final disposal in Taiwan in December 2017. The Fuel Cycle and Materials Administration (FCMA) of AEC kicked off a 12-month review process on this report in January 2018.</p> |
| Research | <p>INER, a government research institute founded in 1968 has long been dedicated to R&D on nuclear safety and radiation applications and protection, while bearing the mission of developing radiopharmaceuticals for the public well-being. In conformity with the national energy policy toward nuclear phase-out, INER has in recent years not only focused its technical work on nuclear facility decommissioning and radioactive waste treatment and disposal technology but also expanded its research to include the development of green energy such as new and renewable energy, energy conservation and carbon emission reduction, in addition to participating in the energy-related economic policy research.</p> <p>One of INER's recent research achievements is the development of Taiwan TomoDR, a new generation 3D imaging modality to improve medical imaging application in diagnostic radiology. It provides more detailed diagnostic information for radiologists and wide applications to clinical examinations.</p> <p>Among the various research activities conducted by a large size of faculty at its College of Nuclear Science and Nuclear S&T Development Center, the National Tsing Hua University (NTHU) operates an open-pool reactor, THOR, for research and medical isotope production. All other research reactors have been decommissioned.</p> |
| Chapter Updates | <p>WiN Taiwan Annual Meeting – Aug 10, 2017. The annual meeting was held jointly with Taiwan Section of the American Nuclear Society at NTHU's conference facilities in Hsinchu. Among 3-digit participants included 61 WiNners. Mr. Ho-Chuan Lee, President of Tse-Yu Think Tank, was invited to deliver a speech on how to lead the young ("cat") generation. A post-meeting tour was also arranged to visit cultural attractions at nearby "Bei-Pu Old Town".</p> <p>WiN Global Annual Conference – Aug 20-24 2017. A delegation of four members attended the 25th WiN Global Annual Meeting</p> |

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| | <p>held in Beijing, China, including post-conference tours to the Center of Excellence on Nuclear Security in Beijing as well as CAP1400, HTGR and AP1000 Projects in Shandong Province. Yi-Hsiang Cheng of ITRI and Ruey-Ying Liao of Taipower also attended the Board meeting prior to the conference.</p> <p>Women and Energy Forum – Sep 2, 2017. The Forum, sponsored by the Energy Bureau of the Economic Affairs Ministry, provided a good opportunity for experts and female leaders in energy, science and environmental protection sectors to share their views on energy policies. Ruey-Ying Liao represented WiN Taiwan to take part in the forum, and expressed her view on the importance of nuclear as part of the energy mix.</p> <p>Fall Seminar – Oct 13, 2017. Seigo Takagi: story told by one of the “50samurai at Fukushima”. Mr. Takagi, who was a QA manager of the Plant and now Risk Communication Director, was and stayed at the site when the accident occurred. He restored the scene of the accident, providing excellent lessons-learned for the audience, especially site workers. A total of 80 in the audience were mainly from different sectors of the nuclear community; the general public accounted for a small fraction.</p> <p>Interview by “the Pebble Stove” – Nov 2017. The Pebble Stove is a newly formed nuclear advocate by a handful of young people. Four members of WiN Taiwan were interviewed by the organization, with clips posted in their facebook.</p> <p>Chung-Hwa Nuclear Society Annual Meeting – Dec 27, 2017. WiNners of Taiwan actively participated in the annual meeting of its mother society CHNS.</p> <p>One-Day Camp on Radioactive Waste – Jan 23, 2018. A one-day camp conducted to introduce to 38 Hsin-Dian Senior High School students on what radioactive waste is all about, from its origins, treatment, reduction and possible reuse, storage to final disposal.</p> <p>Happy gatherings with Jasmin Craufurd-Hill and her husband Andrew from Australia <i>Dec 19, 2017</i> , and with Junko Owaga and Keiko Chitose in Tokyo <i>Jan 27, 2018</i>.</p> <p>Coming up:</p> <p>IYNCWiN18 – March 2018</p> <p>Saturday Spring Outing – April 2018</p> <p>Spring Seminar – May 2018</p> |
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