2024
Taiwan(R.O.C)
National Report

as referred to by the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

December 2024 | Nuclear Safety Commission

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LIST OF ACRONYMS AND ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
ASME	American Society of Mechanical Engineers
BWR	Boiling Water Reactor
GTCC	Greater-Than-Class-C Radioactive Waste
IAEA	International Atomic Energy Agency
ISO	International Organization for Standardization
MOENV	Ministry of Environment
MOEA	Ministry of Economic Affairs
MOI	Ministry of Interior
MOL	Ministry of Labor
NARI	National Atomic Research Institute
NORM	Naturally Occurring Radioactive Materials
NSC	Nuclear Safety Commission
NTHU	National Tsing Hua University
PWR	Pressurized Water Reactors
SSCs	Structures, Systems and Components
SURW	Small User Radioactive Waste
THAR	Tsing Hua Argonaut Reactor
THOR	Tsing Hua Open-pool Reactor
THMER	Tsing Hua Mobile Educational Reactor
TPC	Taiwan Power Company
TRR	Taiwan Research Reactor
TRU	Transuranic Waste
USDOE	U.S. Department of Energy
USNRC	U.S. Nuclear Regulatory Commission
VRC	Volume Reduction Center
WBR	Water Boiler Reactor
ZPRL	Zero Power Reactor at Lungtan

A. INTRODUCTION

A.1. Purpose and Structure

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management of the IAEA (the International Atomic Energy Agency) was opened for signing on September 29, 1997, and officially entered into force on June 18, 2001. The main objectives of the Joint Convention are to encourage the Contracting Parties to commit to the safety of spent fuel and radioactive waste management in order to:

(1) To achieve and maintain a high level of safety worldwide in spent fuel and radioactive waste management.

(2) To ensure that individuals, society and the environment are protected from potential hazard, now and in the future.

(3) To prevent accidents with radiological consequences and to mitigate their consequences should they occur.

Therefore, Article 32 of the Convention requires that each Contracting Party shall submit a national report to each review meeting held every three years, to address the measures taken to implement each of the obligations of the Convention and the achievements.

Though Taiwan, the Republic of China (R.O.C.), is not a Contracting Party of the Convention, shall commit to following the requirements set forth in the relevant international conventions, by the provisions of Article 17, Paragraph 1 of the domestic law, “Nuclear Materials and Radioactive Waste Management Act.” Hence, a national report has been prepared in compliance with the international obligations of the Convention, with the form and structure as provided in IAEA Guidelines (INFCIRC/604/Rev.5).

Table A-1 provides a cross reference between the sections in this report and the specific reporting requirements in the Convention. The data presented in this report had been updated to December 31, 2024, unless otherwise specified.

Table A-1. Cross Reference between the National Report and the Convention

National Report Section	Joint Convention Section
A. Introduction	
B. Policies and Practices	Article 32, Paragraph 1
C. Scope of Application	Article 3
D. Inventories and Lists	Article 32, Paragraph 2
E. Legislative and Regulatory System	Articles 18~20
F. Other General Safety Provisions	Articles 21~26
G. Safety of Spent Fuel Management	Articles 4~10
H. Safety of Radioactive Waste Management	Articles 11~17
I. Transboundary Movement	Article 27
J. Disused Sealed Sources	Article 28
K. General Efforts to Improve Safety	
L. Annexes	

The regulatory authority overseeing the utilization of nuclear energy and ionizing radiation in Taiwan is the Nuclear Safety Commission (NSC), which is responsible for safety regulation and inspection of affairs related to spent fuel and radioactive waste. The NSC is responsible for the compiling this national report, which has been reviewed by the relevant organizations and exports.

A.2. Overview

There are 3 nuclear power plants (NPPs) which are owned and operated by Taiwan Power Company (TPC), a state-owned enterprise. Chinshan NPP and Kuosheng NPP are located in northern Taiwan, as Maanshan NPP is located in southern Taiwan (Figure A-1). Chinshan NPP (under decommissioning) and Kuosheng NPP (under decommissioning) each consists

of 2 boiling water reactors (BWRs), while Maanshan NPP consists of 2 pressurized water reactors (PWRs). The operating licenses for all four units at the Chinshan and Kuosheng Nuclear Power Plants have expired, as stipulated in their respective licenses, and the units are currently in the decommissioning phase. Additionally, Unit 1 of the Maanshan Nuclear Power Plant reached the end of its licensed operating period, with its operating license expiring on July 27, 2024. For general information and the current status of each nuclear power plant, please refer to Table A-2.

Figure A-1. Nuclear Facilities in Taiwan

Table A-2. Commercial NPPs of Taiwan

NPP	Unit	Reactor Type	Capacity (MWe)	Commission Year	Status
Chinshan	Unit 1	BWR	636	1978	Decommissioning
	Unit 2	BWR	636	1979	
Kuosheng	Unit 1	BWR	985	1981	Decommissioning
	Unit 2	BWR	985	1983	
Maanshan	Unit 1	PWR	951	1984	Decommissioning
	Unit 2	PWR	951	1985	Operating

There are 6 research and educational reactors in Taiwan, 5 of them are under decommissioning or decommissioned, only 1 is still operating. The research and educational reactors in Taiwan are as follows (Table A-3):

- Zero Power Reactor at Lungtan (ZPRL): owned by the National Atomic Research Institute (NARI), under decommissioning.
- Taiwan Research Reactor (TRR): owned by NARI, under decommissioning.
- Water Boiler Reactor (WBR): owned by NARI, decommissioned.
- Tsing Hua Argonaut Reactor (THAR): owned by National Tsing Hua University (NTHU), decommissioned.
- Tsing Hua Mobile Educational Reactor (THMER): owned by NTHU, decommissioned.
- Tsing Hua Open pool Reactor (THOR): owned by NTHU, operating.

Table A-3. Research and Educational Reactors of Taiwan

Owner	Reactor	Basic Information	Operating Year	Status
NARI	Zero Power Reactor at Lungtan (ZPRL)	· Light water moderator. · Power capacity 10 kW originally, upgraded to 30 kW. · Material Test Reactor (MTR) type fuel.	1971~2010	Decommissioning
	Taiwan Research Reactor (TRR)	· Heavy water moderator. · Power capacity 40 MW. · Natural Uranium fuel.	1973~1988	Decommissioning
	Water Boiler Reactor (WBR)	· Light water moderator. · Power capacity 100 kW. · Uranium oxide sulfate liquid fuel.	1983~1991	Decommissioned
NTHU	Tsing Hua Argonaut Reactor (THAR)	· Power level 10 kW. · Educational reactor.	1974~1991	Decommissioned
	Tsing Hua Mobile Educational Reactor (THMER)	· Power level 0.1 W. · Educational reactor. · Mobile type.	1975~1990	Decommissioned
	Tsing Hua Open pool Reactor (THOR)	· Light water moderator. · Power level 1 MW originally, upgraded to 2 MW.	1961~	Operating

The radioactive waste in Taiwan can be classified into two categories: high-level radioactive waste (HLW) which includes the spent fuel for final disposal or the extraction residuals generated in reprocessing (not executed in Taiwan currently), and low-level radioactive waste (LLW). It can also be divided into nuclear power-generated radioactive waste and small user radioactive waste (SURW, radioactive waste generated by medical treatment, industry, research, and purposes other than nuclear power generating). Please refer to Section B.4 for classification criteria.

A.3. Updated Since Last Report

The following section summarizes progress made in several important areas since the previous report.

(1) Legislative systems

A series of regulations have been promulgated, including the amendments to:

- Regulations for the Review and Approval of Applications for Construction License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities.
- Regulations on Treatment and Storage of Radioactive Waste and Safety Management of the Facilities.
- Procedures and Principles for the Recognition of Research and Development Projects for Radioactive Material Operational Technologies and Final Disposal.
- Key Procedures for the Hearing Process on Application for the Construction of Radioactive Material Facilities.
- Operation Directions for Reviewing the Application of Design Modification and Equipment Change on Nuclear Materials and Radioactive Waste Facilities.
- Review Directions for the Safety Analysis Report of Low Level Radioactive Waste Final Disposal Facilities.
- Regulations on Qualifications of Personnel Operating Radioactive Waste Treatment Facilities.
- Directions for the Safety Analysis Report on the Application for Establishing the Spent Fuel Dry Storage Facility.

Two review guides have been established and promulgated as follows:

- Radiation Protection Requirements for Marine Vessels Transporting Low Level Radioactive Waste by Sea.
- Application Guidance for the Use of Low-Level Radioactive Waste Containers.

See sections E.2 and L.1 for additional information.

(2) Ensuring operation safety of facilities

The operators of spent fuel or radioactive waste operating facilities should submit statutory reports or application plans for approval, and submit statutory reports or records periodically, in accordance with the relevant regulations (see sections E.2). The NSC is in charge of review and field inspection of the facilities. All the relevant activities have been implemented accordingly without gross negligence. Please refer to sections G and H for major control measures and management activities.

The Nuclear Safety Commission (NSC) also conducted safety control on TPC's LLW Storage Site (also known as Lanyu Storage Site). After TPC had been finished the repacking activities of the "Implementation Plan for Improving Operation Safety of Lanyu Low-Level Radioactive Waste Storage Facility" by October 2022, the storage site resumed static storage condition. See sections H.2 and H.6 for more information.

(3) NPPs decommissioning

The operating licenses of Unit 1 and 2 of Chinshan NPP expired in December 2018 and July 2019 respectively, and have entered into the decommissioning phase thereafter. According to the provisions of "Nuclear Reactor Facilities Regulation Act," the licensee (TPC) shall submit an application, appending the decommissioning plan, to apply for decommissioning permit 3 years prior to the scheduled permanent cessation of operation of the facilities. The NSC had completed the review of the submitted documents in June 2017; following, the "Environmental Impact Assessment Report" was also approved by the Ministry of Environment (MOENV) in July 2019. A decommissioning permit of Chinshan NPP was then issued by the NSC in July 2019. TPC has to complete decommissioning activities according to the rules in 25 years starting from the date of permit granted, aiming for reuse of the site. As of December 31, 2024, TPC has completed the dismantling of the connecting towers between the four main transformers and the switchyard, the gas turbine generator facilities, and the original 69kV switchyard equipment. See sections D.4 and E.6 for additional information of decommissioning activities and safety regulation measures for the Chinshan NPP.

For Kuosheng NPP, the operating licenses of Unit 1 and 2 have expired in December 2021 and March 2023 respectively. TPC had submitted the Decommissioning Plan and documents to the NSC in Desember 2018, to apply

for a decommissioning permit; and the NSC had completed the review in October 2020.

As for Maanshan NPP, the operating license of Unit 1 has expired in July 2024, and which of Unit 2 will expire in May 2025. TPC had submitted the Decommissioning Plan and documents in July 2021, and the NSC has completed the review in April 2023.

(4) Spent Fuel Dry Storage Facility

The 1st phase outdoor dry storage facility of Chinshan NPP had been constructed. The NSC has requested TPC to actively communicate and coordinate with the New Taipei City Government for the soil and water conservation completion certificate of the facility. Both sides finally reached a settlement in April 2024 after long twists and turns, and the second design change of the soil and water conservation plan was approved in May 2024. As a result, TPC obtained the completion certificate of the facility in October 2024 after related construction finished. After that, TPC began to carry out hot test of the dry storage facilities in October 2024, and completed it in December 2024. For more detailed information, please refer to sections D.1 and G.2.

The construction permit of the 1st phase outdoor dry storage facility of Kuosheng NPP had been granted by the NSC on August 7, 2015, however, due to the run-off wastewater reduction plan for the construction site is not yet approved by the New Taipei City Government; the construction has not been commenced yet. Furthermore, the issue of "Application for Extension of Water Conservation-related Deadlines" has arisen.

After administrative relief, TPC won the "Construction Site Runoff Wastewater Pollution Reduction Plan" lawsuit by the Supreme Administrative Court in April 2023, and the plan was approved by the New Taipei City Government in June 2023. Besides this, the "Application for Extension of Water Conservation-related Deadlines" lawsuit was established through administrative mediation with the New Taipei City Government in June 2024 after administrative relief, and the water conservation plan was approved by the New Taipei City Government in August 2024. Therefore, TPC has started construction in January 2025.

(5) Spent Fuel Final Disposal Project

TPC has been developing spent fuel final disposal technologies according to the critical milestone planning in “Spent Fuel Final Disposal Program Plan,” and submitted “Feasibility Assessment Report for the Spent Nuclear Fuel Final Disposal Technology in Taiwan" (SNFD 2017 Report) as an initial safety case of the 1st stage of the project, the “Potential Host Rock Characterization and Evaluation” stage (2005~2017). The report was subjected to international peer review in accordance with the NSC’s request, for the establishment of deep geological disposal technologies that is in line with international safety level. See also sections G.5 and G.7 for more information.

In 2018, the project has entered the 2nd stage of the project, the “Candidate Site Selection and Approval” stage (2018~2028). The MOEA and TPC are responsible for the siting activities in this stage.

The NSC requires TPC to conduct a rolling review of spent nuclear fuel final disposal technology in accordance with the safety case guidelines issued by the International Atomic Energy Agency (IAEA) and refer to the international peer review of "Feasibility Assessment Report for the Spent Nuclear Fuel Final Disposal Technology in Taiwan" (SNFD 2017 Report) as well as the review opinions of the NSC. Based on the stage of Taiwan's Spent Nuclear Fuel Final Disposal Program and the characteristics of the geological disposal bedrock, it adopts international advanced disposal technology, TPC is required to submit the "Preliminary Development of Pre-Siting Safety Case on the Spent Nuclear Fuel Final Disposal Program" report (SNFD 2021 Report) at the end of 2021, and submits the "Development of Pre-Siting Safety Case on the Spent Nuclear Fuel Final Disposal Program" report (SNFD 2025 Report) before the end of 2025, and completes domestic and international peer review operations to ensure that disposal technology in Taiwan can reach the best existing technology and meet international standards, thereby protecting public safety and environmental sustainability.

In December 2021, TPC submitted the "Preliminary Development of Pre-Siting Safety Case on the Spent Nuclear Fuel Final Disposal Program" report (SNFD 2021 Report), which underwent a comprehensive review by the NSC, ensuring that every aspect was thoroughly examined. The NSC completed the review in December 2022, further affirming the rigor and thoroughness of the process.

The “Spent Nuclear Fuel Final Disposal Program Plan” has to be reviewed and revised every 4 years based on Article 37, Paragraph 2 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act.” The current status and results of the final disposal plan implementation, international development and international cooperation had lately been revised in 2022 (verified by the NSC in September 2023), and the scheduled operation commencement time of the disposal site is in 2055.

(6) LLW Final Disposal Project

The MOEA announced Daren Township (Taitung County) and Wuqiu Township (Kinmen County) are the recommended candidate sites in July 2012; however, they still have to be approved through local referendums in accordance with the “Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility,” and MOEA will conduct and hold the local referendums to decide the candidate site. However, the referendum has not yet been carried out due to the failure to reach a consensus with local governments and the public.

Under the NSC's active supervision of the final disposal of low-level radioactive waste (LLW), TPC was required to submit the "Report on LLW Final Disposal Technical Evaluation" at the end of 2016. The purpose is to review the current status of LLW disposal technology for integration and verification of LLW disposal technology capabilities. After being reviewed by domestic and international peers, the NSC completed the review, filed for reference in September 2017, and required TPC to update the technical feasibility report every four years to keep pace with the international level. (See section H.3).

Subsequently, TPC submitted the "Report on LLW Final Disposal Technical Evaluation (2020 Edition)" in June 2021, and the NSC completed the review and filed for reference in March 2022. Since then, TPC was requested to continue to improve various LLW disposal technologies and update the Technical Assessment Report before the end of 2024 to ensure that LLW disposal technologies meet international standards and enhance the safety of LLW disposal facilities. TPC submitted the " Report on LLW Final Disposal Technical Evaluation (2024 Edition)," which was reviewed by domestic and international peers in December 2024. The NSC is currently reviewing it.

A.4. Measures and Challenges to Improve Safety

Taiwan's commitment to improving its policies and technical practices to manage spent fuel and radioactive waste safely is rooted in its adherence to international standards. By aligning with these standards, Taiwan enhances transparency and public participation, ensuring that its efforts in organizational reform, international cooperation, technological development, and public communication align with the best practices in nuclear safety.

(1) Organizational reform and establishment of a special project office

Taiwan recognizes the Atomic Energy Commission (AEC) into the Nuclear Safety Commission (NSC), an independent nuclear safety regulatory agency dedicated to nuclear safety regulation. The Ministry of Economic Affairs (MOEA) supervises TPC in developing nuclear energy and promoting and managing spent fuel and radioactive waste. This approach complies with international legal requirements and development trends and is conducive to safely controlling spent fuel and radioactive waste. The MOEA has also established a project office for radioactive waste disposal to promote the final disposal of spent fuel and radioactive waste.

(2) Public participation and information transparency

The NSC actively promotes the dissemination of information on radioactive waste disposal. In addition to publishing facility operation and decommissioning plans on its website, it also uses its Facebook fan page to provide various radioactive waste disposal content in a multimedia format. It strengthens the mechanism for clarifying false information to ensure the public obtains correct information. At the same time, through organizing local briefings, local visits, and science exhibitions, the NSC provide opportunities for direct participation in nuclear energy public affairs, enhance the public's understanding and trust in nuclear safety issues, and promote rational dialogue and policy transparency.

(3) International cooperation and technical exchange

Through international cooperation and technical exchanges, the NSC is committed to updating and improving the technical level of safety control of spent fuel and radioactive waste. The NSC continues cooperating with the

United States, Japan, France and other countries. signing agreements such as the Taiwan-France Cooperation Framework Agreement (2019-2024) with France, which includes "Safety Assessment and Risk Management Research for Deep Geological Disposal of High-Level Radioactive Waste" and "Underground Research Laboratory (URL)" to carry out scientific and technological research cooperation. In addition, the annual Taiwan-US and Taiwan-Japan nuclear safety exchange meetings are held to facilitate information exchange and technical interaction, even through video during the COVID-19 epidemic.

(4) Challenges and future development

The construction and operation of dry storage facilities and the siting of radioactive waste facilities are essential issues in safely managing spent fuel and radioactive waste in Taiwan. Because dry storage facilities are an essential part of spent fuel management, the NSC strictly supervises the construction of dry storage facilities by TPC at Chinshan NPP and Kuosheng NPP. The dry storage facility of Chinshan NPP has completed hot testing, and the NSC will subsequently conduct a safety review of the operating license. In addition, the dry storage facility of Kuosheng NPP started construction in January 2015, and the NSC regularly conducts facility inspections to supervise construction quality.

Public communication is the key to the site selection of radioactive waste facilities. The NSC requires TPC to refer to the international practical experience of site selection of radioactive waste facility and strengthen consultation with local governments and communication with residents. Strengthening public communication and gaining consensus and recognition can smoothly promote site selection and construction operations.

B. POLICIES AND PRACTICES

Article 32, Reporting, Paragraph 1

In accordance with the provisions of Article 30, each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party the report shall also address its:

(i) spent fuel management policy;

(ii) spent fuel management practices;

(iii) radioactive waste management policy;

(iv) radioactive waste management practices;

(v) criteria used to define and categorize radioactive waste.

B.1 Policies of Spent Fuel or Radioactive Waste Management

To control radioactive materials, prevent radioactive hazards, and ensure public safety, the policies on spent fuel and radioactive waste management of Taiwan follow the related safety guides proposed by the IAEA, for instance “Fundamental Safety Principles” (IAEA Safety Standards Series No. SF-1) and “Predisposal Management of Radioactive Waste” (IAEA Safety Standards Series No. GSR Part 5), including concepts such as ensuring the protection of people and the environment, both now and in the future; the generation of radioactive waste must be kept to the minimum practicable level; the relationships between each steps of generating and management of radioactive waste has to be considered and properly arranged; the safety of the facility has to be considered to ensure that safety is optimized.

B.2 Practical Measures of Spent Fuel Management

(1) Spent Fuel of NPPs

When spent fuel has just been discharged from the reactors, they have to be stored in the spent fuel pools of the NPPs for decay before further managed, because of the high activity and heat they are generating. Present spent fuel management strategies of Taiwan are “storage in spent fuel pools for the short term; dry storage for the medium term; and final disposal for the long term.” These strategies will be adjusted according to the domestic development and international situations.

Spent fuel will be stored in the spent fuel pools when removed from the reactors. TPC is now endeavoring to carry out the spent fuel dry storage plans of Chinshan and Kuosheng NPPs to provide the long-term safe storage needs of spent fuel and facilitate decommissioning operations. The spent fuel pool of Maanshan NPP is capable of accommodating spent fuel generated during its’ 40 years operation.

Dry storage facilities are essential to the decommissioning of NPPs in Taiwan. Spent fuel has to be moved from the reactor buildings to the dry storage facilities as soon as possible so that the decommissioning and dismantling activities can be carried out. For this reason, the NSC has urged TPC to actively promote the construction of dry storage facilities.

As for the final disposal of spent fuel, TPC submitted the “Spent Fuel Final Disposal Program Plan” to the NSC based on the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act.” There are 5 stages included in the final disposal project: “Potential Host Rock Characterization and Evaluation,” “Candidate Site Selection and Approval,” “Detailed Site Investigation and Testing,” “Repository Design and Safety Assessment,” and “Repository Construction.” The repository is scheduled to start operating in 2055. Currently, the project has entered the 2nd stage, “Candidate Site Selection and Approval” stage (2018~2028).

(2) Spent Fuel of Research and Educational Reactors

The management policy for spent fuel removed from the research and educational reactors (NARI and NTHU) is to ship to the United States where it was manufactured.

B.3 Practical Measures of Radioactive Waste Management

(1) Radioactive Waste from NPPs

Practical measures of radioactive waste from NPPs include source control of liquid radioactive waste, control of chemical, reduction of radioactive waste, solidification of sludge from liquid radioactive waste and reactor water, volume reduction of combustible and compactable radioactive waste, and operation of LLW storage facilities, and so on.

Radioactive waste can be divided into two categories according to their properties: wet radioactive waste and dry radioactive waste. Wet radioactive waste mainly includes concentrated sludge, filtered sludge, and spent resin. Those (besides spent resin) are usually cement solidified, and packaged in 55-gallon galvanized steel drums. Spent bead resin, on the other hand, is dewatered without cement solidification, and temporarily stored in 55-gallon galvanized steel drums with HDPE (High Density Polyethylene) liners. Dry radioactive waste mainly includes paper, clothes, plastic, wood, and metal. Those combustible are incinerated, those compactable are compacted, so the volume of the waste can be reduced, and then packaged in 55-gallon galvanized steel drums.

Radioactive waste generated by NPPs is stored in the storage facilities of each NPP respectively, except for those stored in LLW Storage Site before 1996.

Based on Article 29, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” TPC has the responsibility of the treatment, transportation, storage, and final disposal of radioactive waste itself solely or entrusted to the entrepreneur’ who or which is of technical capability of finally disposing of the domestic or foreign radioactive waste, or holds the facilities thereof. TPC shall be responsible for minimizing the generation amount and volume of radioactive waste generated by NPPs. As stipulated in Article 30, the final disposal facilities of radioactive waste shall receive the radioactive waste generated by the whole country.

(2) Radioactive Waste from Small Users

NARI is responsible for collecting, treatment, and storage of radioactive waste from medical, industrial, research activities, and itself. The policies of radioactive waste management of NARI include improving radioactive waste treatment and storage technologies (such as volume reduction of radioactive waste, integration of management process, development of radioactive waste container, and reduction of secondary waste), and improving operational safety of the facilities (such as modernization of the storage facilities, improvement in the operation management, and seismic-resistance evaluation of the facilities and related improvement).

The treatment measures of SURW are: liquid radioactive waste is cement solidified after being condensed by an evaporator, or absorbed and ion exchanged by a fluidized bed; contaminated metal is melted by a furnace after being decontaminated by chemical/mechanical decontamination equipment; compactible or combustible radioactive waste is compacted by a compactor or incinerated by an incinerator. The treated radioactive waste is packaged into 55-gallon galvanized steel drums, and stored in the storage facilities safely.

The quantity, nuclides, and activity of radioactive waste generated by THOR are relatively smaller quantity and simpler than those of commercial NPPs. The radioactive wastes generated by THOR can be classified into three types: gas, liquid, and solid waste, are all properly treated and controlled according to relevant regulations. The radioactive gas is collected by induced draft fan system, and released to the atmosphere after compliance with the regulations is verified. The liquid radioactive waste is temporarily stored for 50~60 days before transferring to liquid radioactive waste storage plant, and will be discharged after compliance with the regulations is verified. For those cannot be discharged, will be collected to NARI for treatment. Solid radioactive waste (ion exchange resin, chemical sludge, and irradiated or contaminated items) is packaged and temporarily stored in radioactive waste storage room, and then it will be transferred to NARI for further treatment.

B.4 Criteria for Definition and Classification of Radioactive Waste

The Article 4 of the “Nuclear Materials and Radioactive Waste Management Act” defines "radioactive waste" as discarded material that is radioactive or is contaminated by radioactive substances, including spent fuel, ready for final disposal. The Article 4 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act” classify radioactive waste into high-level and low-level radioactive waste.

(1) High-level radioactive waste (HLW): the spent fuel for final disposal or the extraction residuals generated in reprocessing.
(2) Low-level radioactive waste (LLW): the radioactive waste other than described above.

Taiwan’s policies on spent fuel management do not exclude reprocessing, but they have not been implemented so far; therefore, high-level waste is referred to as spent fuel in Taiwan.

Practically, low-level radioactive waste can be classified under various principles. Based on the origins of radioactive waste, it can be divided into radioactive waste from NPPs and radioactive waste from small users. Based on the treatment measures, radioactive waste from NPPs can be further divided into wet radioactive waste and dry radioactive waste. Based on transportation requirements, it can be divided into excepted, industrial, type A, type B, type C, fissile, and UF_6 packages according to limits of activity and materials of the packages (“Rules for the Safe Transport of Radioactive Material,” IAEA Safety Requirements No. SSR-6).

Due to long-term safety considerations, the classification criteria regarding the final disposal of LLW are stated in the “Regulations on Final Disposal of Low-Level Radioactive Waste and Safety Management of the Facilities.” According to the limits of radionuclide concentrations, it can be divided into class A, class B, class C, and greater than class C (GTCC). Solidification should be applied to class B and C radioactive waste. Besides solidification, reinforcement of the engineering design of the final disposal panel of class C radioactive waste should also be considered. As for GTCC, radioactive waste

cannot be disposed in LLW final disposal facility unless approved by the regulatory authority.

Radioactive waste with activity or specific activity below certain values almost does not influence on public health and the environment. The NSC has proposed “Regulations on Clearance Level for Radioactive Waste Management,” referring to the IAEA and other countries, to release radioactive waste with activity or specific activity below the clearance level. When radioactive waste decays to a certain level, the activity meets the release criteria in the regulations. Such as Article 6 of the Regulations require, the effective doses to individual members of the public shall not exceed 0.01 mSv/a, and annual collective dose shall not exceed 1 person-Sv caused by the release radioactive waste.

The radioactive waste can be released after the radiation dose evaluation report and the release plan are approved by the NSC. The "Guides for Release Plans on Clearance Level for Radioactive Waste" stated the content and format of the release plan for companies applying for release operations of radioactive waste below clearance level. According to Article 3 of the Guides, the summary of the release plan should be detailed in terms of management organization and responsibilities, sources and characteristics, measurement and analysis methods, release methods and locations, quality assurance projects and matters designated by the competent authority.

C. SCOPE OF APPLICATION

Article 3 Scope of Application

1. This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.
2. This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.
3. This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed within exclusively civilian programmes.
4. This Convention shall also apply to discharges as provided for in Articles 4, 7, 11, 14, 24 and 26.

This National Report applies to spent fuel or radioactive waste generated from all nuclear and civilian applications (including NPPs and other small users).

(1) Reprocessing of Spent Fuel

This National Report does not apply to radioactive waste management derived from reprocessing of spent fuel, because reprocessing of spent fuel has not been implemented in Taiwan so far.

(2) Naturally Occurring Radioactive Materials (NORM)

This National Report does not apply to management of NORM and statutory exemption of radioactive waste.

(3) Spent Fuel and/or Radioactive Waste within Military or Defence Programs

Currently, there is no nuclear fuel within the military or defense programs of Taiwan (either fresh or spent). For radioactive material and equipment capable of producing ionizing radiation in the possession of a military agency, their radiation protection practice and regulation shall be regulated by a separate code laid down by the competent authority (NSC) in consultation with the Ministry of National Defense (MND), in accordance with provisions of Article 54 of the “Ionizing Radiation Protection Act;” and the “Regulations on Radiation Protection and Control for Military Agencies” was therefore proposed on February 26, 2003. The management of radioactive waste within military or defence programs follows the regulations stated above, and is not included in this National Report.

(4) Discharge of Radioactive Waste

This National Report applies to gas and liquid waste discharged from spent fuel or radioactive waste facilities.

D. INVENTORIES AND LISTS

Article 32 Reporting, Paragraph 2

This report shall also include:

(i) a list of the spent fuel management facilities subject to this Convention, their locations , main purposes , and essential features;

(ii) an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;

(iii) a list of the radioactive waste management facilities subject to this Convention, their locations , main purposes and essential features;

(iv) an inventory of radioactive waste that is subject to this Convention that:

(a) is being held in storage at radioactive waste management and nuclear fuel cycle facilities;

(b) has already been disposed of; or

(c) has resulted from past practices.

This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity, and specific radionuclides;

(v) a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.

D.1 Lists of Spent Fuel Management Facilities and Inventories

(1) NPPs

The spent fuel generated from commercial NPPs is presently stored in spent fuel pools. Spent fuel pools of NPPs and spent fuel inventories are listed in Table D-1.

Table D-1. Spent Fuel Pools of NPPs and Spent Fuel Inventories

Facility Name	Unit	Storage Capacity (Bundle)	Currently Stored (Bundle)	Total Uranium Weight (kg)
Chinshan NPP (BWR)	Unit 1	3,083	2,982	511,300.9
	Unit 2	3,083	3,076	528,567.1
Kuosheng NPP (BWR)	Unit 1	4,838	4,808	807,970.7
	Unit 2	4,838	4,812	808,488.5
Maanshan NPP (PWR)	Unit 1	2,160	1,879	749,606.3
	Unit 2	2,160	1,749	697,527.3
Total		20,162	19,306	4,103,460.8

1. Spent fuel in reactor cores is not included in this table.
2. In May 2017 and January 2019, the NSC agreed to the storage space for 440 bundles of spent fuel in the cask loading pools of Units 1 and 2 of the Kuosheng NPP.
3. Updated to December 26, 2024. For the current operating status of NPP, please refer to the NSC's NPP Real-time Information webpage.

Chinshan NPP, Kuosheng NPP, and Unit 1 of Maanshan NPP have entered the decommissioning phase in 2018, 2021, and 2024. The key of decommissioning is to remove spent fuel from the reactor. After evaluation of technical feasibility, storage safety, and social, economic, and environmental impacts, TPC decides to build dry storage facilities at Chinshan and Kuosheng NPP to store the spent fuel.

TPC entrust NARI to construct Chinshan dry storage facility. The storage cask system INER-HPS is transferred from NAC-UMS and designed and manufacture by NARI. Each cask is capable of storing 56 bundles of spent fuel. The storage capacity of the facility is 1,680 spent fuel assemblies. The facility’s construction has been finished, and the pre-operation test was completed on December 18, 2024. There were 112 bundles of spent fuel removed from the fuel pool to the dry storage facility. (Figure D-1).

Figure D-1. Spent Fuel Outdoor Dry Storage Facility of Chinshan NPP

The construction of Kuosheng dry storage facility has been jointly contracted to CTCI Machinery Corporation of Taiwan and NAC International by TPC. There will be 27 MAGNASTOR type concrete casks installed in the facility, each is capable of storing 87 spent fuel assemblies. The planned storage capacity is 2,349 bundles of spent fuel. The construction license has been approved by the NSC at present on August 7, 2015.

Please refer to Table D-2 for basic information of the spent fuel outdoor dry storage facilities of Chinshan and Kuosheng NPPs.

Table D-2. Basic Information of the Dry Storage Facilities

Facility	Storage Cask Type	# of Storage Cask	Storage Capacity of the Cask (Bundle)	Total Storage Capacity (Bundle)	Current Status
Dry Storage Facility of Chinshan NPP	INER-HPS	30	56	1,680	Operating license application in progress
Dry Storage Facility of Kuosheng NPP	MAGNASTOR	27	87	2,349	Under construction

(2) Small Users

Most of the spent fuel of TRR was shipped back to the U.S. A., and the rest is stored in the centralized warehouse of NARI. Liquid spent fuel removed from WBR has been packaged in 20-L drums, and stored in the centralized warehouse of NARI. As for the spent fuel removed from ZPRL all had been shipped back the U.S. by July 19, 2009.

On the other hand, U-235 (enrichment 19.8%) spent fuel removed from THOR is stored in THOR spent fuel pool. See Table D-3 for more information.

Table D-3. Inventories of Nuclear Materials of Small Users

Facility	Inventory	Source	Storage Location
NARI	· Natural uranium: 129,361.433 kgs · Depletion uranium: 27,046.429 kgs · Low-enriched uranium:14.611kgs	Uranium sludge in the TRR spent fuel pool, stabilized spent fuel, and test samples, etc.	Mainly stored in centralized warehouse and hot cells.
NTHU	Low-enriched and High-enriched uranium: 84.467 kgs	· Low-enriched uranium (enrichment 19.8%) · High-enriched uranium: high-enriched uranium fission chamber (HEU F.C.) for neutron detection.	THOR spent fuel pool

Updated to January 15 2025.

D.2 Lists of Radioactive Waste Management Facilities and Inventories

(1) NPP Radioactive Waste Management Facilities

Gas radioactive waste, liquid radioactive waste, and solid radioactive waste treatment systems are included in the radioactive waste treatment system of Chinshan NPP. Liquid radioactive waste treatment, demineralization, clarification of spent fuel pools, clarification of core water, and evaporation treatment of liquid radioactive waste are the main sources of wet radioactive waste.

Currently, there are 2 LLW storage buildings in Chinshan NPP; an LLW trench has completed clearance and decommissioning operations, and the NSC agreed to approve the lifting of decommissioning controls on August 17, 2022. The sorage amount of Chinshan NPP is 43,902 drums (updated to the end of December 2024).

Gas radioactive waste, liquid radioactive waste, solid radioactive waste treatment systems, high volume-reduction solidification systems, combustible radioactive waste incinerator (volume reduction center, VRC), and super compacter (VRC) are included in the radioactive waste treatment systems of Kuosheng NPP.

Currently, there are 3 LLW storage buildings, a LLW temporary storage area, and a LLW trench in Kuosheng NPP. The storage amount of Kuosheng NPP is 59,501 drums (updated to the end of December 2024).

Gas radioactive waste, liquid radioactive waste, and solid radioactive waste treatment systems, high volume-reduction solidification systems, and LLW incinerator are included in the radioactive waste treatment systems of Maanshan NPP.

Currently, there are 4 LLW storage areas and one LLW storage facility (operated in 2012) in Maanshan NPP. The storage amount of Maanshan NPP is 10,148 drums (updated to the end of December 2024).

The storage amount of LLW will be further reduced by volume reduction and stabilization in complies with “The Nuclear Materials and Radioactive Waste Management Act,” (Article 29, Paragraph 1), and the storage capacity of each NPP is capable of storing LLW generated before the decommissioning of the NPPs. Currently, the operations and management of radioactive waste of each NPP are all working normally.

LLW Storage Site (Figure D-2) is located in the southeastern part of Orchid Island, and it is an off-site storage facility which has 23 underground engineered trenches. From 1982 to May 1996, LLW Storage Site had received 97,672 drums of LLW (55 gallons each). Inspection and repacking activities of the LLW Storage Site had been taken place from December 2007 to June 2012. And the amount of LLW was increased to 100,277 drums. In November 2019, the TPC had started another repacking activity of LLW (Figure D-3) for the preparation of relocation. The repacking activities had been finished on October 20, 2022.

Figure D-2. LLW Storage Site in Orchid Island

Figure D-3. Repacking Activities in the LLW Storage Site

Lists of TPC LLW storage facilities and inventories are shown in Table D-4.

Table D-4. LLW Storage Facilities and Inventories

	Storage Facility	Storage (Drum)	Overview	Total Amount (Drum)
Chinshan NPP	Storage Building #1	16,338	Spent bead resin and compactable radioactive waste mainly.	43,902
	Storage Building #2	27,564	Solidified, combustible, and other radioactive waste mainly.	
Kuosheng NPP	Storage Building #1	0	None.	59,501
	Storage Building #2	33,771	Solidified radioactive waste, spent bead resin, insulation materials, and compressed discus mainly.	
	Storage Building #3	25,562	Solidified radioactive waste, insulation materials, and compressed discus mainly. Currently inspecting corrosion of the solidified drums.	
	Temporary storage area	168	Radioactive waste of all kinds.	
	Trench	0	Cleanup for decommissioning.	
Maanshan NPP	Storage Area #1	1,490	Dewatered resin, combustible radioactive waste, spent resin, and sludge.	10,148
	Storage Area #2	246	Solidified radioactive waste, dewatered resin, compactable radioactive waste, ash, spent resin, sludge, bottom ash, and spent resin.	
	Storage Area #3	0	None.	
	Storage Area #4	0	None.	
	LLW Storage Building	8,412	Radioactive waste of all kinds.	
LLW Storage Site	Trench	100,277	Receiving LLW from 1982 to 1996.	100,277
Total				213,828

1. The capacity is estimated on the basis of 55-gallon drum.
2. Updated to the end of December 2024.

(2) Small User Radioactive Waste Management Facilities

There are 13 radioactive treatment and storage facilities in NARI; 4 of them are treatment facilities and 9 of them are storage facilities. There is 1 LLW temporary storage area in NTHU; and all of the LLW will be transferred to NARI for further treatment and storage, for there is no solid radioactive waste treatment facility in NTHU. All of the SURW treatment and storage facilities are safely operating under safety regulation and environmental radiation monitoring. Please refer to Table D-5 and Table D-6 for more information. Total of 18,031 drums of SURW and 14,802 sealed radioactive sources are in storage to the end of December 2024.

Table D-5. SURW LLW Treatment Facilities

Facility	Purpose	Current Status
Liquid LLW Treatment Plant (Building 064、015B)	Treatment and storage of liquid radioactive waste.	Operating
Metal Scraps Melting Plant (Building 017)	Melting of LLW contaminated metal.	Operating
Radioactive waste incinerator (Building 018)	Incinerating of combustible radioactive waste.	Operating
Plasma furnace (Building 018)	Plasma melting of solid radioactive waste.	Decommissioning

Updated to the end of December 2024.

Table D-6. SURW LLW Storage Facilities and Inventories

Facility	Purpose	Current Status	Capacity	Inventory	Note
NARI					
Radioactive Waste Storage Facility #1 (Building 015V)	Storage of transuranic waste (TRU waste).	Operating	551 drums	505 drums	
Radioactive Waste Storage Facility #2 (Building 015K)	Storage of non-combustible solid radioactive waste.	Operating	5,868 drums	5,521 drums	Currently, 308 disused sources are also stored in the building.
Radioactive Waste Storage Facility #3 (Building 067)	Storage of solid radioactive waste and high-activity solid radioactive waste.	Operating	8,900 drums	7,130 drums	Currently, 297 disused sources are also stored in the building.
Radioactive Waste Storage Facility #3 (Building 075)	1 F: storage of large and irregular non-combustible solid radioactive waste. 2 F: storage of combustible radioactive waste.	Operating	1,800 drums	720 drums	Currently, 14,197 disused sources are also stored in the building.
High-activity Radioactive Waste Underground Storage Facility (Building 015D)	Storage of high-activity radioactive waste and disused sources.	Decommissioning	288 drums	0 drums	Decommissioning
Very Low Contaminated Soil Underground Storage Facility (Building 066)	Storage of very low contaminated soil.	Operating	16,087 m^3	16,011 m^3	
TRR (Building 012)	Storage of TRR decommissioning waste.	Operating	3,414 drums	542 drums	
Retention sump (Building 012)	Storage of TRR decommissioning waste.	Operating	744 drums	300 drums	
Building 074	TRR vessel.	Operating	TRR vessel.	TRR vessel.	

1. The capacity is estimated on the basis of 55-gallon drum.
2. Updated to the end of December 2024.

D.3 Disposed Radioactive Waste and Past Practices

Currently, there is no final disposal facility in Taiwan, and TPC is endeavoring to carry out the final disposal plan presently. All of the radioactive waste is safely stored in the existing storage facilitiesl for now.

To solve the dilemma of the final disposal of radioactive waste in Taiwan, the Executive Yuan National Sustainable Development Council's Nuclear-Free Homeland Promotion Task Force (hereinafter referred to as the Executive Yuan Nuclear-Free Homeland Task Force) has asked TPC to actively promote the construction of a mid-term temporary storage facility for radioactive waste and initiate social communication to serve as a relay station before the final disposal of radioactive waste and continue to promote the final disposal plan.

D.4 Lists of Decommissioned Facilities and Status of Decommissioning Activities

The decommissioning of NPPs is an important issue of Taiwan. The NSC has established a thorough laws and regulations system of NPP decommissioning activities, and has actively participate in international NPP decommissioning technical conferences, to keep relevant technologies and knowledge up to date. Relevant information is also published on the NSC's website, for information disclosure and better public participation.

The decommissioning activities of nuclear facilities in Taiwan are stated as follows:

(1) NPPs

The operating license of Chinshan NPP was expired in July 2019; Chinshan NPP has been permanently shut down since then. TPC submitted the "Decommissioning Plan of Chinshan NPP" to the NSC in compliance with Article 23 of the "Nuclear Reactor Facilities Regulation Act" in November 2015, and the plan was approved in June 2017; together with the "Environmental Impact Assessment Report" approved by EPA in July 2019, a decommissioning permit of Chinshan NPP was then issued by the NSC in July 2019.

TPC had submitted the “Decommissioning Plan of Kuosheng NPP” to the NSC in December 2018, and the according review was conducted from January 21, 2019 to October 20, 2020.

As for Maanshan NPP, the Decommissioning Plan had ben submitted to the NSC in July 2021, and the according review was conducted from August 23, 2021 to April 24, 2023.

(2) SURW

(A) NARI

TRR was shut down in January 1988. Since October 1988, unnecessary systems had been removed from the reactor, and the reactor was then sealed. The sealed reactor was removed to the dismantling building in November 2002, and has been monitored using radiation detectors, strain gauges, settlement meters, inclinometers, and seismographs and so on. In April 2004, the NSC approved the Decommissioning Plan of TRR, and the following decommissioning activities have been started. Decontamination of the spent fuel pool was completed in 2018; and relevant technologies had been established include decontamination of high-contaminated materials, dismantling of concrete structures of nuclear facilities, treatment of liquid radioactive waste, reduction of secondary waste, whole system decontamination of nuclear facilities, and management of the dismantling.

The Decommissioning Plan of WBR was approved and started implementing in May 1997. December 1997, system equipment was dismantled, and the reactor core and all of the contaminated systems and equipment in the reactor building were removed. December 2007, the remaining biological shielding was dismantled, and the decommissioning of WBR was completed.

The operation of ZPRL was temporarily stopped in December 2005. July 2009, all of the spent fuel was transferred to the U.S. January 2010, ZPRL was permanently shut down, and the Decommissioning Plan was approved in July 2013. Currently, ZPRL is under decommissioning.

Regarding the decommissioning status of the NARI's radioactive waste facilities, the low-level radioactive waste storage facilities include the underground storage of spent resins, which was cleaned and

decontaminated in December 2018 and decommissioned in February 2020 and the decommissioning regulations was lift; the decommission of underground storage of spent fuel casings was completed in October 2021 and the decommissioning regulations was lift; the temporary flammable waste storage facility (015F) submitted a decommissioning plan in July 2021, and the NSC approved the decommissioning in February 2022. The decommissioning was completed in December 2022, and the decommissioning regulations was lift. The underground high-activity waste storage facility (015D) submitted a decommissioning plan in August 2021, and the NSC approved the decommissioning in April 2022. The decommissioning is currently underway. In addition, the decommissioning plan for the plasma incineration and melting furnace (018) in the low-level radioactive waste treatment facility was submitted in January 2021. The NSC approved the decommissioning in October 2021 and is currently underway.

(B) NTHU

THAR had completed decommissioning in 1993. The spent fuel and the generated radioactive waste were transferred to NARI for storage; and the former was further shipped back to the U.S. in July 2009.

THMER had completed decommissioning in September 2003. The spent fuel was transferred to NARI for storage, and the generated radioactive waste with activity or specific activity below certain values was currently stored on site.

E. LEGISLATIVE & REGULATORY SYSTEMS

Article 18 Implementing Measures

Each Contracting Party shall take, within the framework of its national laws, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under this Convention.

E.1 Implementing Measures

Although Taiwan is not a Contracting Party of the Convention, we have still established a comprehensive regulatory framework following the requirements of the Convention. Paragraph 1 of Article 17 of the “Nuclear Materials and Radioactive Waste Management Act” explicitly stipulates that radioactive waste treatment, storage, and final disposal facilities shall comply with requirements set forth by the relevant international conventions. The government will follow the related laws and regulations to adopt all the regulatory, administrative measures, and other actions necessary to ensure that the management of spent fuel and radioactive waste meets the safety standards required by the Joint Convention.

E.2 Legislative and Regulatory Framework

Article 19 Legislative and Regulatory Framework

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.
2. This legislative and regulatory framework shall provide for:
   (i) the establishment of applicable national safety requirements and regulations for radiation safety;
   (ii) a system of licensing for spent fuel and radioactive waste management activities;

(iii) a system of prohibition for the operation of a spent fuel or radioactive waste management facility without a license;
(iv) a system of appropriate institutional control, regulatory inspection and documentation and reporting;
(v) the enforcement of applicable regulations and of the terms of the license;
(vi) a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and radioactive waste management.

3. When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall take due account of the objectives of this Convention.

The legislative and regulatory framework of Taiwan can be divided into three tiers (Figure E-1): the first tier describes “Acts” that shall be passed by the Legislative Yuan then signed and promulgated by the President; the second tier regards “Legal Orders” which include Regulations and Standards laid down by Regulatory Bodies under the authorization of the aforementioned Acts; the third tier details the “Administrative Rules” written by Regulatory Bodies for the operation of the Regulatory Bodies based on their authority, those Administrative Rules include Guidelines, Points, and Policies and so on. The establishment of Legal Orders and Administrative Rules shall follow related requirements in compliance with the “ Administrative Procedure Act” (Chapter IV). Legal Orders shall be approved by superior authorities and published in government gazettes or newspapers. Administrative Rules, on the other hand, shall be directed to lower units or subordinate officers. Administrative Rules are provisions of an interpretation nature and guidelines on the exercise of discretion in making consistent interpretation of laws and regulations, finding the facts, and exercising the power of discretion; they shall be signed by the head officers of the competent authorities, and released by publishing in government gazettes.

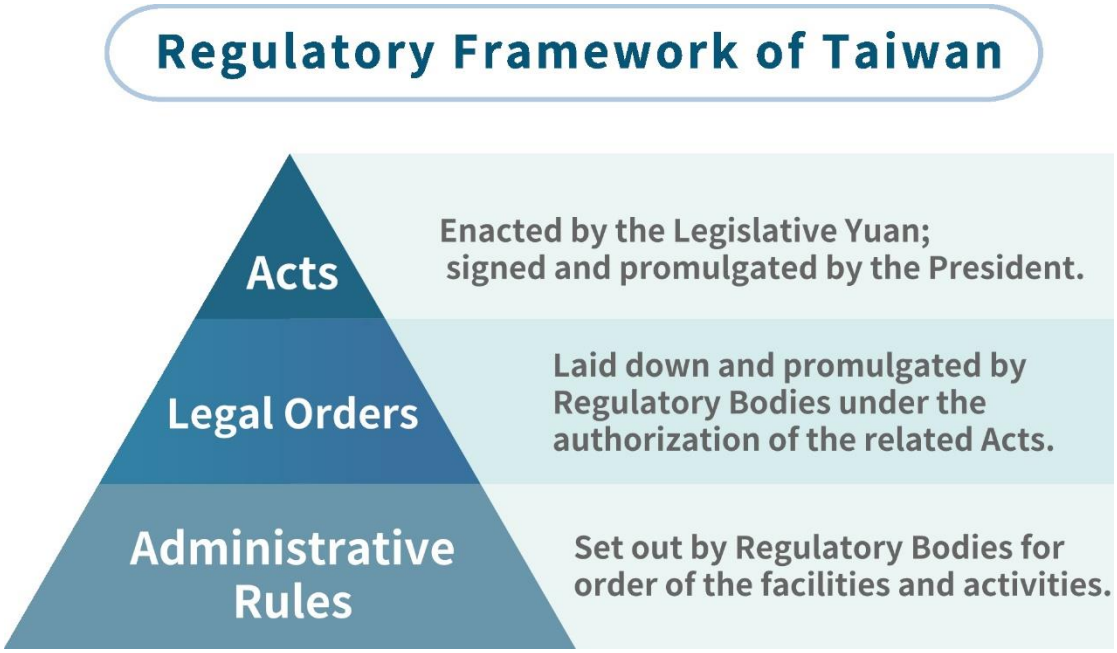

Figure E-1. Regulatory Framework of Taiwan

During drafting of Legal Orders, relevant authorities should be consulted; also, expert advices and opinions from conferences and public hearings should be taken into account, for the thoroughness and practicality of the Legal Orders. In practice, safety regulations proposed by the IAEA, Federal regulations of USNRC (U.S. Nuclear Regulatory Commission), and regulations from other countries are all important references to the establishment of the drafting of Legal Orders in Taiwan, regarding radioactive waste. Moreover, the NSC reviews the Legal Orders each year, to make sure that the regulatory system is advancing with the times.

(1) Safety Requirements and Regulations for Radiation Safety

"Nuclear Materials and Radioactive Waste Management Act," which is the competent legal of nuclear materials, nuclear fuel, and radioactive waste in Taiwan, was promulgated in 2002. The competent authority of the Act is the Nuclear Safety Commission (NSC). There are 5 chapters in the "Nuclear Materials and Radioactive Waste Management Act," the Chapter 1 is the General Principles, which states the legislative purpose of the Act, and that is to manage radioactive waste properly in order to control its radioactive hazards and thereby ensure public safety; the Chapter 2 is the Regulation of Nuclear Source material and Nuclear Fuel; the Chapter 3 is the Regulation of Radioactive Waste; the Chapter 4 is the Penal Provisions, which adopt both

administrative penalty and administrative order penalty as effective means to achieve the regulatory purposes; the Chapter 5 is the Supplemental Provisions. The establishment of Legal Orders and Administrative Rules relating to this Act are authorized to the competent authority.

The NSC has established related Legal Orders regarding detailed regulatory requirements of safe control of radioactive materials and their corresponding facilities. Administrative Rules such as “Safety Analysis Report Guides for Radioactive Materials Facilities” are also proposed, for interpretation of laws and regulations, finding the facts, exercising the power of discretion and for reference by facility operators. For more information, please refer to Section L.1.

“Ionizing Radiation Protection Act,” the competent legal of radiation source regulation, was promulgated in 2002. The competent authority of the Act is also the Nuclear Safety Commission (NSC). In coordination with the regulatory system of radioactive waste, the relevant regulations related to safety control of radiological protection are divided into four parts as follows:

- Relevant organizations or personnel of radiation protection: “Standards for Establishment of Radiation Protection Management Organizations and Radiation Protection Personnel” and “Administrative Regulations for Radiation Protection Personnel.”
- Personnel dose: “Safety Standards for Protection against Ionizing Radiation”
- Environmental radiation surveillance of radiation workplace: “Regulations for Management of Radiation Workplaces and Environmental Radiation Monitoring outside Them”
- Transportation Control of radioactive material: “Regulations for the Safe Transport of Radioactive Material”

The "Nuclear Reactor Facilities Regulation Act," the enabling statute for regulating nuclear reactors, research nuclear reactors, and their facilities, was promulgated and implemented in 2003. Its competent authority is the NSC, which is divided into five chapters. Chapter 1 is the General Principles, which clearly state that the purpose of the legislation is to regulate nuclear reactor facilities and ensure public safety. Chapter 2 is the Regulation of Construction and Operation, and Chapter 3 is the Regulation of Off-Commissioning and

Decommissioning. Chapter 4 is the Penal Provisions. For violations of the provisions of this Law, administrative penalties and administrative order penalties are adopted to achieve the regulation purpose effectively. Chapter 5 is the Supplemental Provisions. Regulations orders, and administrative rules related to this Act shall be authorized to be separately enacted by the competent authority.

The NSC has made changes of the Legal Orders and Administrative Rules regarding the management of spent fuel and radioactive waste:

- Revision and promulgation of “Regulations for the Review and Approval of Applications for Construction License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities”: It requires applicant apply for construction license of spent fuel and radioactive waste treatment, storage, or final disposal facilities shall hold the public explanatory meetings before submitting the application to provide information on facility safety analysis to facilitate communication so that the public can understand the safety issues related to the facility application and provide opinions.
- Revision and promulgation of “Regulations on Treatment and Storage of Radioactive Waste and Safety Management of the Facilities”: It requires that the containers can only be used after having been approved. The applicant shall submit a report including the technical feasibility assessment on the containers in each stage of the radioactive waste operations.
- In conjunction with the reorganization of the Atomic Energy Council (AEC) into the Nuclear Safety Commission (NSC) and to bring the content of laws and regulations into line with the current situation, several laws and regulations, and administrative rules have been revised and promulgated, including the “Regulations on Qualifications of Personnel Operating Radioactive Waste Treatment Facilities,” “Operation Directions for Reviewing the Application of Design Modification and Equipment Change on Nuclear Materials and Radioactive Waste Facilities,” “Review Directions for the Safety Analysis Report of Low Level Radioactive Waste Final Disposal Facilities,” and “Directions for the Safety Analysis Report on the Application for Establishing the Spent Fuel Dry Storage Facility.”

- Promulgation of “Radiation Protection Requirements for Marine Vessels Transporting Low Level Radioactive Waste by Sea.”
- Promulgation of “Application Guides for Use of Containers for Low-Level Radioactive Waste.”

(2) Lisencing and prohibition of operation without license

According to the requirements outlined in the “Nuclear Materials and Radioactive Waste Management Act,” the competent authority (NSC) approval must be obtained before the construction, operation, permanent cessation, and decommissioning of radioactive waste facilities. Any other related operations of radioactive waste are the same.

As stipulated in Article 17, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” for the construction of treatment, storage or final disposal facilities of radioactive waste, an application for construction license shall be submitted to the competent authority (NSC), and the construction shall not commence until the application has been reviewed and approved to meet the following provision and the competent authority (NSC) has issued a construction license therefor.

As stipulated in Article 18, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” even after the completion of the construction of treatment, storage or final disposal facilities of radioactive waste, the facilities shall not be formally operated without approval from the competent authority and the issuance of an operating license.

According to Article 27 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” the validity period of an operation license granted is up to 40 years for treatment facilities or storage facilities of radioactive waste, and is up to 60 years for final disposal facilities.

The NSC has granted the operating license of LLW thermal treatment and volume reduction system facility for Maanshan NPP in December 2020. Furthermore, the NSC has issued the construction license of LLW storage facilities for the decommissioning of Chinshan NPP in July 2024.

(3) Control, Regulatory Inspection, Documentation, and Reporting

According to Article 19, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” during the construction or operation period of treatment, storage or final disposal facilities of radioactive waste,

neither of the design amendment nor equipment change, if involved in the significant safety items, shall be made without an application therefor submitted to and approved by the competent authority.

As stipulated in Article 20 of the “Nuclear Materials and Radioactive Waste Management Act,” the operator of treatment, storage or final disposal facilities of radioactive waste shall submit regularly to the competent authority the reports related to operation, radiation protection, environmental radiation monitoring, abnormal or emergency event, and any other reports designated by the competent authority; and the competent authority shall publicize the relevant reports.

As stipulated in Article 23, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” for the permanent cessation of operation of treatment or storage facilities of radioactive waste, the operator shall prepare a decommissioning plan and shall implement it after the same has been reported to and approved by the competent authority. As stipulated in Article 23, Paragraph 2 of the Act, for the closure of the final disposal facilities of radioactive waste, the operator shall prepare the closure plan and the institutional control plan and shall implement the same after they have been reported to and approved by the competent authority.

As stipulated in Article 25, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” unless approved by the competent authority, the radioactive waste shall not be imported, exported, transited, transshipped en route, transported, discarded, or assigned.

The NSC has a mandate to carry out inspection during the operation of the facilities. Through the inspection, safety requirements are ensured to be fulfilled, and public confidence can be further enhanced. In addition to routine inspections, special inspections, unannounced inspections, and overhaul inspections, regulatory inspections include regular inspections and accident response drills for the operational management of spent fuel and radioactive waste. Through strict inspections, we can understand the long-term operation status of each facility, equipment maintenance, waste reduction implementation results, storage, quality assurance records, follow-up improvements, and subsequent commitment implementation. The NSC urges operators to implement independent quality assurance measures and perform independent

quality assurance audits to ensure independent management performance and operational safety.

The operators of radioactive waste facilities should follow relevant requirements, and keep adapting new technologies, improving management procedures, and conducting crisis management, to ensure operation safety of the facilities. And the operation information shall be submitted to the regulatory authority.

The NSC has approved the following decommissioning activities of radioactive waste facilities:

- The Decommissioning Completion Report of Spent Resin Underground Storage Facility of NARI was reviewed and approved in February 2020.
- The Decommissioning Completion Report of Spent Fuel Cladding Underground Storage Facility of NARI was reviewed and approved in October 2021.
- The Decommissioning Plan of plasma reactor (018) of NARI was reviewed and approved in October 2021.
- The Decommissioning Plan of combustible waste storage facility (015F) of NARI was reviewed and approved in February 2022.
- The Decommissioning Plan of high-activity waste underground storage facility (015D) of NARI was reviewed and approved in April 2022.
- The Decommissioning Completion Report of combustible waste storage facility (015F) of NARI was reviewed and approved in November 2022.
- The decommissioning Completion Report of LLW trench of Chinshan NPP was reviewed and approved in August 2022.

(4) Enforcement

The NSC acts under the “Nuclear Materials and Radioactive Waste Management Act” and enforces control of spent fuel and radioactive waste. Enforcement is in response to non-compliance with specified requirements, including fines, penalties, and licenses revocation. In addition, the operators shall remedy the non-compliance, and the regulatory authority will ensure the progress of the remediation; furthermore, necessary measures will be taken to prevent recurrence.

(5) Allocation of Responsibilities

In accordance with Article 2 of the “Nuclear Materials and Radioactive Waste Management Act,” the NSC is the competent authority in charge of supervision of activities regarding spent fuel and radioactive waste management.

According to Article 28 of the “Nuclear Materials and Radioactive Waste Management Act,” the generator of radioactive waste shall bear the expenses for treatment, transportation, storage and final disposal of waste and the decommissioning of facilities.

According to Article 29, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” the treatment, transportation, storage and final disposal of radioactive waste shall be done by the generator of radioactive waste itself solely or be entrusted to the entrepreneur’ who or which is of technical capability of finally disposing of the domestic or foreign radioactive waste, or holds the facilities thereof.

TPC is responsible for implementation and necessary expenses for radioactive waste generated from NPPs currently, including storage and final disposal of spent fuel; management, storage, and final disposal of LLW, and decommissioning of NPPs and so on.

On the other hand, NARI is responsible for receiving radioactive waste generated from small users, and proper fees will be collected by NARI.

As stipulated in Article 30 of the “Nuclear Materials and Radioactive Waste Management Act,” the development of a radioactive waste final disposal is a national mission. Such final disposal facility is expected to receive radioactive waste from both TPC and small users.

For NPPs of TPC are the main source of spent fuel and radioactive waste in Taiwan (more than 90% of spent fuel and radioactive waste are generated from NPPs), in accordance with “Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility,” the MOEA is the implementing authority of LLW final disposal site selection; and in accordance with Article 89 of “The Electricity Act,” TPC appropriates funds to “Nuclear Backend Fund” for the expenses of nuclear back-end operation. The responsibility of management of “Nuclear Back-end Fund” lies with the MOEA.

E.3 Regulatory Body

Article 20 Regulatory Body

1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 19, and provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.
2. Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions where organizations are involved in both spent fuel or radioactive waste management and in their regulation.

(1) The Regulatory Body and its Duties

(A) The Nuclear Safety Commission (NSC)

The Atomic Energy Council was founded according to “The Atomic Energy Law” promulgated on May 9, 1968, and became subordinate to the Executive Yuan (at ministerial level), with three subordinate agencies: the Nuclear Energy Research Institute, the Radioactive Materials Management Bureau, and the Radiation Detection Center. It is responsible for developing atomic energy technology and safety supervision related to the peaceful use of atomic energy.

On September 27, 2023, in conjunction with the Executive Yuan's organizational restructuring, the operation of Taiwan's nuclear energy and radiation safety regulatory agencies was reorganized. The Atomic Energy Council (AEC) was reorganized into the Nuclear Safety Commission (NSC), an independent central-level agency (under ministerial level). The formerly affiliated the Fuel Cycle and Materials Regulation Office (FCMRO) was merged into the NSC as an internal department, and the Institute of Nuclear Energy Research (INER) was reorganized into the National Atomic Research Institute (NARI).

The NSC has taken over all tasks from the AEC and is responsible for the safety supervision of domestic nuclear power plants, nuclear

facilities, and radiation work sites, properly planning the safety regulation of spent fuel and radioactive waste, strengthening radiological emergency response capabilities and environmental radiation monitoring, striving to make information disclosure and transparency, and strictly controlling the safety of the public. In accordance with the "Atomic Energy Act," it also actively promotes the R&D of atomic energy science and technology and the application of atomic energy in medicine, agriculture, industry, and environmental protection in order to enhance people's well-being and environmental sustainability.

The NSC commissioners (including the Chairman and Vice Chairman) are assigned from relevant ministries or agencies within the Executive Yuan or scholars, and experts. The NSC has a chairman (Minister), a vice chairman (Deputy Ministers), and a Secretary General; there are 5 departments, 4 offices, 1 subordinated unit (Radiation Monitoring Center), 1 fund management board (Nuclear Emergency Response Foundation) and several task-group committees established according to Commission’s needs to promote the affairs of the committee jointly.

The Chairman (Minister) presides over the Commission and oversees the Commission’s affairs with the assistance of 2 Vice-Chairmen (Deputy Ministers) and a Secretary General. The 5 business departments include the General Planning Office, Nuclear Regulation Office, Radiation Protection Office, Nuclear Security and Emergency Response Office, and Fuel Cycle and Materials Regulation Office. The 4 administrative offices are the the Office of Secretariat, the Office of Personnel, the Office of the Comptroller, the Office of Government Ethics.

Other task-grouping committees established according to Commission’s affairs include the Review Committee on Atomic Energy Science Research and Development Achievements, the Advisory Committee on Nuclear Facility Safety, the Advisory Committee on Safety of Ionizing Radiation, the Advisory Committee on Safety of Radioactive Material, the Committee on State Compensation Cases, the Committee on Nuclear Legislation, the Committee on Gender Equality, the Committee on Sexual Harassment Complaints. (Figure E-2).

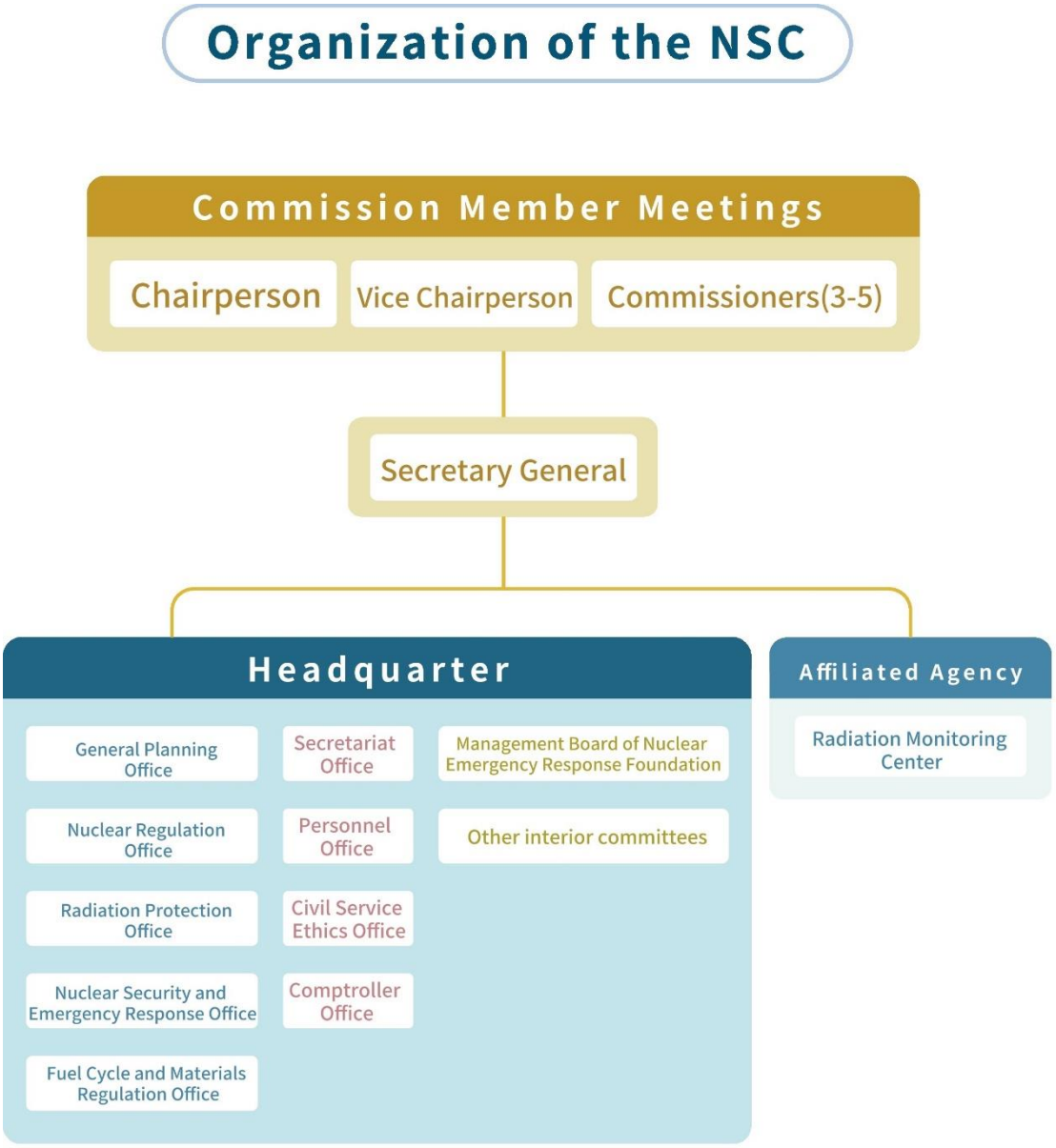

Figure E-2. Organization of the NSC

Among the aforementioned departments, the General Planning Office is in charge of nuclear safeguards; the Nuclear Regulation Office is in charge of regulating the safety of nuclear reactor operations, nuclear fuel in operating reactors and spent fuel in spent fuel pools; the Radiation Protection Office is in charge of radiation protection of public health and the environment; the Nuclear Security and Emergency Response Office is responsible for coordinating and planning matters of nuclear security regulation, radiological emergency response and preparedness; and the Fuel Cycle and Materials Regulation Office is responsible for the safety control of our country's nuclear raw fuel, spent nuclear fuel and radioactive waste.

The Advisory Committee on Safety of Radioactive Materials is found to improve regulation of radioactive materials, prevent radioactive hazards, and ensure environmental quality and public health. Experts of environmental protection, public policy, laws, nuclear engineering, geology, spent fuel and radioactive waste, radiation protection, economy, and energy are invited to participate in the Committee; to offer suggestions about the strategies, policies, laws, safety regulation, review, and R&D with regard to radioactive materials.

(B) Other relevant competent authorities

The management and regulation system of radioactive waste in Taiwan is shown as Figure E-3. The Executive Yuan is the country's highest administration department. Under its jurisdiction, there are the Nuclear Safety Commission (NSC), the Ministry of Economic Affairs (MOEA), the Ministry of Environment (MOENV), and the Ministry of Labor (MOL), and so on. Among the aforementioned ministries, the NSC, as mentioned, is in charge of the supervision and regulation of operation safety of spent fuel and radioactive waste; the MOEA is the supervision ministry of TPC (the owner of NPPs), and is in charge of the construction, operation, and also decommissioning of spent fuel and radioactive waste facilities. The MOEA also promulgated and issued the "Directices for the Establishment of the Radioactive Waste Disposal Project Office of the MOEA" on May 10, 2024; the MOENV is in charge of regulation of environmental evaluation and protection regarding spent fuel and radioactive waste facilities; and MOL is in charge of occupational safety and health of workers. In addition, the Ministry of the Interior (MOI) is in charge of supervision of facility construction and firefighting. Besides those, local governments have jurisdiction over measures related to soil and water conservation as well as water pollution control of a facility in accordance with the “Soil and Water Conservation Act” and the “Water Pollution Control Act.”

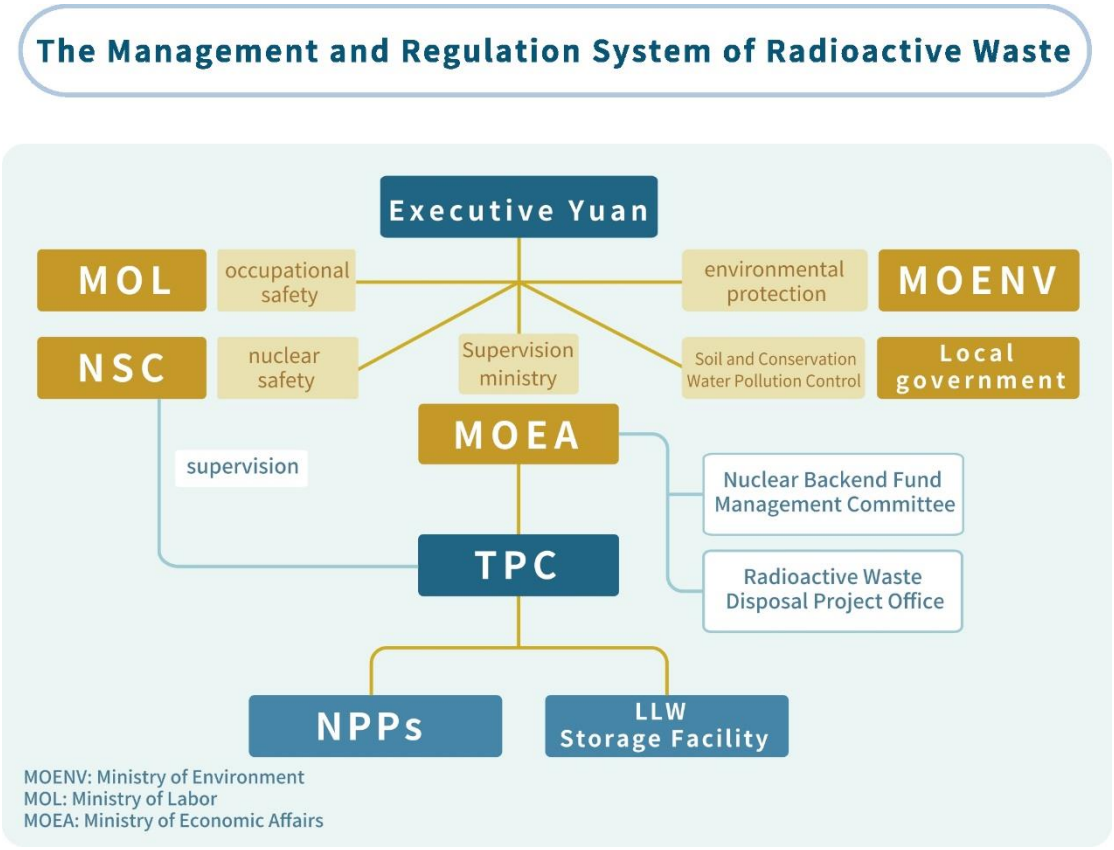

Figure E-3. The Management and Regulation System of Radioactive Waste

(2) Independence of Regulatory Functions

The NSC exercises its authority and operates independently according to its organizational law. Unless otherwise provided by law, it is not subject to the command or supervision of other agencies. The NSC implements national safety control of spent fuel and radioactive waste in accordance with “The Nuclear Materials and Radioactive Waste Management Act.”

F. OTHER GENERAL SAFETY PROVISIONS

Article 21 Responsibility of the License Holder

1. Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant license and shall take the appropriate steps to ensure that each such license holder meets its responsibility.
2. If there is no such license holder or other responsibility party, the responsibility rests with the Contracting Party which has jurisdiction over the spent fuel or over the radioactive waste.

F.1 Responsibility of the License Holder

(1) License holder

(A) Primary Responsibility Resting with the License Holder

The prime responsibility of management of spent fuel and radioactive waste rests with the operators of the facilities (the license holders) according to current regulatory framework. The operators shall construct spent fuel or radioactive waste facilities according to plans approved by the regulatory authority, and ensure that the operation of the facility meets with the requirements. The operators shall ensure that the facility can be properly decommissioned or closed, and shall demonstrate the compliance with the requirements proposed by the regulatory authority. Moreover, the operators shall make all possible efforts to improve the safety and reliability of the facilities.

(B) Measures to Ensure that the License Holders Meeting its Responsibility

The NSC, in accordance with the “Nuclear Materials and Radioactive Waste Management Act,” ensures that the license holders of spent fuel or radioactive waste facilities perform activities (construction, commissioning, operation, decommissioning and/or closure, and institutional control of the facility) in compliance with relevant regulations and the license conditions through safety inspection. No construction shall be undertaken unless a

construction license is granted by the NSC. And during construction, the NSC will request the license holders to take corrective and remedial measures to ensure the safety of the facilities if any violations occur. After completion of the construction, the facilities shall not be operated unless operating licenses have been granted by the NSC. An operating license is granted when commissioning inspection has been taken by the NSC and that safely operation of the facility can be assured. Afterward, the NSC shall periodically inspect the facilities during operation to ensure compliance with relevant regulations and technical standards prescribed in relevant provisions. If operation activities fail to meet the license conditions, the NSC will either ask for corrective and remedial measures or order a penalty (including license revocation or operation suspension).

In addition, according to Articles 6 of the Act, unless permitted by the competent authority, the license and the rights vested in the license, which are administered in accordance with this Act, shall not be assigned, leased, lent, pledged or mortgaged in order to prevent the license holder from arbitrarily shifting responsibility.

(2) Absence of License Holder

According to Articles 17, Paragraph 1 and Articles 18, Paragraph 1 of “The Nuclear Materials and Radioactive Management Act,” the construction and operation of a spent fuel or radioactive waste management facility require a license from the regulatory authority. If there are any violations, the regulatory authority can order penalties, fines, suspension, and demolition of the Act, depending on the severity.

F.2 Human and Financial Resources

Article 22 Human and Financial Resources
Each Contracting Party shall take the appropriate steps to ensure that:
(i) qualified staff are available as needed for safety related activities during the operating lifetime of a spent fuel and a radioactive waste management facility;

(ii) adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning;

(iii) financial provision is made which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility.

(1) Qualified Personnel

According to Article 17, Paragraph 1 of “The Nuclear Materials and Radioactive Waste Management Act,” for the construction license of treatment, storage, or final disposal facilities of radioactive waste, the technical, the management capabilities, and the financial bases of the applicant shall be competent to operate the facilities. This requirement ensures qualified personnel are available during the operation period.

And according to Article 27 of “The Nuclear Materials and Radioactive Waste Management Act,” treatment facilities of radioactive waste shall be operated by qualified personnel. The qualification of the operating personnel shall follow the provisions of the “Regulations on Qualifications of Personnel Operating Radioactive Waste Treatment Facilities,” and qualification certificates will be issued after training and examination are taken by the personnel.

Moreover, for improvement in professional quality of operators and management staff, the NSC holds “Examination for Operators of Radioactive Waste Treatment Facilities” and issues senior operator and operator licenses correspondingly, in accordance with the “Regulations on Qualifications of Personnel Operating Radioactive Waste Treatment Facilities.”

There are 92 senior operators and 278 operators in Taiwan, 370 qualified personnel in total, up to December 2024.

(2) Financial Resources during Operating Lifetime and Decommissioning

According to Article 28 of “The Nuclear Materials and Radioactive Waste Management Act,” the generator of radioactive waste shall bear the expenses for treatment, transportation, storage and final disposal of waste and the decommissioning of facilities. In addition, according to Article 3, Paragraph 1 of the “Regulations for the Review and Approval of Applications for Construction

License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities," the applicant shall submit an application form enclosed with a safety analysis report and a financial guarantee statement to the competent authority for review and pay the licensing fee. In accordance with Article 6 of the Regulations, to apply for the construction license of radioactive waste treatment or storage facilities, the financial guarantee statement shall include the budget sources and financial planning of the expenses for construction, operation and decommission of the facilities; to apply for the construction license of final disposal facilities, the financial guarantee statement shall include the budget sources and financial planning of the expenses for construction, operation, closure and surveillance of the facilities.

In compliance with the above regulations, Nuclear Backend Fund has been established since 1987. The fund was managed by TPC until 1998 and then redefined as a non-operational fund of the MOEA. The management right was also shifted to Nuclear Backend Fund Management Committee under the MOEA's supervision. There are 8 to 14 members in the Committee, and the chairman is designated by the MOEA.

The purposes of the Nuclear Backend Fund are as follows:

- Independent volume reduction, treatment, packaging, transportation, interim storage, and final disposal of LLW generated by NPPs.
- Reprocessing of the spent fuel.
- Packaging, transportation, interim storage, and final disposal of spent fuel or radioactive waste arising from reprocessing.
- Nuclear safeguards and security measures during nuclear backend operations.
- Decommissioning and safety maintenance of NPPs, and treatment, packaging, transportation, interim storage, and final disposal of the relevant radioactive waste.
- Necessary compensation measures
- Management and general expenses.
- Other expenses.

There are NT$461.203 billion dollars in the Nuclear Backend Fund (updated to the end of December 2024). The expenses for management of the

spent fuel or radioactive waste generated from operation are covered by the operation costs of the NPPs.

(3) Financial Provisions following Closure of a Disposal Site

According to Article 28 of “The Nuclear Materials and Radioactive Waste Management Act,” the generator of radioactive waste shall bear the expenses for treatment, transportation, storage and final disposal of waste and the decommissioning of facilities. If there is any shortages, TPC is responsible for make it up. On the other hand, TPC is also responsible for the closure of radioactive waste and spent fuel disposal sites, and implements institutional control in accordance with institutional control plans approved by the regulatory authority. The expenses for the closure and institutional control are covered by the Nuclear Backend Fund, along with all other expenses regarding the final disposal of the radioactive waste.

F.3 Quality Assurance

Article 23 Quality Assurance Each Contracting Party shall take the necessary steps to ensure that appropriate quality assurance programs concerning the safety of spent fuel and radioactive management are established and implemented.

Quality assurance (QA) program shall be incorporated in the safety analysis report of construction license application of radioactive waste facilities, in accordance with Article 4, Paragraph 1 of the “Regulations for the Review and Approval of Applications for Construction License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities.” The “Quality Assurance Criteria of Nuclear Reactor Facilities” are the only regulations regarding quality assurance of nuclear facilities in Taiwan, and are applied to nuclear reactor facilities, and all other spent fuel or radioactive waste facilities (including spent fuel pools, radioactive waste treatment facilities, on-site storage facilities, and so on).

Quality assurance programs shall be included in safety analysis reports for the application for construction and operating licenses according to current regulations. In practice, the operators usually draw up the quality assurance

programs referring to the “Quality Assurance Criteria of Nuclear Reactor Facilities” and other guides for safety analysis reports of spent fuel or radioactive waste facilities. Article 9, Paragraph 1 of the “Quality Assurance Criteria of Nuclear Reactor Facilities” applies to all activities related to the safety of spent fuel or radioactive waste facilities.

F.4 Operational Radiation Protection

Article 24 Operational Radiation Protection

1. Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:
   (i) the radiation exposure of workers and the public caused by the facility shall be kept as low as is reasonably achievable, economic and social factors being taken into account;
   (ii) no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and
   (iii) measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.
2. Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:
   (i) to keep exposure to radiation as low as is reasonably achievable, economic and social factors being taken into account; and
   (ii) so that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.
3. Each Contracting Party shall take appropriate steps to ensure that during the operating lifetime of a regulated nuclear facility, in the event that an unplanned or uncontrolled release of radioactive materials into the

environment occurs, appropriate corrective measures are implemented to control the release and mitigate its effects.

(1) Protection from Radiation Exposures

(A) ALARA

Article 1 of the “Ionizing Radiation Protection Act” proposes that ALARA (as low as reasonably achievable) is the primary principle of radiation protection. Therefore, radiation exposure of workers and the public caused by spent fuel or radioactive waste facilities shall be kept as low as reasonably achievable. Along with other economic and social factors, radiation exposure could be kept well under dose limits in the regulations.

(B) Dose Limits

(a) Dose Limits to the Radiation Workers

Article 7, Paragraph 7.1 of the “Safety Standards for Protection against Ionizing Radiation” specifies that the dose limits of occupational exposure for radiation workers are as specified as follows:

- The effective dose shall not exceed 100 mSv over a cycle of five consecutive years, and not exceed 50 mSv in any single year. (5 consecutive years started from January 1, 2003);
- The equivalent dose to the lens of the eye shall not exceed 150 mSv in a year; and
- The equivalent dose to skin or extremities shall not exceed 500 mSv in a year.

(b) Dose Limits to the General Public

Article 12 of the “Safety Standards for Protection against Ionizing Radiation” specifies that the annual dose limits for the member of the public that are attributable to practices are:

- An effective dose shall not exceed 1 mSv;
- An equivalent dose to the lens of the eye shall not exceed 15 mSv;
- An equivalent dose to skin shall not exceed 50 mSv.

The design of radiation protection shall ensure that the annual effective dose to individual members of the general public from a spent fuel or radioactive waste facility shall not exceed 0.25 mSv.

(2) Control of Discharge

(A) ALARA

Article 1 of the “Ionizing Radiation Protection Act” stipulates that in order to protect against the detriment of ionizing radiation and to maintain health and safety of our citizens, all radiation activities shall be implemented in accordance with the ALARA principle; i.e. the same principle shall be applied to control of discharge. Furthermore, the facility operator shall not discharge any radioactive material until after a radiation safety assessment is conducted and submitted to the competent authority and approval has been granted in accordance with Paragraph 9.1 of the Act.

(B) Control Limits

Col. 4 to 6 of Schedule IV-2 in the “Safety Standards for Protection against Ionizing Radiation” list the control limits of released radionuclides in air, water, and effluent. The operators of the facilities shall demonstrate that the releases meet the aforementioned control limits.

(C) Measures to Prevent Unplanned and Uncontrolled Releases

For the prevention of unplanned and uncontrolled releases, Paragraph 9.1 of the “Ionizing Radiation Protection Act” stipulates that the facility operator shall not discharge any waste gas or waste water containing radioactive material until after a radiation safety assessment is conducted and submitted to the competent authority and approval has been granted. Moreover, in accordance with Article 41 of the Act, violation of the provision in Paragraph 9.1, namely, one who released gas or water contaminated with radioactive material without prior approval, shall be sentenced to an administrative fine as well as an order to rectify the situation before a deadline. Failure to rectify by the deadline will result in consecutive penalties and even an order to cease practice; and if deemed necessary, permission, permits or registration may be revoked.

(D) Corrective Measures Following Unplanned or Uncontrolled Releases

Unplanned or uncontrolled discharge of radioactive gas or liquid waste is prohibited in accordance with Article 9, Paragraph 9.1 of the "Ionizing Radiation Protection Act." However, if accidents result in radiation intensity off-site or concentration of radioactive materials in water, air, or effluent exceeding the limits in Article 13 of the "Safety Standards for Protection against Ionizing Radiation," the facility operator shall take the necessary protection and cleaning up measures, and shall immediately notify the competent authority. In addition, facility operator shall investigate, analyze, record and submit a report to the competent authority within a prescribed time period.

(3) Environmental Radiation Monitoring

According to Article 19 of the Ionizing Radiation Protection Act, which was put into practice on February 1, 2003, the Competent Authority shall conduct environmental radiation monitoring at properly designated locations, where radiation monitoring facilities are set up and samples are taken, and make results available to the public. Currently, there are 63 environmental radiation monitoring posts nationwide that monitor environmental radiation changes 24/7, for radiation safety of the public.

Furthermore, the Radiation Monitoring Center of the NSC carries out radiation monitoring activities around NPPs, research nuclear facilities, and LLW Storage Site periodically, including direct monitoring of dose rates and radioactive analysis of samples from air, grass, rivers, groundwater, ponds, lakes, mountain spring water, seawater, milk, chickens, rice, vegetables, fish, seaweed, shells, biological indicators, soil, coastal sand, sludge, and so on. Monitoring reports are published periodically, and the monitoring results are within the normal range of background radiation variations.

F.5 Emergency Preparedness

Article 25 Emergency Preparedness

1. Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on site and, if necessary, off site emergency plans. Such emergency plans should be tested with appropriate frequency.
2. Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.

(1) Emergency Plans

(A) NPPs

Except for LLW Storage Site, currently all spent fuel or radioactive waste management facilities are located in NPP sites; therefore, the emergency plans are incorporated in the emergency plans of the NPPs, and are regulated by the “Nuclear Emergency Response Act” and the “Enforcement Rules for the Implementation of the Nuclear Emergency Response Act.”

The LLW Storage Site stores all the LLW in solidified form in steel drums, and it has stopped receiving LLW since April 1996. Presently, an off-site emergency plan is not needed for the LLW Storage Site.

(B) Small Users

The small users of radioactive waste generators in Taiwan include the NARI and NTHU. The “Regulations on Emergency Response of Research Reactor Facilities” amended on June 4, 2009 is the basis of regulation of emergency response of research reactor facilities of NARI and NTHU. For the 3 research reactors in NARI have permanently ceased operation, currently there are no emergency plans for research reactors. Presently, accident response plans or relevant plans incorporated in the Safety Analysis Report (SAR) of spent nuclear or radioactive waste facilities in NARI are submitted to the competent authority for review and approval

in accordance with Article 26, Paragraph 2 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act.” On the other hand, the emergency plans of THOR had been reviewed on 2023.

In September 2017, the NSC required all spent fuel and radioactive waste facilities to strengthen their annual independent emergency response exercises in order to familiarize themselves with the emergency response procedures for abnormal or unexpected incidents, improve their emergency response maturity, and enhance the crisis awareness of employees, so as to prevent accidents before they occur. Based on this, the NARI formulates an abnormal/accident response drill plan for spent fuel and radioactive waste storage facilities every year, plans and conducts emergency response exercises, and submits reports to the NSC for reference.

(2) Emergency Exercises

(A) NPPs

The emergency exercises of spent fuel or radioactive waste facilities in NPPs are covered by the emergency exercises of NPPs. Based on Article 15 of the “Nuclear Emergency Response Act,” the NSC shall periodically select an emergency planning zone (EPZ) and conduct exercise according to the approved Emergency Response Basic Plan. For each nuclear reactor facility, the licensee shall periodically carry out the exercise according to the Emergency Response Plans for the Nuclear Reactor Facility.

The NSC has conducted emergency exercises once a year since 2001 to review response ability of NPPs and the surrounding area. The central and local government and the operators of nuclear reactor facilities have all participated in the exercises. The emergency exercises include on-site unit response, radiation detection, dose evaluation, sheltering in place, evacuation and shelter placement, iodine tablets distribution, medical treatment for radiation injuries, decontamination, and so on.

With Article 26, Paragraph 2 of the "Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act," regarding emergency plans, the NSC requires TPC's spent fuel and radioactive waste facilities at NPPs and the LLW Storage Site to conduct abnormal accident response

drills every year to enhance crisis awareness and familiarize operators with operating procedures and response measures.

(B) Small Users

With Article 26, Paragraph 2 of the "Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act," regarding emergency plans, the NSC requires NARI's one radioactive waste facility to conduct abnormal accident response drills every year to enhance crisis awareness and familiarize operators with operating procedures and response measures.

The Chemical Research Institute of the NARI conducted an "Abnormal Event Drill During the Replacement of Containers in Radioactive Waste Storage Facilities" (Building 067) in August 2021; The Materials Research Institute of the NARI conducted an "Accidental Drill During Casting, in Which Molten Metal Material Collapses Outside the Mold and Causes Fire" in the Contaminated Metal Foundry (Building 017) in July 2022; The Engineering Institute of the NARI conducted an "Accidental Drill During TRR Furnace Disassembly " in the Disassembly and Assembly Plant (Building 074) on July 21, 2023; and the Chemical Research Institute of the NARI conducted an " Accidental Drill During Plasma Furnace Disassembly " in the Incinerator (Building 018) on August 22, 2024.

(3) Improve Emergency Preparedness Regulations

In order to improve the nuclear emergency response system and strengthen the emergency response function to ensure the safety of the public, the NSC enacted the "Nuclear Emergency Response Act" in December 2003 and also formulated implementation rules and related measures based on the authorization of the Act. Subsequently, we referred to the relevant laws and regulations of the United States, Japan, and the IAEA, the overall nuclear safety re-assessment and nuclear emergency exercise experience over the years, and the needs of practical operations to continuously review and revise nuclear emergency response measures.

The nuclear accident and other types of radiological emergency are deemed one of the statutory disasters in the “Disaster Prevention and Protection Act” revised on April 2016. Based on this Act, the NSC has proposed the following regulations to improve radiological emergency preparedness. First

of all, “Classification, Content, Model, Method and Activation Timing of Alert and Notification System for Nuclear Emergency” and “Regulations on the Disclosure of Information about Potential Radiation Disasters” were revised in January and March 2017. The NSC enacted the "Regulations for the Commendation of Public Education on Radiation Disaster Prevention and Protection" in January 2023 and continuously revised the "Operation Plan of Radiation Disaster" for more thorough nuclear emergency preparedness.

In addition, our NPPs have also referred to the experience of the Fukushima accident in Japan to strengthen the units' earthquake, flood, and tsunami resistance capabilities to confine the disaster consequence within the NPPs. They have also made deployments in advance outside the plants to respond and expand the scope of response preparations and drills. The current nuclear emergency preparedness measures are implemented by combining the "Nuclear Emergency Response Act" and the "Disaster Prevention and Protection Act" mechanisms. Practical preparedness operations have been expanded to a 16-kilometer radius from NPPs. Nuclear emergency exercises continue to conduct radiation detection in the area of 8 to 16 kilometers radius from NPPs, diverse notification methods such as CBS and village broadcast and cross-regional support and dispatch drills to enhance the overall response performance of nuclear emergency.

(4) Nuclear Security and Emergency Response Measures

For the improvement of radioactivity analysis in emergency response, the NSC has established 2 backup laboratories in National Yang-Ming University and National Pingtung University of Science and Technology individually. The 2 laboratories had set up the equipment and software needed by 2019, and have been certified by the Taiwan Accreditation Foundation (TAF).

The NSC had also completed the review of the renewal of the nuclear security plan of Kuocheng and Maanshan NPP by 2018, and Chinshan NPP by 2020. The plan was renewed according to the newest international nuclear security regulations and regulation requirements of the NSC, to strengthen the nuclear security of NPPs in Taiwan.

To ensure the timeliness of emergency mobilization by NPPs’ and TPC’s emergency response organizations, the NSC establishes “Unannounced Emergency Mobilization Drill or Communication Test for NPPs” each year and

conduct an unannounced communication test and an unannounced emergency mobilization drill on selected NPPs. The test results showed that the awareness of NPP’s emergency resonse organizations met the required standards.

Moreover, in order to enhance the radiological emergency response capabilities and preparedness of local governments, radiological emergency prevention and protection knowledge of the first responders has been strengthened through assistance, training, and exercises. Local governments have also been actively integrated into the radiological emergency preparedness efforts to strengthen the national radiological emergency response system.

- Assistance: The NSC has guided the radiological emergency preparedness of local governments through participating in the review of regional plan of disaster prevention and protection and the “All-Out Defense Mobilization Plan” implemented by the Executive Yuan. The NSC has also assisted local governments in implementing radiological emergency preparedness measures.
- Training: The NSC had steady organized “Radiological Emergency Response Workshop for Local Government” to improve first responders’ understanding of the radiological emergency response mechanism and measures. The Workshop's content includes basic concepts of radiation protection, precautions for responders to radiological emergency, domestic and foreign case analysis, and operation essentials of radiation detection equipment. Radiological emergency tabletop exercise are conducted to help participants apply what they have learned and increase learning effectiveness. Through a curriculum combining theory and practice, participants will become familiar with the essentials of radiation protection and strengthen their first responder's capabilities, such as category identification, control zone demarcation, detection, and decontamination.
- Exercise: In 2024, radiological emergency response drills had been conducted with 11 local governments (Taoyuan City, Nantou County, Changhua County, Pingtung County, Chiayi County, Miaoli County, Hsinchu County, Yilan County, Yunlin County, New Taipei City, and Kaohsiung City) through the All-out Defense Mobilization and Disaster Prevention and Rescue (Min An) Exercise mechanism. The NSC designed

the drill scenario and provided consultation, script review, and assessment in the drills. Besides, Radiological Emergency Response Team(RERT) of the NSC were also assigned to participate in the drills held in Taoyuan City and Kaohsiung City to strengthen the joint response mechanism between central and local governments.

According to the “Cyber Security Management Act,” information security management system (ISMS) has been introduced to NSC since 2017 for the confidentiality, availability, and integrity of information asset. And the system has been certified with ISO 27001. Through process reviews, establishment of information security policies, asset inventories, and risk assessment, the ISMS can establish relevant information security documents for each department. Information security management can also be improved through information security campaigns, information security training, and review of internal audits and emergency reporting procedures.

F.6 Decommissioning

Article 26 Decommissioning
Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that: (i) qualified staff and adequate financial resources are available; (ii) the provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied; (iii) the provisions of Article 25 with respect to emergency preparedness are applied; and (iv) records of information important to decommissioning are kept.

The regulatory provisions regarding decommissioning of nuclear reactor facilities are stipulated in the “Nuclear Reactor Facilities Regulation Act,” and related regulations include the prescribed period for completing decommissioning activities of nuclear reactor facilities, the radiation dose in the site of dismantled facilities, the scope of significant amendment in a decommissioning plan, the report on environmental radiation monitoring on the

site after the completion of the decommissioning plan and decommissioning completion reports. The documents requisite for an application for the permit for decommissioning of nuclear reactor facilities, review and approval procedures, and other matters are stipulated in the “Regulations on the Permit Application and the Management for Decommissioning of Nuclear Reactor Facilities.”

In accordance with the “Nuclear Reactor Facilities Regulation Act,” and related regulations, TPC shall submit decommissioning plans 3 years before the scheduled permanent cessation of operation of NPPs. The NSC will review the plan and issue a decommissioning permit if the plan is bonded to the provisions. The decommissioning activities shall be completed within 25 years.

(1) Qualified Staff and Adequate Financial Resources

Decommissioning plans shall include the chapter of organization and personnel training, in accordance with Article 3 of the “Regulations on the Permit Application and the Management for Decommissioning of Nuclear Reactor Facilities.” This can ensure that there are sufficient qualified personnel to implement the decommissioning activities.

Article 2, Paragraph 1 of the “Regulations on the Permit Application and the Management for Decommissioning of Nuclear Reactor Facilities” requires applying for decommissioning of nuclear reactor facilities, the licensee shall submit an application form enclosed with a decommissioning plan to the competent authority for review and pay the fee. Also, Article 3, Paragraph 16 of the Regulations requires the decommissioning plan shall include the report of technology, management ability and the financial basis including the financial guarantee statement, which shall include the financial sources and financial planning of the expenses for decommissioning of the facilities and management of radioactive waste. Currently, the financial resources for the decommissioning are supported by the Nuclear Backend Fund.

(2) Radiation Protection

Article 3 of the “Regulations on the Permit Application and the Management for Decommissioning of Nuclear Reactor Facilities” stipulates that radiation dose evaluation and radiation protection measures shall be included in decommissioning plans. The above-mentioned radiation protection and radioactive material management shall comply with the provisions of relevant

laws and regulations, including the protection of radiation workers and the general public, by Article 23, Paragraph 1, Clause 3 of the “Nuclear Reactor Facilities Regulation Act,”

Moreover, in accordance with Article 22 of the “Nuclear Reactor Facilities Regulation Act,” and Article 17 of the “Enforcement Rules for the Implementation of Nuclear Reactor Facilities Regulation Act,” as to the decommissioning of nuclear reactor facilities, the radiation doses in the post-decommissioning site of the facilities shall comply with provisions that the annual effective dose caused to general public shall not exceed 1 mSv for the restrictive use thereof; and those caused to general public shall not exceed decimal 0.25 mSv for the non-restrictive use thereof.

(3) Control of Waste Release

Article 31 of the “The Nuclear Materials and Radioactive Waste Management Act” and the “Regulations on Clearance Level for Radioactive Waste Management” are the regulatory basis of the release of radioactive waste generated from decommissioning of nuclear facilities. Radioactive waste meets the control limits can be exempted from control, and then recycled, reused, incinerated, or buried according to the approved release plans after properly monitored.

On the other hand, radiation sources will be regulated based on Article 53 of the “Ionizing Radiation Protection Act” and “Exemption Standards for Radiation Sources;” for those with radiation activity under the exemption standards can be exempted from control.

(4) Emergency Preparedness

Emergency response plan shall be included in the decommissioning plan in accordance with Article 3 of the “Regulations on the Permit Application and the Management for Decommissioning of Nuclear Reactor Facilities,” and the plan shall be reviewed and approved by the regulatory authority before implementation.

(5) Record Keeping for Information Important to Decommissioning

Article 14 of the “Regulations on the Permit Application and the Management for Decommissioning of Nuclear Reactor Facilities” requires the decommissioning plan, the decommissioning plan related documents, information, various reports or records reported in accordance with this

regulation which have been reviewed by the competent authority shall be permanently preserved; the licensee shall set a list of categories and preservation duration for documents and information related to decommissioning technologies, analysis, measurement, and the others, and submit the list to the competent authority for reference.

(6) Regulations Amendment

The NSC conducted a comprehensive review on purposes of the legislation stipulated in the decommissioning regulations, application and review procedures for decommissioning permits, transition between expiration of operating licenses and issuance of decommissioning permits, safety regulation of onsite decommissioning activities, and site deregulation after decommissioning, and amended the “Enforcement Rules for the Implementation of Nuclear Reactor Facilities Regulation Act,” the “Regulations on the Permit Application and the Management for Decommissioning of Nuclear Reactor Facilities” and the “Standards of Fees for Regulatory Services under the Nuclear Reactor Facilities Regulation Act.” Moreover, “Guides for Nuclear Reactor Facilities Decommissioning Plan” and “Review Guides for Nuclear Reactor Facilities Decommissioning Plan” were also amended for safety regulation of the activities during decommissioning period. These amendments were based on real practices of NPPs regulation in Taiwan. The provisions specify that the decommissioning period of a nuclear reactor facility starts from the next day of the operating license expiration date. In addition, the provisions also specify regulation measures such as required documents for application for decommissioning permits and the deadlines for submission, content that shall be included in the decommissioning plans, and nuclear fuel safety/environmental radiation safety/releases of radioactive gas and liquid radioactive waste/management of spent fuel and radioactive waste during decommissioning period.

Beside the amendments mentioned above, for the improvement in quality of decommissioning activities of nuclear facilities and effective management of radioactive waste generated from decommissioning, the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act” was amended in 2019. In order to secure sufficient time for the operators to plan decommissioning activities of spent fuel and radioactive waste facilities and to

ensure environmental and public safety, deadlines for the decommissioning plans were clearly specified. Meanwhile, procedures for deregulation were included for the operators to follow when releasing sites after decommissioning.

(7) Review of Decommissioning Plans

In accordance with Article 23 of the “Nuclear Reactor Facilities Regulation Act,” for the decommissioning of nuclear reactor facilities, an application appending the decommissioning plan, shall be filed by the licensee to the competent authority, and the decommissioning thereof shall not commence until the application has been reviewed and approved by the competent authority to comply with the related provisions and a decommissioning permit has been granted. A task force, consisted of experts from nuclear safety fields and specialists from the NSC, was organized by the NSC to strictly review the Decommissioning Plan of NPPs. Futhermore, a web page dedicated to pertinent information has also been set up for information disclosure, and public meetings were held for public participation and opinion collection.

The “Decommissioning Plan of Chinshan NPP” and the “Report on Technical and Management Ability and Financial Assurance of Chinshan NPP” were approved by the NSC in June 2017. The review has confirmed that the Decommissioning Plan complies with the regulations, and that the health and safety of the public will be well protected during decommissioning; also, that the technical competence, the management competence, and financial status are capable of implementing decommissioning activities. After the environmental impact assessment (EIA) report was approved by the MOENV in July 2019, the NSC issued the decommissioning permit of Chinshan NPP on July 12, 2019. (Effective since July 16, 2019)

The progress of NPP decommissioning in Taiwan can be divided into four phases: transitional phase, dismantling phase, final site survey phase, and site remediation phase. Currently, the spent fuel of Chinshan NPP still remains in the reactors. For safety, the NSC follows the regulation measures in outage to regulate the decommissioning activities of Chinshan NPP, and Pre-Defueled Safety Analysis Report (PDSAR) and Technical Specification (PDTS) were asked to be submitted as the safety baseline during decommissioning. The documents were approved in November 2018 to maintain the functions of safety

related systems and equipment, so that the safety of nuclear fuel in the reactors can be assured.

As for Kuosheng NPP, TPC submitted the “Decommissioning Plan of Kuosheng NPP” to apply for decommissioning permit on December 27, 2018. The abovementioned plan was reviewed from January 21, 2019, and was approved on October 20, 2020. Currently, TPC is waiting for the MOENV to submit an environmental impact assessment and related information, which will be approved by the NSC. Once it confirms that it complies with Article 23 of the "Nuclear Reactor Facilities Regulation Act," it can proceed with issuing a decommissioning permit.

As for Maanshan NPP, TPC submitted the “Decommissioning Plan of Maanshan NPP” to apply for decommissioning permit on July 26, 2021. The abovementioned plan was reviewed from August 23, 2021, and was approved on April 24, 2023. Currently, TPC is waiting for the MOENV to submit an environmental impact assessment and related information, which will be approved by the NSC. Once it confirms that it complies with Article 23 of the "Nuclear Reactor Facilities Regulation Act," it can proceed with issuing a decommissioning permit.

(8) Regulation of Decommissioning Activities

For regulation of NPP decommissioning and assurance of public safety and environmental quality, the NSC oversees and inspects that TPC implements dismantling, radiation protection, management of spent fuel and radioactive waste, environmental radiation monitoring, engineering management, and other activities during decommissioning follows the approved decommissioning plan. To ensure that the decommissioning activities are consistent with the approved decommissioning plan, TPC should file an application with dismantling plan prior to dismantling any buildings or facilities. According to the aforementioned regulation measures, the NSC reviewed the dismantling plan of towers (with only power output function) located between the main transformer and the switchyard of Chinshan NPP based on its classification and evaluation result of radiation impacts, dismantling methods, response actions, and housekeeping, and conducted onsite inspection, to ensure that the dismantling activities would be consistent with the approved

plan. The plan was approved in November 2019, and TPC started to dismantle the towers thereafter. As of December 31, 2024, TPC has demolished the connecting towers between the four main transformers, the switchyard, the gas turbine plant facilities, and the original 69kV switchyard equipment.

Besides, the NSC completed the review of the “Decommissioning Plan of Waste Trench in Chinshan NPP” in 2019. Inspectors will visit monthly during the plan’s implementation to ensure personnel and public safety. TPC completed the demolished work in September 2020 and submitted a decommissioning completion report of the waste trench in March 2021. After review, on-site inspection, and confirmation, the NSC agreed to lift the decommissioning control of the waste trench of the NPP in August 2022. The location of the waste trench will be used as the in spent fuel dry storage facility (an indoor facility) of Chinshan NPP for decommissioning.

Chinshan NPP is currently under decommissioning; however, treatment systems for the volume reduction should be maintained for volume reduction of LLW generated during decommissioning. The NSC has requested TPC to complete a safety evaluation of these systems according to the principles of a 10-years periodic reassessment.

In response to the decommissioning of the NPP, TPC submitted an application to the NSC for the construction of a new LLW storage facility for the decommissioning of Chinshan NPP. After the NSC invited scholars and experts to conduct a strict review and held a hearing to solicit opinions from all walks of life, it was confirmed that it met the requirements of relevant safety regulations. On July 17, 2024, the application was reviewed and approved, and a construction license was issued. In the future, the NSC will continue to work on construction quality and safety control. In addition, the diversification of decommissioning waste containers is an international trend. In November 2024, the NSC approved TPC's application to use five types of LLW containers, which will help improve the safety of nuclear power plant decommissioning operations.

(9) Development of Decommissioning Technologies

NARI has been proactively participating in the planning and license application for decommissioning of Chinshan NPP since 2013 in line with the national policies. The following key technologies have been developed ever since: (A) Schedule planning of decommissioning activities of NPPs: Chinshan

NPP is required to be dismantled when decommissioning in accordance with the regulations. And all the decommissioning activities shall be completed within 25 years after the decommissioning permit is issued by the regulatory authority. The timeline of the whole decommissioning can be mainly divided into four phases: post-operation transition phase (8 years), dismantling and demolition phase (12 years), final site survey phase (3 years), and remediation phase (2 years). (B) 3D engineering simulation and visual aids: 3D engineering simulation of the systems, structures, and components required for NPP decommissioning. Also, radiation measurement data and application of visual aids are also incorporated in the simulation. The first NPP digital model database and decommissioning information management system in Taiwan was then established for decontamination, dismantling and demolition, management of spent fuel or radioactive waste, and personnel training during decommissioning.

(10) Decommissioning of Facilities Generating SURW

For the permanent cessation of operation of production or storage facilities of nuclear source material or nuclear fuel, also treatment or storage facilities of radioactive waste, the operator shall prepare a decommissioning plan and shall implement it after the same has been reported to and approved by the competent authority in accordance with Article 14, Paragraph 1 and Article 23, Paragraph 1 of the “The Nuclear Materials and Radioactive Waste Management Act.”

Article 20 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act” stipulates that the decommissioning plan shall include the following items, such as personnel training, radiation dose evaluation and radiation protection measures, and accident response scheme and so on.

Decommissioning plans of many of the non-reactor facilities in NARI have been approved by the NSC. Among those, Fuel Assembly Recycle Plant (Building 017B), Fuel Assembly Waste Warehouse (Building 040), UO_2 Fuel Manufacturing Lab (Building 021), Radiochemistry Lab (Building 016), and Decontamination Lab and Quality Testing Lab for Solidified Waste (Building 039) have been decommissioned or cleaned up. Those that were decommissioned during the reporting period include the underground storage of waste resin, the

underground storage of spent fuel casings, and the combustible waste storage (Building 015F). In addition, the decommissioning work is underway at the plasma incineration and melting furnace of the LLW treatment facility(Building 018) and the high-activity waste underground storage facility of the LLW storage facility(Building 015D).

G. SAFETY OF SPENT FUEL MANAGEMENT

Article 4 General Safety Requirements

Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management, individuals, society and the environment are adequately protected against radiological hazards.

In so doing, each Contracting Party shall take the appropriate steps to:

(i) ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;

(ii) ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;

(iii) take into account interdependencies among the different steps in spent fuel management;

(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the frame work of its national legislation which has due regard to internationally endorsed criteria and standards;

(v) take into account the biological, chemical and other hazards that may be associated with spent fuel management;

(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;

(vii) aim to avoid imposing undue burdens on future generations.

G.1 General Safety Requirements

(1) Subcriticality and Residual Heat Removal of Spent Fuel Management

In accordance with Article 13, Paragraph 2 of the “Regulations on Treatment and Storage of Radioactive Waste and Safety Management of the Facilities,” the design of the storage facilities of HLW shall meet the safety

requirements for maintaining residual heat removal and the sub-critical functions.

(2) Minimizing Radioactive Waste Generated from Management of Spent Fuel

Currently, there are no spent fuel management facilities or final disposal sites in Taiwan. All of the spent fuel is stored in the spent fuel pools. Dry storage facilities of Chinshan NPP and Kuosheng NPP are both ongoing. And the operation of spent fuel storage facilities can barely produce any radioactive waste. Nevertheless, the NSC has asked TPC to minimize radioactive waste produced from operation of dry storage facilities and from decommissioning.

(3) Interdependencies among Different Steps in Spent Fuel Management

According to the policies at present, spent fuel removed from the cores will be temporarily stored in the spent fuel pools for dry storage. The spent fuel can be transferred to dry storage facilities once the facilities start to operate, and finally it will be disposed in final disposal site.

(4) Regulations for Radiation Protection

(A) ALARA

Article 1 of the “Ionizing Radiation Protection Act” proposes that ALARA (as low as reasonably achievable) is the primary principle of radiation protection. Therefore, radiation exposure of workers and the public caused by spent fuel facilities shall be kept as low as reasonably achievable. Along with other economic and social factors, radiation exposure could be kept well under dose limits in the regulations.

(B) Dose Limits

(a) Dose Limits for Radiation Workers

Article 7, Paragraph 7.1 of the "Safety Standards for Protection against Ionizing Radiation" stipulates that the dose limits of occupational exposure for radiation workers are specified as follows:

- The effective dose shall not exceed 100 mSv over a cycle of five consecutive years, and not exceed 50 mSv in any single year. (5 consecutive years started from January 1, 2003);
- The equivalent dose to the lens of the eye shall not exceed 150 mSv in a year; and

- The equivalent dose to skin or extremities shall not exceed 500 mSv in a year.

(b) Dose Limits for General Public

Article 12 of the “Safety Standards for Protection against Ionizing Radiation” specifies that the annual dose limits for the member of the public that are attributable to practices are:

- An effective dose shall not exceed 1 mSv;
- An equivalent dose to the lens of the eye shall not exceed 15 mSv; and
- An equivalent dose to skin shall not exceed 50 mSv.

(5) Consideration for Biological, Chemical and Other Hazards

In the design, construction, operation, decommissioning, and closure process, the operators shall evaluate all potential biological, chemical and other hazards that may adversely impact on the safety of spent fuel facilities. Since reprocessing of spent fuel is not adopted currently, impact from potential biological, chemical and other hazards are very limited.

(6) Consideration for Impacts on Future Generations

The safety standards also apply to future generations; in addition, government and the operators shall evaluate influence on future generations from management of spent fuel based on regulations of the “Fundamental Safety Principles” (IAEA Safety Standards Series No. SF-1), and provide proper design and proper protective measures.

(7) Consideration for Burdens on Future Generations

For ethical reasons and follow the “Fundamental Safety Principles” (IAEA Safety Standards Series No. SF-1), the management of spent fuel shall not cause undue burdens on future generations. Under the government’s policies, the operators of NPPs shall be responsible for the management of spent fuel generated from operation of NPPs. Whether it is the design, construction, operation, decommissioning, closure or funding should all comply with these policies.

G.2 Existing Facilities

Article 5 Existing Facilities Each Contracting Party shall take the appropriate steps to review the safety of any spent fuel management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility.

(1) Spent Fuel Dry Storage Facilities

The construction and performance test of the outdoor spent fuel dry storage facility of Chinshan NPP has been completed, and the NSC approved TPC to carry out a hot test of the facility in September 2013. However, the New Taipei City Government has not issued a soil and water conservation completion certificate yet, and a hot test of the facility had not been carried out. After TPC proposed administrative relief and actively communicated and coordinated with the New Taipei City Government, the two sides reached an agreement in 2024. The mediation was established on April 1, and the second changed design of the soil and water conservation plan was approved on May 10. Construction began on June 12, and the soil and water conservation completion certificate was obtained on October 15. The hot test operation of the dry storage facility began on October 23 and was completed on December 18, 2024. The NSC will subsequently conduct a safety review of the facility's operating license and will only issue an operating license after confirming that it complies with the control requirements of the "Nuclear Materials and Radioactive Waste Management Act."

The NSC issued the construction license for the spent fuel dry storage facility of Kuosheng NPP in August 2015; however, the construction has not been started, which led to the issue of an "application for extension of water conservation-related deadlines" due to the “Plan for Reduction of Runoff Wastewater at Construction Site” has not yet been approved by the New Taipei City Government. After administrative relief, TPC won the "Construction Site Runoff Wastewater Pollution Reduction Plan" lawsuit by the Supreme Administrative Court on April 19, 2023, and the New Taipei City Government

approved the plan on June 17, 2023. As for the "Water Conservation Related Deadline Extension Application" lawsuit, it was established through administrative mediation with the New Taipei City Government on June 11, 2024. After administrative relief, the New Taipei City Government approved the water conservation plan on August 14, 2024, and TPC started construction on January 2, 2025.

For social consensus and public acceptance, and for the implementation of the decommissioning plan as scheduled within 25 years (until 2044), the NSC has asked TPC to plan the 2nd phase spent fuel dry storage facility of Chinshan NPP to adopt indoor storage. The facility should be completed and operated as soon as possible to remove the spent fuel and proceed with the decommissioning smoothly.

The “Investment Feasibility Report of the 2nd Phase Indoor Spent Fuel Dry Storage Facility of Chinshan NPP” was approved by the Executive Yuan in August 2019, and the “Investment Feasibility Report of the 2nd Phase Indoor Spent Fuel Dry Storage Facility of Kuosheng NPP” was approved by the Executive Yuan in April 2021. The NSC has regulated the implementation progress of the 2nd Phase Indoor Spent Fuel Dry Storage Facility of Chinshan NPP through monthly meetings and has asked TPC to commence operation of the facilities in the transitional phase to facilitate the NPP decommissioning activities on schedule and with quality. The “Investment Feasibility Report of the Indoor Spent Fuel Dry Storage Facility of Maanshan NPP” was approved by the Executive Yuan in October 2021. The NSC will actively urge TPC to complete and operate the facility according to the decommissioning plan to facilitate the decommissioning on schedule with quality.

For the regulation and safety review of indoor dry storage facilities, the NSC has amended the “Safety Analysis Report Guides for Spent Fuel Dry Storage Facility Application” and has promulgated the “Review Guides for Safety Analysis Reports of Spent Fuel Dry Storage Facilities” (January 2019).

(2) Research Reactor Facilities

The NSC has reviewed and inspected TRR spent fuel pool, ZPRL reactor pool, WBR spent fuel drums, Central Warehouse, and inspection facility (hot cell) in NARI. The results show that all spent fuel facilities in NARI are in compliance with the safety standards.

In May 2019, five experts from IAEA, the U.S. National Nuclear Security Administration (NNSA), Los Alamos National Laboratory (LANL), and the Argonne National Laboratory (ANL) visited NARI, to inspect WBR fuel and have discussion over follow-up stabilization procedures.

NARI completed uranium powder stabilization of the fuel rods and TRR fuel pool in November 2019. All of the stabilized products (38 sets of storage containers) were transported to two temporarily storage boxes in Building 074. The 23 sets of storage containers of the first temporarily storage box have already been transported to Central Warehouse in Building 036A after approved by IAEA in March 2014. The remaining 15 sets of storage containers of the second temporary storage box were accounted for, sealed, and approved by the IAEA in October 2020. They were safely transported to the Central Warehouse in Building 036A in July 2021.

G.3 Siting of Proposed Facilities

Article 6 Siting of Proposed facilities

1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed spent fuel management facility:
   (i) to evaluate all relevant site related factors likely to affect the safety of such a facility during its operating lifetime;
   (ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment;
   (iii) to make information on the safety of such a facility available to members of the public;
   (iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.
2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facility shall not have unacceptable effects on other

Contracting Parties by being sited in accordance with the general safety requirements of Article 4.

According to Article 4 of the “Regulations on the Final Disposal of High Level Radioactive Waste and Safety Management of the Facilities,” the disposal facilities must not be located in the following areas: active fault or areas in which the geological conditions would affect the safety of the disposal facilities; areas with geochemical conditions not favorable for effectively controlling the spreading of pollution caused by radioactive nuclides and likely to affect the safety of the disposal facilities; areas with surficial or underground hydrographical conditions likely to affect the safety of the disposal facilities; areas with high population density; and other areas in which development is prohibited according to law. In addition, Article 5 of the Regulations stipulate that the disposal facilities shall be avoided to be located in the following areas: where landslide, collapse and volcanic activities are likely to occur; where geological structure is likely to change obviously; where hydrographical conditions are prone to change; where parent rock for disposal is being deteriorated obviously; where lithosphere is ascending or eroding obviously. If disposal facilities are located in any of the above areas, the operators shall bring forward solutions to ensure the facilities meet the safety requirements.

For detailed site investigation, Article 6 of the “Regulations on the Final Disposal of High Level Radioactive Waste and Safety Management of the Facilities” stipulates the operators of disposal facilities shall submit a plan for detailed site investigation, and then start the detailed investigation after the plan is approved by the competent authority. The plan of detailed site investigation shall include the following contents: description of the location, conceptual design of the operating area of disposal facilities, necessity of drilling or excavation and operation planning, research and test plan, plan for investigating and controlling the factors likely to influence the capability of the location to isolate highly radioactive wastes, quality assurance plan, restoration plan, financial description, and other contents specified by the competent authority.

TPC follows the “The Nuclear Materials and Radioactive Waste Management Act” and relevant regulations, carries out the siting and

construction of spent fuel final disposal facility. According to the regulations, TPC shall revise “Spent Fuel Final Disposal Program Plan” every 4 years, and submit to the NSC for review. The Plan was revised in 2022; and according to its planning, 2018 to 2028 is the second stage of the project, the “Candidate Site Selection and Approval” stage. The NSC has asked TPC to carry out siting activities based on three principles: detached organization, public participation, and objective criteria. The NSC has also asked TPC to implement the siting activities in host rock areas in priority based on former results, regional geological data, siting factors, and verification and comparison with results from public work and academic research in large-scale investigation.

G.4 Design and Construction of Facilities

Article 7 Design and Construction of Facilities

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and environment, including those from discharges or uncontrolled releases;

(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;

(iii) the technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing or analysis.

(1) Limitation of Radiological Impact

Spent fuel dry storage facilities are taken as independent spent fuel storage facilities, although they are located in the site of NPPs. According to Article 14, Paragraph 1 of the “Regulations on Treatment and Storage of Radioactive Waste and Safety Management of the Facilities,” the radiation protection design of the facilities shall ensure the annual effective dose equivalent to a general public outside the facilities is not more than 0.25mSv, and confirm to the as low as reasonably achievable (ALARA) principle.

The design of disposal facilities stipulated in Article 8 of the “Regulations on the Final Disposal of High Level Radioactive Waste and Safety Management of the Facilities,” multi-level isolation shall be designed for the disposal facilities. Also, from Article 9, the disposal facilities shall be designed to ensure that the annual effective radiation dosage to a common person outside the facilities is not more than 0.25mSv. Also, from Article 10, the disposal facilities shall be designed to ensure that the personal annual risk caused by the radiation to a person in the key groups outside the facilities is not more than 1/1,000,000.

(2) Planning and Technical Provisions for Decommissioning

There are plenty of international experiences regarding spent fuel pool decommissioning, proves that spent fuel pools can be decommissioned safely.

According to Article 4, Paragraph 4 of the “Regulations for the Review and Approval of Applications for Construction License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities,” conceptual plans and application of decommissioning of dry storage facilities shall be submitted with parts of safety analysis reports when applying for construction licenses.

(3) Technology Support from Experience, Testing and Analysis

The applicants should follow the technology support which is established from experience, testing, and analysis by the designers. This practice is anticipated to be continued in the future.

G.5 Safety Evaluation of Facilities

Article 8 Assessment of Safety of Facilities Each Contracting Party shall take the appropriate steps to ensure that: (i) before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out; (ii) before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (I).

(1) Safety and Environmental Assessments before Construction

According to Article 17, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” systematic safety and environmental assessments shall be carried out before the construction of spent fuel facilities. The evaluation shall be able to meet the following provisions:

- The construction is consistent with the provision of the relevant international conventions;
- The equipment and the facilities are sufficient to secure the public health and safety;
- The impact on the environmental ecology complies with the provision of relevant laws and regulations;
- The technology, the management capability and the financial basis, etc., of the applicant are competent to operate the facilities.

The safety analysis reports of spent fuel dry storage facilities of Chinshan and Kuosheng NPPs were reviewed in 2009 and 2015, respectively, and contruction licenses were issued.

The NSC asked TPC to submit a “Technical Feasibility Assessment Report on the Spent Nuclear Fuel Final Disposal (SNFD 2017 report)” by 2017 after complete the 1st stage “Potential Host Rock Characterization and Evaluation” of the final disposal project. The report is taken as a compilation of the R&D results in the stage, and it was reviewed by international peers to make sure that the development was in line with international standards.

The NSC invited experts and academics from engineering geology, earthquake engineering, civil engineering, nuclear engineering, radiation protection, materials science, and functional safety assessment, and so on, to review the feasibility of the project in accordance with the requirements in the “Regulations on the Final Disposal of High Level Radioactive Waste and Safety Management of the Facilities.” For the purpose of information disclosure, relevant reports have been made available online.

In response to the development of the phased work, the NSC also requires TPC to steadily conduct a rolling review and improve high-level radioactive disposal technology. Referring to the countries currently developing high-level

radioactive disposal plans, most of them have put forward safety case reports or safety assessment reports of high-level radioactive disposal facilities at different stages to verify the safety requirements of high-level radioactive disposal sites or use them as public communication. Therefore, the NSC participated in the review. Based on the experience of advanced nuclear energy countries, TPC was required to follow the safety case and safety assessment guidelines issued by the IAEA, refer to the international peer review of the "Feasibility Assessment Report on the Final Disposal of Spent Nuclear Fuel in Taiwan" and the review opinions of the NSC, and adopt the international advanced high-level radioactive disposal technology in the stage of Taiwan's high-level radioactive disposal plan and the characteristics of the geological disposal bedrock. A "Preliminary Safety Case Report for the Spent Nuclear Fuel Final Disposal" must be submitted before the end of 2021, and a "Safety Case Report for the Spent Nuclear Fuel Final Disposal" must be submitted before the end of 2025. Both reports must undergo domestic and international peer review to ensure that TPC's high-level radioactive disposal technology meets the best available technology and is in line with international standards, thereby improving the safety of high-level radioactive disposal facilities and ensuring public safety and environmental quality.

TPC subsequently submitted the "Preliminary Safety Case Report for the Spent Nuclear Fuel Final Disposal" in December 2021. After reviewing the report, TPC mainly referred to the experience and practices of countries that have not yet completed site selection internationally and established reference cases for research in non-specific sites for engineering design and safety assessment. The NSC has requested that TPC should provide continuous feedback on the technical development recommendations made by international peer experts in the "Preliminary Safety Case Report for the Spent Nuclear Fuel Final Disposal" to subsequent high-level radioactive disposal technology research and development, site investigation, engineering design, and safety assessment, to enhance Taiwan's high-level radioactive disposal technology capabilities. At the same time, it should adopt a rolling review to improve high-level radioactive disposal technology and continue to develop high-level radioactive disposal technology suitable for Taiwan's local conditions.

TPC plans to submit a "Safety Case Report for the Spent Nuclear Fuel Final Disposal" before the end of 2025. The NSC will continue to require TPC to follow international standards and enhance its high-level radioactive disposal technology and capabilities to bring TPC's high-level radioactive disposal technology capabilities up to international standards. It should also promote Taiwan's spent nuclear fuel final disposal plan by the planned schedule.

(2) Updating Assessments before Operation of Facilities

According to Article 18, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” spent fuel facilities shall not be formally operated without approval from the competent authority and the issuance of an operating license. Also, in accordance with Article 26, Paragraph 2 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” the applicants shall submit safety analysis report of the lastest edition to the competent authority to apply for operation license.

G.6 Operation of Facilities

Article 9 Operation of Facilities

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the license to operate a spent fuel management facility is based upon appropriate assessment as specified in Article 8 and is conditional on the completion of a commissioning program demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;

(iv) engineering and technical support in all safety related fields are available throughout the operating lifetime of a spent fuel management facility;

(v) incidents significant to safety are reported in a timely manner by the holder of the license to the regulatory body;
(vi) programs to collect and analyze relevant operating experience are established and that the results are acted upon, where appropriate;
(vii) decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.

(1) Operating License

According to Article 18, Paragraph 1 of the "Nuclear Materials and Radioactive Waste Management Act," spent fuel facilities shall not be shall not be formally operated without approval from the competent authority and the issuance of an operating license. According to Article 26 of the "Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act," before to apply for operation license, the applicant shall submit a test run plan to the competent authorities to apply for test run at first. After test run is finished, a letter of application enclosed with the following documents shall be submitted to the competent authorities to apply for operation license:

- Safety analysis report of the latest edition;
- Facility operating technical specifications;
- Test run report;
- Accident response plan;
- Other documents designated by the competent authorities.

The phase 1 construction of spent fuel dry storage facility of Chinshan NPP has completed but not yet operated. The dismantling activities of Chinshan NPP cannot be carried out if the spent fuel is not able to be removed from the reactors. Therefore, the NSC has requested TPC to adopt indoor dry storage concept which is in line with the social consensus for the 2nd phase spent fuel dry storage facility of Chinshan NPP, and to commission the facility as fast as it can for the decommissioning of Chinshan NPP.

(2) Operational Limits and Requirements

Operational limits and requirements derived from tests, operational experience and evaluation shall be incorporated into the Facility Operating Technical Specifications and submitted to the NSC according to regulations

currently applied. In addition, Article 19, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act,” stipulates neither of the design amendment nor equipment change, if involved in the significant safety items, shall be made without an application therefor submitted to and approved by the competent authority.

(3) Procedures for Operation, Maintenance, Monitoring, Inspection and Testing

Planning for quality assurance shall be included in the safety analysis reports for spent fuel facility operating licenses according to regulations currently applied. The operator shall follow the quality assurance plan specified in the safety analysis report approved by the NSC and strictly implement quality assurance measures. In accordance with Article 9, paragraph 1 of the “Quality Assurance Criteria of Nuclear Reactor Facilities,” all activities related to quality shall follow appropriate procedures.

The NSC will apply relevant regulations and licensing/ inspection procedures on the construction, commissioning, and operation of spent fuel storage facilities.

Regarding the inspection of spent fuel facilities, the NSC has proposed specific Inspection Guidance (IG-1) and Checklist of Inspection (IG-2) for each inspection items.

(4) Engineering and Technical Support in Safety Related Fields

Article 17, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act” stipulates the application for construction licenses of redioative waste facilities, the NSC will review the technology, the management capability and the financial basis, etc., of the applicant are competent to operate the facilities. Then the NSC will make sure that during operation, there will be sufficient engineering and technical support for safety related events.

(5) Reporting of Incidents

Reporting of incidents of redioative waste facilities (including abnormal or emergency events) shall comply with the following requirements in accordance with Article 30 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act.”

- Inside the nuclear reactors: report shall be prepared in accordance with related regulations on the Nuclear Reactors Facilities Regulation Act;

· Outside the nuclear reactors: information shall be made within 2 hours, and written report shall be brought forward within 30 days commencing from discovery of the event.

Article 7, Paragraph 1 of the “Enforcement Rules for the Implementation of Nuclear Reactor Facilities Regulation Act,” for the emergency event report in the nuclear reactor facility, a circular notice be submitted within one hour of finding the event, and followed by a written report within 30 days of that finding.

(6) Collection and Analysis of Operating Experience

Article 20 of the “Nuclear Materials and Radioactive Waste Management Act” stipulates that, the operator of treatment, storage or final disposal facilities of radioactive waste shall submit regularly to the competent authority the reports related to operation, radiation protection, environmental radiation monitoring, abnormal or emergency event, and any other reports designated by the competent authority. Therefore, the operators have the responsibility to collect and analyze operational experience, and report to the competent authority.

(7) Decommissioning Plan

According to Article 23 of the “Nuclear Materials and Radioactive Waste Management Act,” the decommissioning of redioative waste facilities shall be completed within 15 years after the permanent cessation of operation, and a decommissioning plan and shall implement it after the same has been reported to and approved by the competent authority. According to Article 20, Paragraph 1 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” a decommissioning plan shall include the following contents:

· Facility overview.
· Decommissioning objectives and time schedule.
· Decontamination methods and radioactive waste reduction measures.
· Class, characteristics, quantity, treatment, transportation and storage of radioactive waste.
· Radiation dosage evaluation and radiation protection measures.
· Environmental radiation monitoring.
· Personnel training.
· Reutilization plan of factory building or land.
· Quality assurance program.
· Accident response scheme.

· Other matters designated by the competent authorities.

G.7 Final Disposal of Spent Fuel

Article 10 Disposal of Spent Fuel If, pursuant to its own legislative and regulatory framework, a Contracting Party has designated spent fuel for disposal, the disposal of such spent fuel shall be in accordance with the obligations of Section C relating to the disposal of radioactive waste.

Under Article 29, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act”, TPC is responsible for the final disposal of spent nuclear fuel and also submitted a "Final Disposal Plan for Spent Nuclear Fuel" by the law, which was approved by the NSC in 2006 after review. Subsequently, the disposal plan should be reviewed and revised every four years by Article 37, Paragraph 2 of the "Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act" and submitted to the NSC for review.

In 2022, TPC submitted the "Final Disposal Plan for Spent Nuclear Fuel (2022 Revised Edition)", which has been reviewed and approved by the NSC, and relevant information has been made public on the NSC website.

According to the "Final Disposal Plan for Spent Nuclear Fuel (2022 Revised Edition)," the disposal is divided into five phases: "survey and evaluation of potential host rock (2005~2017), "candidate site selection and approval (2018~2028)," "detailed site investigation and test (2029~2038)," "repository design and safety analysis (2038~2044)" and "repository construction (2045~2055)." It entered the second stage, "Selection and approval of candidate sites," in 2018, and the disposal facility is scheduled to operate in 2055.

The NSC has formulated the "Regulations on the Final Disposal of High Level Radioactive Waste and Safety Management of the Facilities," which stipulate the safety standards for the final disposal of spent nuclear fuel, and established the "Site Specifications for the Final Disposal of High-Level

Radioactive Waste" for the MOEA and TPC to follow when selecting final disposal sites.

In May 2024, the MOEA also formulated the "Directives for Establishment of Radioactive Waste Disposal Project Office" to promote the work related to selecting sites for the Spent Nuclear Fuel Final Disposal Program in Taiwan.

H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

Article 11 General Safety Requirements

Each Contracting Party shall take the appropriate steps to ensure that at all stages of radioactive waste management individuals, society and the environment are adequately protected against radiological and other hazards. In so doing, each Contracting Party shall take the appropriate steps to:

(i) ensure the criticality and removal of residual heat generated during radioactive waste management are adequately addressed;

(ii) ensure that the generation of radioactive waste is kept to the minimum practicable;

(iii) take into account interdependencies among the different steps in radioactive waste management;

(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;

(v) take into account the biological, chemical and other hazards that may be associated with radioactive waste management;

(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;

(vii) aim to avoid imposing undue burdens on future generations.

H.1 General Safety Requirements

According to the “Nuclear Materials and Radioactive Waste Management Act,” the construction, operation, decommissioning, closure, institutional control, and exemption from institutional control of radioactive waste facilities are

reviewed and approved by the competent authority (NSC). The NSC inspects and oversees the facilities to ensure that the relevant regulations and commitments are complied with; moreover, appropriate measures are taken to ensure that adequate protection are provided against radiation and other hazards to any individuals, society and environment.

(1) Subcriticality and Residual Heat Removal

For there are no nuclear source material, nuclear fuel production facilities, and HLW produced from spent fuel reprocessing, criticality is normally not a concern in radioactive waste (except for spent fuel) management. The decay heat of LLW is very low, and the decay heat of HLW is relatively high.

(2) Minimization of Radioactive Waste Generation

The producers of radioactive waste shall be responsible for minimizing the quantity and volume of radioactive waste generation in accordance with Article 29, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act.” In addition, the treatment, transportation, storage and final disposal of radioactive waste shall be done by the generator of radioactive waste itself solely or be entrusted to the entrepreneur’ who or which is of technical capability of finally disposing of the domestic or foreign radioactive waste, or holds the facilities thereof.

TPC and small users have implemented radioactive waste volume reduction and other relevant measures in compliance with the requirements from the NSC.

(3) Interdependencies among Different Steps in Radioactive Waste Management

Regulations for each step of radioactive waste management facilities, including treatment, transportation, storage, disposal, decommissioning, closure, and institutional control, have been promulgated; NSC would confirm that interdependencies among the design, construction, and operation of each step are fully taken into account by facility operators.

(4) Regulations for Radiation Protection

(A) ALARA

Article 1 of the “Ionizing Radiation Protection Act” proposes that ALARA (as low as reasonably achievable) is the primary principle of radiation protection. Therefore, radiation exposure of workers and the

public caused by spent fuel facilities shall be kept as low as reasonably achievable. Along with other economic and social factors, radiation exposure could be kept well under dose limits in the regulations.

(B) Dose Limits

(a) Dose Limits for Radiation Workers

Article 7, Paragraph 7.1 of the "Safety Standards for Protection against Ionizing Radiation" stipulates that the dose limits of occupational exposure for radiation workers are specified as follows:

- The effective dose shall not exceed 100 mSv over a cycle of five consecutive years, and not exceed 50 mSv in any single year. (5 consecutive years started from January 1, 2003);
- The equivalent dose to the lens of the eye shall not exceed 150 mSv in a year; and
- The equivalent dose to skin or extremities shall not exceed 500 mSv in a year.

(b) Dose Limits for General Public

Article 12 of the “Safety Standards for Protection against Ionizing Radiation” specifies that the annual dose limits for the member of the public that are attributable to practices are:

- An effective dose shall not exceed 1 mSv;
- An equivalent dose to the lens of the eye shall not exceed 15 mSv; and
- An equivalent dose to skin shall not exceed 50 mSv.

(5) Consideration for Biological, Chemical and Other Hazards

Operators shall evaluate all potential biological, chemical and other hazards that may have bad influence on the public in each step of radioactive waste facilities in accordance with the current regulations.

(6) Consideration for Impacts on Future Generations

The safety standards are the same to current and future generations. However, “Fundamental Safety Principles” (IAEA Safety Standards Series No. SF-1) should also be followed by the government and the operators, and impacts to future generations should be evaluated to ensure that future generations are properly protected.

(7) Consideration for Burdens on Future Generations

The management of radioactive waste shall not impose an undue burden on future generations for ethical reasons and the requirements of “Fundamental Safety Principles” (IAEA Safety Standards Series No. SF-1). The policies in Taiwan are that the producers should be responsible for the management of radioactive waste; therefore, the design, construction, operation, decommissioning, closure, and funding of radioactive waste management facilities shall all comply with these policies.

H.2 Existing Facilities and Past Practices

Article 12 Existing Facilities and Past Practices

Each Contracting Party shall in due course take the appropriate steps to review:

(i) the safety of any radioactive waste management facility existing at the time the Convention enter into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;

(ii) the results of past practices in order to determine whether any intervention is needed for reasons of radiation protection bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention.

(1) Safety Review of Existing Radioactive Waste Facilities

(A) NPPs

The existing facilities related to NPPs and radioactive waste management are on-site treatment facilities, volume reduction centers (VRC), on-site storage facilities, and off-site LLW Storage Site. All of the abovementioned radioactive waste facilities are operated normally from 2020 to 2024; the generation of solidified LLW is also reduced continuously.

The NSC has conducted project reviews, periodical and routine inspections, and review of annual reports, ten-year re-evaluation, and safety assessment reports for relicensing to ensure that facility safety is in

compliance with safety standards. In addition, Meetings of Radioactive Materials Regulation have been periodically held for better communication between the regulatory authority and the operators.

Regarding the regulation of LLW Storage Site, under the strict supervision of the NSC, TPC completed the “Implementation Plan for Enhancement of Operation Safety of LLW Storage Site” on October 20, 2022, and restored to static storage mode. Subsequently, seismic resistance and aging management assessments of the storage facility structures will continue to ensure the safe storage of LLW in Lanyu.

(B) Small Users

The NSC had completed review of treatment and storage facilities in NARI during 2020 to 2024, and made sure that everything was in compliance with the safety standards.

The NSC has also reviewed and inspected temporary storage facility of radioactive waste in NTHU, to make sure that it is in compliance with the safety standards.

(2) Examination of Results from Past Practices

The NSC has reviewed past practices and concluded that there is no need of intervention. All radioactive waste arising from NPPs, as well as medical, agricultural, industrial and research activities is either stored on-site or off-site. There has no disposal of radioactive waste.

H.3 Siting of Proposed Facilities

Article 13 Siting of Proposed Facilities
1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility: (i) to evaluate all relevant site related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;

(ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of site conditions of disposal facilities after closure;

(iii) to make information on the safety of such a facility available to members of the public;

(iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.

2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.

The only ongoing siting activities are the siting of LLW final disposal; relevant activities and results are compiled in this section.

(1) Overview of Siting

The “Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility” was promulgated in May 2006. The purposes of this Act are to propose responsibility and procedures of siting, and to achieve objectives of maintaining safety and protect environment. The points are summarized as follows: (A) responsibility and procedures of the regulatory authority and the host organization; (B) the main producers of radioactive waste are responsible for the siting, and siting groups will be organized by representatives of government agencies, scholars and experts, environmental groups; (C) siting shall follow the principles of transparency, impartiality, openness, respectful feedback, communication, and collecting public opinions; (D) necessary requirements of time limit of siting and land acquisition.

Based on the Act, the MOEA is the host organization, and TPC is responsible for siting activities. The MOEA has organized a siting group through open selection, and announced Daren Township (Taitung County) and Wuqiu Township (Kinmen County) to be the recommended candidate sites in 2012. However, due to the failure to reach a consensus with these two local

governments and the public, the siting activities have been postponed ever since. In the future, the MOEA will be responsible for holding local referendums of siting activities.

The Executive Yuan's Nuclear-Free Group, considering the unsuccessful site selection for LLW disposal facilities, has requested the promotion of a mid-term interim storage facility (i.e., consolidated storage facility) plan as a response. The meeting held in March 2019 required TPC to actively promote the construction of a mid-term interim storage facility for radioactive waste and initiate social communication. Furthermore, in the meeting in December 2020, it requested TPC to develop relevant countermeasures regarding potential difficulties that might arise for the facility and to establish site selection criteria.

According to the decisions made in the Executive Yuan's Nuclear-Free Group meetings, TPC is tasked with commissioning the "Nuclear Waste Social Communication Planning Project" and the "Nuclear Waste Facility Site Selection Social Communication Plan." These initiatives mainly focus on gathering information about public participation regarding radioactive waste facility site selection, organizing focus group discussions and public dialogues to collect a wide range of opinions, and utilizing different discussion formats to accumulate feedback from various social groups to advance the site selection process.

The NSC has established and issued the "Regulations on Siting of Consolidated Radioactive Waste Facilities," which can serve as objective criteria for TPC in the site selection process to choose sites that meet the basic conditions of geological safety and environmental scientific assessment.

(2) Siting Criteria and Safety Evaluation

When siting of LLW final disposal site is implemented, safety evaluation should be done on possible impacts during operation and post-closure. According to Article 4, Paragraph 1 of the “Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility” and Article 7 of the “Regulations on Final Disposal of Low Level Radioactive Waste and Safety Management of the Facilities,” the siting of LLW final disposal site shall meet the following criteria, and further specification details in the “Guidelines for Restriction Areas of Low-level Radioactive Waste Final Disposal Facilities.”

That is, a site of disposal facilities must not be located in any of the following areas:

- Area where active faulting or geological conditions could endanger the safety of the disposal facilities,
- Area where the geochemical conditions are unfavorable for effectively suppressing the diffusion of radioactive nuclides, and it is likely to endanger the safety of the disposal facilities,
- Area where the hydrologic conditions of surface water or groundwater are likely to endanger the safety of the disposal facilities,
- Area of high population density, and
- Areas that cannot be developed according to the law.

The safety evaluation of final disposal facilities during operation and post-closure can follow the amended “Safety Analysis Report Guides for Low Level Radioactive Waste Final Disposal Facilities” (September 2016).

To actively control the safety of the final disposal of LLW, the NSC required TPC in December 2013 to submit a "LLW Final Disposal Technology Analysis Report" by the end of 2016. The report was intended to establish technical reports on waste characteristics, site characteristics investigation, disposal facility design and operation, and safety assessment related to the final disposal of LLW in Taiwan and to complete an international peer review to enhance the report's credibility. The NSC agreed to keep it for record after review in September 2017.

The NSC requires TPC to refer to the relevant regulations of the IAEA, keep pace with the times and improve its technology, and submit an updated version of the "LLW Final Disposal Technology Analysis Report" reviewed by domestic and international peers every four years to ensure that Taipower's LLW disposal technology can reach the best available technology and meet international standards. In June 2021, TPC submitted the "LLW Final Disposal Technology Analysis Report (2020 Edition)". After review by domestic and international peers, the NSC agreed to keep it for review in March 2022. In the future, TPC will continue to improve its various LLW disposal technologies and update the "LLW Final Disposal Technology Analysis Report" before the end of 2024. On December 30, 2024, TPC submitted the "LLW Final Disposal

Technology Analysis Report (2024 Edition)," which was reviewed by domestic and international peers, and the NSC is currently reviewing it.

(3) Evaluation of Impacts to Safety of Public, Society, and Environment

TPC shall submit the following reports regarding final disposal facilities of LLW: (A) “Report on Selection of Recommended Candidate Sites” (cooperate with site selection group) according to Article 9, paragraph 1 of the “Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility,” (B) “Investment Feasibility Study Report” according to Article 6 of the “Editing Guidelines for Fixed Assets Investment Project Affiliated to the MOEA,” (C) “Environmental Impact Assessment Report” according to Article 30, paragraph 1 of the “Standards for Determining Specific Items and Scope of Environmental Impact Assessments for Development Activities,” (D) “Safety Analysis Report” according to Article 3, paragraph 1 of the “Regulations for the Review and Approval of Applications for Construction License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities.” These documents should be able to demonstrate the siting procedures of LLW final disposal facilities, the results of investment feasibility study, the results of environmental impact assessment and safety evaluation; possible impacts of final disposal facilities on public, society, and environment now and in the future should also be included. The above documents should be reviewed by the regulatory authority, and taken as the basis for approving its construction.

(4) Availability of Information Disclosure

All information held or kept in custody by an administrative authority shall be made available to the public upon request in principle unless reasons for non-disclosure apply according to the “Administrative Procedure Act” amended on January 20, 2021.

Several regulations also require information related to safety of nuclear facilities to be made public, including the regulations that the MOEA referred to review the results of investment feasibility study, the regulations that the MOENV referred to review the results of environmental impact assessment, and the regulations that the NSC referred to review the results of safety analysis report. Current policies are to disclose information to the public.

The NSC has set up a final disposal section on its official website to enhance availability of information and public participation.

(5) Influence on Other Contracting Parties

Taiwan is surrounded by ocean without any border with other countries; given the nature and condition of LLW final disposal, the final disposal facilities will not have unacceptable impacts on other countries. If severe security incidents occurred, Taiwan will offer prompt and comprehensive information to the neighboring countries.

H.4 Design and Construction of Facilities

Article 14 Design and Construction of Facilities Each Contracting Party shall take the appropriate steps to ensure that: (i) the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases; (ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account; (iii) at the design stage, technical provisions for the closure of a disposal facility are prepared; (iv) the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.

(1) Limitation of Radiological Impacts

The radiation protection design of radioactive waste treatment and storage facilities shall comply with Article 5, Paragraph 1 and Article 14, Paragraph 1 of the “Regulations on Treatment and Storage of Radioactive Waste and Safety Management of the Facilities,” ensure the annual effective dose equivalent to a general public outside the facilities is not more than 0.25 mSv, and confirm to the as low as reasonably achievable (ALARA) principle.

The design of low level disposal facilities stipulated in Article 9 of the “Regulations on Final Disposal of Low Level Radioactive Waste and Safety Management of the Facilities,” multiple barriers shall be designed in the low level disposal facilities. Also, from Article 8, effective doses to individual members of the public caused by the facility shall not exceed 0.25 mSv/a, and doses shall be maintained ALARA.

The design of high level disposal facilities stipulated in Article 8 of the “Regulations on the Final Disposal of High Level Radioactive Waste and Safety Management of the Facilities,” multi-level isolation shall be designed for the disposal facilities. Also, from Article 9, the disposal facilities shall be designed to ensure that the annual effective radiation dosage to a common person outside the facilities is not more than 0.25mSv. Also, from Article 10, the disposal facilities shall be designed to ensure that the personal annual risk caused by the radiation to a person in the key groups outside the facilities is not more than 1/1,000,000.

(2) Decommissioning Planning and Technical Requirements

In Taiwan, the operators of radioactive waste treatment and storage facilities shall sumit a decommissioning plan comply with the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” which include contents of the facilities to be decommissioned, such as radiation evaluation, technical planning for each decommission stages, and radiation dosage evaluation. The relevant provisions are described as follows:

As stipulated in Article 28 of the Enforcement Rules, to apply for renewal of operation license according to Article 18, Paragraph 2 of the Act, the applicant shall submit a letter of application enclosed with the safety analysis report of the latest edition and the safety evaluation report for renewal of license to the competent authorities. Where necessary, the competent authorities may require the applicant to bring forward a decommissioning plan.

As stipulated in Article 29 of the Enforcement Rules, the safety evaluation report for renewal of license and the decommission plan referred to in the preceding article shall include the contents as prescribed in Articles 10 and 11.

As stipulated in Article 11 of the Enforcement Rules, the decommissioning plan brought forward shall include the following contents: Organization of the decommissioning executor, description of the facilities to be decommissioned,

radiation evaluation of the facilities to be decommissioned, classes and quantities of the radioactive wastes, manpower and technical planning for each decommission stages, job specification and time schedule of the stages, evaluation of radiation dosage and protection measures, Other matters designated by the competent authorities.

(3) Technical Support of Closure of Final Disposal Facility

The radioactive waste final disposal facility in Taiwan has outlined the technical support for closure during the design phase. Chapter 11 of the "Safety Analysis Report Guides for Low Level Radioactive Waste Final Disposal Facilities" specifies the requirements for operators to follow. Additionally, Article 33 of the "Enforcement Rules for the Nuclear Materials and Radioactive Waste Management Act" details the necessary items of the closure plan.

As stipulated in Chapter 11 of the “Safety Analysis Report Guides for Low Level Radioactive Waste Final Disposal Facilities,” it has regulated the planning for closure and monitoring, providing operators of the facilities with a framework for preparing the safety analysis report. The content includes:

- Stability planning for the disposal site: Proposing stability planning for the site to ensure the design or measures for a stable disposal facility.
- Closure planning: Describing the closure plan for the disposal facility, including decontamination planning, radiation protection design, inspection and monitoring plans, plans for the dismantling of auxiliary facilities, and methods for handling secondary waste.
- Monitoring planning: Describing the monitoring plan after the closure of the disposal site, including the monitoring period, management of the disposal site, and environmental monitoring measures.

As mentioned above, Article 33 of the "Enforcement Rules for the Nuclear Materials and Radioactive Waste Management Act" stipulates that the closure plan proposed by the facility operator shall include organization of the executing unit, procedures for the dismantling of surface facilities and decontamination operations, backfilling operations in the excavated areas, stabilization operations after the site closure, long-term safety assessments, accident analysis and response operations after closure, quality assurance plans, and other items designated by the competent authority.

(4) Technical Support by Experience, Testing, and Analysis

Taiwan requires that after the completion of the final disposal facilities for radioactive waste, trial operations shall be conducted according to relevant laws and regulations, which provide technical support for the formulation of norms, testing, and analysis.

According to Article 26, Paragraph 1 of the "Enforcement Rules for the Nuclear Materials and Radioactive Waste Management Act," before applying for an operation license for radioactive waste treatment, storage, or final disposal facilities according to Paragraph 1, Article 18 of the Act, the applicant shall submit a test run plan to the competent authorities to apply for a test run at first. Paragraph 2 of the same article states that after a test run is finished in accordance with the above paragraph, a letter of application enclosed with the following documents shall be submitted to the competent authorities to apply for an operation license, including a Safety analysis report of the latest edition, facility operating technical specifications, test run report, accident response plan, and other documents designated by the competent authorities.

H.5 Safety and Environmental Assessments of Facilities

Article 15 Assessment of Safety of Facilities

Each Contracting Party shall take the appropriate steps to ensure that:

(i) before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

(ii) in addition, before construction of a disposal facility, a systematic safety assessment and environment assessment for the period following closure shall be carried out and the results evaluated against the criteria established by the regulatory body;

(iii) before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

(1) Safety and Environmental Assessments before Construction

Article 17, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act” stipulates that before the construction of radioactive waste facilities, systematic safety and environmental assessments shall be carried out to ensure that the following criteria are met.

For the construction of treatment, storage or final disposal facilities of radioactive waste, an application for construction license shall be submitted to the competent authority, and the construction shall not commence until the application has been reviewed and approved to meet the following provision and the competent authority has issued a construction license therefor:

- The construction is consistent with the provision of the relevant international conventions;
- The equipment and facilities are sufficient to secure public health and safety;
- The impacts on the environmental ecology complies with the provision of relevant laws and regulations;
- The technical and management capability and the financial bases, etc. of the applicant are competent to operate the facilities.

(2) Post-Closure Safety and Environmental Assessments of Final Disposal Facilities before Construction

As stipulated in Article 3 and Article 4, Paragraph 2 of the “Regulations for the Review and Approval of Applications for Construction License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities,” to apply for construction license of final disposal facilities, the safety analysis report shall be appended with a closure and surveillance plan. In addition, where environmental impact assessment shall be conducted, the applicant shall submit the relevant environmental impact data recognized by the competent authority in charge of environmental protection during the construction license application.

(3) Updating Assessments before Operation of Facilities

Before to apply for operation license of radioactive waste facilities according to Article 26, Paragraph 1 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” the applicant shall submit a test run plan to the competent authorities to apply for test run at first. Also,

Article 26, Paragraph 2 of the Act, after test run is finished, a letter of application documents shall be submitted to the competent authorities to apply for operation license which enclosed with safety analysis reports of the latest edition, facility operating technical specifications, test run report, accident response plan, and other documents designated by the competent authorities.

H.6 Operation of Facilities

Article 16 Operation of Facility

Each Contracting Party shall take the appropriate steps to ensure that:

(i) the license to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning program demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedure. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;

(iv) engineering and technical support in all safety related fields are available throughout the operating lifetime of a radioactive waste management facility;

(v) procedures for characterization and classification of radioactive waste are applied;

(vi) incidents significant to safety are reported in a timely manner by the holder of the license to the regulatory body;

(vii) programs to collect and analyze relevant operating experience are established and that the results are acted upon, where appropriate;

(viii) decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body; (ix) plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.

(1) Operating License

According to Article 26 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” Before to apply for operation license of radioactive waste facilities, the applicant shall submit a test run plan to the competent authorities to apply for test run at first. After test run is finished, a letter of application enclosed with the following documents shall be submitted to the competent authorities to apply for operation license:

- Safety analysis report of the latest edition;
- Facilitiy operating technical specifications;
- Test run report;
- Accident response plan;
- Other documents designated by the competent authorities.

The facilities shall not be operated until approved by the competent authority along with issuing of the operating licenses.

(2) Operational Limits and Requirements

Operational limits and requirements shall be incorporated into the Facility Operating Technical Specifications, which is one of the references of operating licenses. Amendment of the Facility Operating Technical Specifications shall be reviewed and approved by the competent authority.

(3) Procedures of Operation of Final Disposal Facilities and Updating of Post-Closure Safety Assessment

Quality assurance program shall be included in the safety analysis reports required by the operating licenses of radioactive waste facilities according to current regulations. The operators shall follow the quality assurance program specified in the safety analysis reports approved by the NSC to implement quality assurance measures strictly. According to Article 9, Paragraph 1 of the

“Quality Assurance Criteria of Nuclear Reactor Facilities,” all activities that could impact the quality shall be performed in compliance with appropriate procedures.

Article 17 of the “Regulations on Final Disposal of Low Level Radioactive Waste and Safety Management of the Facilities” stipulates that the operators of LLW final disposal facilities shall re-evaluate the disposal facilities once every ten years, and submit an evaluation report to the competent authority for review and approval. This renewal is to further verify the results of post closure safety assessment through reviewing of the operational data and validating assumption provided in the Safety Analysis Reports.

(4) Engineering and Technical Support in Safety Related Fields

Article 17, Paragraph 1 of the “Nuclear Materials and Radioactive Waste Management Act” stipulates the application for construction licenses of redioative waste facilities, the NSC will review the technology, the management capability and the financial basis, etc., of the applicant are competent to operate the facilities. Then the NSC will make sure that during operation, there will be sufficient engineering and technical support for safety related events.

(5) Characteristics and Classification of Radioactive Waste

Different treatment procedures, different transportation packages, and different final disposal measures shall be applied according to the characteristics of the radioactive waste. The characteristics and classification of radioactive waste are stipulated in Articles 3 and Articles 4 of the “Regulations on Final Disposal of Low Level Radioactive Waste and Safety Management of the Facilities.”

(6) Reporting of Incidents

According to Article 30 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” the reporting of incidents (including abnormal or emergency events) in radioactive waste facilities shall follow the following requirements:

- Inside the nuclear reactors: report shall be prepared in accordance with related regulations on the Nuclear Reactors Facilities Regulation Act;
- Outside the nuclear reactors: information shall be made within 2 hours, and written report shall be brought forward within 30 days commencing from discovery of the event.

Article 7, Paragraph 1 of the “Enforcement Rules for the Implementation of Nuclear Reactor Facilities Regulation Act” for the emergency event report in the nuclear reactor facility, a circular notice be submitted within one hour of finding the event, and followed by a written report within 30 days of that finding.

(7) Collection and Analysis of Operating Experience

For properly collecting and analyzing operating experiences, Article 30 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act” stipulates that:

- Annual report on operation, radiation protection, and environmental radiation monitoring shall be submitted within 3 months after the termination of a year.
- Quarterly environmental radiation monitoring report shall be submitted within 60 days after the termination of each season.
- Monthly report on the quantity of treatment, generation, and storage of radioactive waste shall be submitted before the end of the next month.

In addition, Article 17 of the “Regulations on Treatment and Storage of Radioactive Waste and Safety Management of the Facilities” stipulates that, the operators shall re-evaluate the radioactive waste storage facilities every 10 years, and submit reports to the NSC for review and approval.

Also, Article 17 of the “Regulations on Treatment and Storage of Radioactive Waste and Safety Management of the Facilities” stipulates that the operators shall re-evaluate the storage facilities once every ten years, and submit an evaluation report to the competent authority for review and approval.

(8) Decommissioning Plan

The operators shall submit decommissioning plans within the specified time in accordance with Article 19, Paragraph 2 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” for decommissioning activities when the facilities are permanently cease of operation. According to Article 20, Paragraph 1 of the Enforcement Rules, a decommissioning plan shall include the following content:

- Facility overview.
- Decommissioning objectives and time schedule.
- Decontamination methods and radioactive waste reduction measures.

- Class, characteristics, quantity, treatment, transportation and storage of radioactive waste.
- Radiation dosage evaluation and radiation protection measures.
- Environmental radiation monitoring.
- Personnel training.
- Reutilization plan of factory building or land.
- Quality assurance program.
- Accident response scheme.
- Other matters designated by the competent authorities.

In accordance with Article 23, Paragraph 5 of the “Nuclear Materials and Radioactive Waste Management Act,” the decommissioning of radioactive waste facilities shall be completed within 15 years after the permanent cessation of operation. And the radiation protection design of the facilities shall ensure the annual effective dose equivalent to a general public outside the facilities is not more than 0.25mSv.

(9) Closure Plans for Final Disposal Facilities

According to Article 23, Paragraph 2 of the “Nuclear Materials and Radioactive Waste Management Act,” for the closure of the final disposal facilities of radioactive waste, the operator shall prepare the closure plan and the institutional control plan and shall implement the same after they have been reported to and approved by the competent authority.

According to Article 32 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act,” the closure plan prepared under Article 23, Paragraph 2 of the Act for an operator to close the final disposal facilities of radioactive waste shall include organization of executor, procedure of dismantling the facilities on the ground surface and decontamination, backfill of the excavated areas, stabilization operations after the site is closed, long-term safety evaluation, analysis of accidents likely to occur and response plan after closure, quality assurance program, and other matters designated by the competent authorities.

(10) Relocation Project of the LLW Storage Site

Relocation of LLW Storage Site in Orchid Island is consistency policy of the government in Taiwan. The NSC has urged TPC to keep implementing the relocation of the LLW Storage Site and the implementation status will be

reported to the Nuclear-Free Homeland Task Force of the Executive Yuan periodically. The NSC had also asked the Task Force to prioritize the discussion over the relocation of the LLW Storage Site and consolidated storage facility in July 2018, to relocate the LLW as soon as possible.

For further improvement of the safety of LLW storage before relocation, the NSC has asked TPC to submit the “Implementation Plan for Enhancement of Operation Safety of LLW Storage Site” and implement accordingly. The 55-gallon drums in the trench were repacked into hot-dip galvanized containers, which could prevent corrosion in advance and prepare for future relocation. TPC completed the repacking and restoring activities on October 20, 2022, and converted to static storage mode to ensure radiation safety and environmental quality.

The government places significant importance on the issues related to low-level radioactive waste on Orchid Island. Regarding compensation for the loss of indigenous reserved land used for low-level waste storage, the Executive Yuan approved the "Compensation Directives for Losses Related to the Use of Indigenous Reserved Land for Low-level Waste Storage on Orchid Island" effective October 2019. A compensation fund was established by retroactive compensation donations to specifically manage and promote the welfare of the Yami (Tao) people on Orchid Island. The NSC regularly convenes meetings to discuss follow-up actions related to the "truth investigation of the nuclear waste storage facility on Orchid Island," in cooperation with the MOEA and the Council of Indigenous Peoples, to supervise TPC in effectively carrying out relocation efforts. TPC has also been instructed to expedite planning for an "Interim storage facility for radioactive waste" and submit to the Nuclear-Free Homeland Task Force of the Executive Yuan to facilitate the relocation of LLW on Orchid Island.

In March 2019, the Executive Yuan's Nuclear-Free Homeland Task Force resolved that TPC should actively promote the construction of an interim storage facility for radioactive waste (i.e., a centralized storage facility) and initiate social communication. In addition to ongoing public communication, TPC has also commissioned the "Innovation Democracy Center at National Chengchi University" to carry out a "social communication plan for the site

selection of nuclear waste facilities," gathering opinions from various parties as a reference for advancing the site selection process.

Before the LLW is moved out from Orchid Island, the NSC will continue supervising the management of LLW and monitoring the environmental radiation of Orchid Island, to ensure the radiation safety and environmental quality of the personnel and the local people.

H.7 Institutional Control after Closure

Article 17 Institutional Measures after Closure Each Contracting Party shall take the appropriate steps to ensure that after closure of a disposal facility: (i) records of the location, design and inventory of that facility required by the regulatory body are preserved; (ii) active or passive institutional controls such as monitoring or access restrictions are carried out, if required; and (iii) if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is detected, intervention measures are implemented, if necessary.

Article 23, Paragraph 2 of the “Nuclear Materials and Radioactive Waste Management Act” stipulates that closure plan and institutional control plan shall be submitted and approved before the closure of the final disposal facilities, for the safety management of radioactive waste final disposal facilities after closure. And Article 33 of the “Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act” stipulates that the institutional control plan shall include the following contents:

- Organization of the executor,
- Site security,
- Environmental radiation monitoring,
- Quality assurance program,
- Records and archives management, and
- Other matters designated by the competent authorities.

Moreover, Article 24 of the “Nuclear Materials and Radioactive Waste Management Act” stipulates that for exemption from institutional control, the

environmental impact assessment and radiation safety assessment shall be approved by the MOENV and the NSC respectively. And from Article 34 of the "Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act," a final disposal facility can only be exempted from institutional control, when the annual effective dose caused by final disposal facilities to general public is lower than 0.25 mSv. The same Article also stipulates that the radiation safety evaluation report include the following contents shall be submitted:

- Description of the final disposal facilities and the ambient areas.
- Data of environmental radiation monitoring data during the operation, closure, and institutional control period.
- Natural and human activities impacting the final disposal facilities and the adjacent areas during the operation, closure, and institutional control period.
- Land reutilization plan.
- Radiation safety evaluation for land reutilization.
- Other matters designated by the competent authorities.

(1) Record Keeping

Article 33 of the "Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act" stipulates that the operators shall submit institutional control plans to the NSC for review and approval before the closure of the final disposal facilities. Chapter of "Management of Records and Archives" shall be included in the institutional control plans.

(2) Active and Passive Institutional Control

Article 33 of the "Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act" stipulates that the operators shall submit institutional control plans to the NSC for review and approval before the closure of the final disposal facilities. The institutional control plans shall include chapters of active institutional control such as "Environmental Radiation Monitoring" and "Site Security" and passive institutional control such as "Management of Records and Archives."

(3) Intervention Measures If Necessary

Article 32 of the "Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act" stipulates that the closure plan shall

include the analysis of accidents likely to occur and response plan after closure. Although there are no specific regulations regarding intervention measures, if any incident should occur, the operators should take intervention measures, and the NSC will ensure that the intervention measures can be properly executed.

I. TRANSBOUNDARY MOVEMENT

Article 27 Transboundary Movement

1. Each Contracting Party involved in transboundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant binding international instruments.

   In so doing:

   (i) a Contracting Party which is a State of origin shall take appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;

   (ii) transboundary movement through States of transit shall be subject to those in ternational obligations which are relevant to the particular modes of transport utilized;

   (iii) a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;

   (iv) a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph are met prior to transboundary

   (v) a Contracting Party which is a state of origin shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.

2. A Contracting Party shall not license the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.

3. Nothing in the Convention prejudices or affects:
   (i) the exercise, by ships and aircraft of all States, of maritime, river and air navigation rights and freedoms, as provided for in international law;
   (ii) rights of a Contracting Party to which radioactive waste is exported for processing to return, or provide for the return of, the radioactive waste and other products after treatment to the State of origin;
   (iii) the right of a Contracting Party to export its spent fuel for reprocessing;
   (iv) rights of a Contracting Party to which spent fuel are exported for reprocessing to return, or provide for the return of, radioactive waste and other products resulting from reprocessing operations to the State of origin.

I.1 General Requirements

The transboundary movement of radioactive waste is regulated by the "Regulations for the Operation Permit of Radioactive Waste," the transboundary movement of spent fuel is mutatis mutandis within part of the "Regulations for the Nuclear Fuels Operational Safety Management." Moreover, they should all comply with the requirements in the "Regulations on Safely Transportation of Radioactive Materials."

(1) Transit Transportation

There are no practical needs for transit transportation of spent fuel or radioactive waste in Taiwan; therefore, currently, there are no regulations regarding transit transportation as for the related regulations of the "Nuclear Materials and Radioactive Waste Management Act." However, if transboundary movement requires transit transportation, international regulations and requirements regarding transit transportation will be followed.

(2) Requirements of Receiving Countries' Consent of Transboundary Movement

Article 13, paragraph 1 of the "Regulations for the Operation Permit of Radioactive Waste" stipulates that, to apply for export permit of radioactive waste, an application form enclosed with a transport plan and the following

documents shall be submitted to the competent authority for review and approval:

- Photocopy of the import permits issued by the receiving country, which shall be notarized by the overseas missions of the Republic of China.
- The Chinese translation of the import permits referred to in the preceding subdivision, which shall be notarized by the overseas missions of the Republic of China or by domestic public notaries.
- Photocopy of the certificate on the management capability of receiving institute.
- Assessment documents conform to the related safety requirements set forth in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management issued by the IAEA.
- Photocopy and Chinese translation of the operation permit of receiving facility.
- Photocopy and Chinese translation of the written contracts signed by the applicant and the receiving institute as well as other related documents.
- Relevant laws, regulations as well as inspect and examine requirements of the receiving country on the low level radioactive waste (original and English or Chinese version), and assessment documents of its safety-related requirements.

In accordance with the above regulations, radioactive waste will only be exported to countries having administrative and technical capacity, as well as regulatory structure needed to manage the radioactive waste in a manner consistent with the Convention.

(3) Requirements of Exporting Countries' Consent of Transboundary Movement

Article 11, Paragraph 1 of the "Regulations for the Operation Permit of Radioactive Waste" stipulates that, to apply for import permit of radioactive waste, an application form enclosed with a transport plan and the following documents shall be submitted to the competent authority for review and approval:

- Photocopy of the export permit issued by the exporting country, which shall be notarized by the overseas missions of the Republic of China.

- The Chinese translation of the export permit referred to in the preceding subdivision, which shall be notarized by the overseas missions of the Republic of China or by domestic public notaries.
- Photocopy and Chinese translation of the written contract signed by the applicant and the exporting institute as well as other related documents.
- The purpose and the treatment methods of imported radioactive waste.
- Type, characteristics, quantity, nuclides activity and packaging of the radioactive waste.
- Photocopy of operation permit of the receiving facility and the planning on the volume estimation, return and disposal measure of secondary waste.

So far, there is no experience of allowing importation of radioactive waste.

(4) Re-entry in case of Non-Conformity

Re-entry of non-conforming spent fuel or radioactive waste has never been required in Taiwan. International requirements and domestic regulations or laws will be followed if there is re-entry of non-conforming spent fuel or radioactive waste. Article 10 of the “Regulations for the Operation Permit of Radioactive Waste” stipulates that, to apply for import of radioactive waste, the applicant shall have any of the following qualifications:

- Operator of radioactive waste treatment facility.
- Operator of radioactive waste final disposal facility.
- Exporter of radioactive waste in case that the original waste or the waste after treatment should be returned.

I.2 Transportation Beyond 60 Degrees Latitude South

The applicants for exportation of spent fuel or radioactive waste shall apply for export permits to the competent authority in accordance with the “Nuclear Materials and Radioactive Waste Management Act.” The abovementioned permit does not apply to transportation beyond 60 degrees latitude south (including the whole Antarctica). Although transportation beyond 60 degrees latitude south is not prohibited by the Act, practically, Taiwan will follow the provision from Article 27 of the Convention, and the transportation will not be approved.

J. DISUSED SEALED SOURCES

Article 28 Disused Sealed Sources

1. Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, re-manufacturing or disposal of disused sealed sources takes place in a safe manner.
2. A Contracting Party shall allow for re-entry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.

J.1 Safety Regulation on Disused Sealed Sources

According to the provisions of the “Administrative Regulations for Radioactive Material and Equipment Capable of Producing Ionizing Radiation and Associated Practice,” the operators or the possessors of the sources shall fill out application forms for permanent cessation of use of sealed sources. Permission to cease from use will be granted by the NSC after the documents are reviewed and approved. The sealed sources possessed by TPC are solidified and stored in Chinshan NPP, Kuosheng NPP, and Maanshan NPP by region, along with the radioactive waste generated by the NPPs. Other disused sealed sources from small users shall be transported to NARI for management and storage according to Article 37, Paragraph 2 of the “Administrative Regulations for Radioactive Material and Equipment Capable of Producing Ionizing Radiation and Associated Practice.”

Application forms and documents related to transportation shall be submitted to the competent authority when disused sealed sources from small users retracted by their suppliers. Export permits will be granted after the documents are reviewed and approved. Moreover, the operators shall cancel the original registration certificates or permits within 30 days after exportation, by submitting the photocopy of the export documents, the radiation workplace monitoring certificate, and other relevant documents to the competent authority.

For the management of disused sealed sources, the NSC will review the abovementioned documents, and carry out on-site inspection. The disused sealed sources of TPC will be inspected along with routine inspection of NPPs, and the disused sealed sources stored in NARI will be inspected along with routine inspection of NARI. The NSC will implement on-site inspection for the storage management and radiation safety of the storage facilities if disused sealed sources possessed by civilian facilities are not delivered to NARI within 3 months after the NSC grants the permission and also not apply for an extension.

J.2 Management of Disused Sealed Sources

The disused sealed sources of TPC are currently stored in NPPs. There are 367 disused sealed sources in total stored in NPPs by the end of December 2024. Few of the disused sealed sources have been solidificated with sludge, and stored in the 55-gallon drums in the NPPs.

The NSC has appointed NARI to receive and manage the disused sealed sources produced by small users. NARI will review the documents submitted by the users, to double check the types and activity of the radionuclides before receiving the sources. Then the sources will be stored in the radioactive waste storage facilities in NARI with their original packages. Relevant information will be reported to the competent authority monthly.

The disused sealed sources produced by small users are transferred to NARI for treatment and storage. By the end of December 2024, there are 14,802 disused sealed sources stored in NARI.

J.3 Re-entry into the Territory

In Taiwan, NARI is the only manufacturer producing sealed sources. However, the sources produced by NARI are mainly provided to medical institutions in Taiwan and have not been exported. Therefore, re-entry into the territory is not an issue in Taiwan.

K. GENERAL EFFORTS TO IMPROVE SAFETY

Besides establishment of the laws and regulations, improvement in the management system, and practical measures of radioactive waste management, this chapter demonstrates activities done by the NSC, MOEA, and TPC for improvement in safety.

K.1 Organization Reformation and Establishment of Project Office

The government is responsible for managing spent fuel and radioactive waste and maintaining public health and environmental safety while ensuring intergenerational equity and justice. By the fundamental safety principles of the International Atomic Energy Agency (IAEA) and by referencing the disposal experiences of advanced countries, to appropriately address the issues of spent fuel and radioactive waste, the government should establish independent safety regulatory agencies, develop comprehensive safety standards, and have an explicit allocation of responsibilities and divisions within the operational management structure. This will ensure independent review and oversight functions for safe management. The reorganization of the Atomic Energy Council (AEC) of Executive Yuan will be transformed into the Nuclear Safety Commission (NSC), which will serve as the independent safety regulatory agency for nuclear safety regulations. The Ministry of Economic Affairs (MOEA) has established guidelines for establishing the "Directives for Establishment of Radioactive Waste Disposal Project Office" to promote site selection for the final disposal of spent fuel and radioactive waste.

(1) Organization Reformation of the NSC and Confirmation of the domestication of the Joint Convention

The AEC has been re-organized into the NSC which is solely in charge of nuclear safety regulation. The re-organization is corresponding to the organization reformation policy of the Executive Yuan and the basic principles

of IAEA nuclear energy safety. The NSC Organization Act was announced and implemented on June 21, 2023. It clearly states that the NSC shall independently perform its powers according to the law. Its responsibilities include the safety review and regulation of radioactive materials and their facilities, ensuring a clear division of authority and responsibilities between the operators and the regulatory body, and guaranteeing an independent review and oversight of the safety management of spent nuclear fuel and radioactive waste.

To align with the government's push for the domestic implementation of multilateral international treaties and agreements and to confirm that the established regulatory framework meets current international safety standards, the NSC will systematically compare each article of the Convention with our country's existing regulations on radioactive material. After extensive review, the NSC has confirmed that the safety requirements for radioactive materials outlined in the Convention have been adequately reflected in the regulatory system under its jurisdiction and further implemented in regulatory practices.

(2) Establishment of Project Office

The MOEA issued the "Directives for Establishment of Radioactive Waste Disposal Project Office of the MOEA" on May 10, 2024, to effectively promote the final disposal plan for spent fuel and radioactive waste in Taiwan. This office will handle related tasks, including formulating policies for the final disposal of HLW, promoting legislation for the site selection of HLW disposal, operating site selection for both HLW and LLW disposal and necessary geological surveys, public participation and communication, and other related matters.

K.2 Improvement in Public Participation and Information Transparency

(1) The Nuclear Safety Commission (NSC)

(A) Information Transparency

The NSC adheres to an independent and professional stance, publicly sharing information related to radioactive material regulation and NPP decommissioning on its official website for public access at any time. The content includes safety evaluation reports on radioactive waste liquid treatment facilities, annual reports on radioactive waste management, annual solid waste production calculations, information about dry storage facilities, and plans for final disposal and implementation results. The NSC has established a dedicated section on decommissioning control, providing public access to significant decommissioning safety control notes, decommissioning plans, and review documents, thereby enhancing information transparency. Additionally, the Commission actively collects media coverage and key public concern issues, monitors public sentiment trends, and responds swiftly to changes. In the face of misinformation or major crisis management, the Commission quickly understands the core issues, provides timely explanations, and posts clarifying information on the official website's dedicated "Responses to Significant Public Concerns" section for public reference, ensuring that the public receives accurate information.

In light of changing times and environments, the communication methods between the government and the public also need to keep pace. Therefore, in addition to optimizing the content of its official website, the NSC actively manages the Facebook fan page, using concise text, infographics, and multimedia videos to combine current topics, producing thematic posts such as "Decommissioning NPPs for Beginners," "Radioactive Waste Disposal Control," "Reducing LLW," "Dry Storage Facilities," and "Dutch Consolidated Radioactive Waste Storage Facilities." Compared to the systematic and comprehensive professional information on the official website, the fan page is more interactive and timely, effectively attracting public attention. Furthermore, through the social media sharing function, relevant information can be rapidly disseminated, expanding the communication reach, increasing information openness and transparency, and facilitating two-way communication with the public.

The NSC recognizes that popular science activities can bridge the gap in public interaction, as they have educational significance and serve a social communication function. Therefore, it abandons traditional thinking and introduces design elements to promote atomic energy awareness through curation, establishing safety control sections for nuclear power plants, and radioactive waste disposal. Considering that the public may be unfamiliar with the structures of nuclear power plants and waste disposal facilities, the Commission produces small-scale models of the Chinshan NPP, dry storage, and HLW final disposal for visitors to observe and touch, supplemented by easy-to-understand explanations, enhancing the public's understanding of related issues and domestic and international developments. From 2020 to the end of 2024, the NSC held 12 popular science exhibitions, totaling 28 exhibition days, attracting approximately 56,000 visitors across 9 counties and cities in Taiwan's northern, central, southern, and eastern regions.

Moreover, to enhance public trust and understanding regarding nuclear safety affairs, the NSC has established a "National Participation Advisory Committee," inviting six experts, scholars, or representatives from civil organizations concerned about nuclear safety issues to serve as members, providing concrete suggestions for the NSC's public participation and communication-related operations to meet practical needs.

(B) Local briefings and hearings

The NSC conducted a safety review of the decommissioning plan for Kuosheng NPP, which began after receiving the submitted decommissioning plan and related documents from TPC in December 2018. The Commission convened a project review team comprising experts and the NSC staff to assess the materials and published the decommissioning-related information on its website. On March 22, 2019, the Commission invited local governments, representatives, and civic groups from the area where the NPPs are located to participate in a local briefing session on the decommissioning plan for Kuosheng NPP in order to listen to public opinions as a reference for the review process.

To enhance public participation and gather diverse local views, when the Commission received the decommissioning plan for Maanshan NPP from TPC in July 2021, it convened a review team composed of scholars, experts, and colleagues to conduct a substantial review of key aspects of the plan, including decontamination and dismantling methods, radiation protection and environmental monitoring, waste management, organizational and personnel training, emergency response, and fuel safety. On November 3, 2021, the Commission held a local briefing session near Maanshan NPP to gather opinions from residents, representatives, and public groups regarding the decommissioning plan, which would serve as a reference for the review process.

In addition, the Commission completed revisions to the "Regulations for the Review and Approval of Applications for Construction License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities" in 2020, requiring the facility operator, Taiwan Power Company, to hold public explanatory meetings prior to applying for construction licenses for each facility, thereby allowing the local community and concerned groups ample opportunity to understand the contents of the applications and fully express their opinions.

On January 30, 2023, Taiwan Power Company submitted an application to the Nuclear Safety Commission for constructing an LLW storage facility to decommission Chinshan NPP. Under the provisions of the "Nuclear Materials and Radioactive Waste Management Act" and the "Administrative Procedure Act," the NSC conducted public announcements, prepared hearings, and held hearings, providing the public with a complete opportunity to express their opinions and present evidence. Subsequently, the Commission will consider all hearing outcomes and safety review results and issue the construction license in July 2024.

(2) The Ministry of Economic Affairs (MOEA) and Taiwan Power Company (TPC)

Since the MOEA began its site selection operations for LLW final disposal facilities, it has published information about these operations quarterly on the

Department of State-owned Enterprise Affairs website [1]. Taiwan Power Company also emphasizes the transparency of information regarding the backend operations of nuclear energy. In 2018, TPC established a dedicated website for nuclear backend operations[2] to publish information on dry storage, nuclear power plant decommissioning, LLW final disposal, HLW final disposal, and interim storage. By making this information public, the public can understand the basic safety considerations and the progress of the site selection process.

TPC has entrusted National Chengchi University (NCCU) with planning a communication project concerning nuclear waste, which is scheduled from June 2019 to June 2021, with ongoing activities planned from August 2021 to August 2024. The project will primarily focus on issues related to the site selection of spent fuel and radioactive waste facilities, collecting public participation information regarding domestic and international site selection processes, organizing focus group discussions, and public dialogue meetings to gather opinions from various perspectives. Different discussion formats will also accumulate feedback from various social groups and serve as a reference for promoting site selection efforts.

Regarding the plans for the final disposal of spent fuel and radioactive waste, the NSC, on December 12, 2023, requested that TPC conduct relevant public communication operations, ensuring that the participants in the public engagement and communication processes should include not only stakeholders but also members of the public concerned about the issue. The Commission also recommended that the communication process strengthen participatory mechanisms with deliberative democracy and gather opinions from scholars, experts, and civil organizations.

[1] https://www.moea.gov.tw/MNS/cnc/content/SubMenu.aspx?menu_id=12094
[2] https://nbmi.taipower.com.tw/

K.3 International Collaboration and Technical Information Exchange

Radioactive waste management technologies are advancing rapidly, in order to make the safety requirements and safety regulation technologies in line with international standards, the NSC has actively seeking for international collaboration and technical information exchange. In 2019, the NSC and the French Institute for Radiological Protection and Nuclear Safety (IRSN) signed a Framework Cooperation Agreement in the Field of Radiation Protection and Nuclear Safety. Moreover, the NSC continues to hold the annual "TECRO-AIT JSC Meeting on Civil Nuclear Cooperation " and the "NSC-NRA Nuclear Regulatory Information Exchange Meeting" to facilitate technical exchanges and experience sharing, enhance knowledge, and maintain technological advancement.

TPC continues to invite experts from the Electric Power Research Institute (EPRI) in the United States each year to share updates and technical exchanges regarding the "Operational Information on Spent Nuclear Fuel and High-Level Radioactive Waste" through workshops to deepen knowledge on dry storage and obtain the latest developments in dry storage in the United States. In addition to organizing workshops, Taiwan Power Company also participates in the annual ESCP meetings organized by EPRI for technical exchanges, Other important international activities during this reporting period include the following:

(1) Routine activities

- TECRO-AIT JSC Meeting on Civil Nuclear Cooperation in 2021 (Video).
- The 7th NSC-NRA Nuclear Regulatory Information Exchange Meeting in 2021 (video).
- TECRO-AIT JSC Meeting on Civil Nuclear Cooperation in 2022 (United States).
- The 8th NSC-NRA Nuclear Regulatory Information Exchange Meeting in 2022 (video).
- TECRO-AIT JSC Meeting on Civil Nuclear Cooperation in 2023 (Taipei).

- The 9th NSC-NRA Nuclear Regulatory Information Exchange Meeting in 2023 (Tokyo).
- The NSC and the Atomic Decommissioning Study Agency of Japan (ANDES) jointly hosted the "2024 Japan Nuclear Power Plant Decommissioning Waste Safety Control Technology Experience Seminar."

(2) Other activities

- The "Taiwan-France Framework Cooperation Agreement in the Field of Radiation Protection and Nuclear Safety" (2019–2024) was signed in 2019. The technical and scientific topics covered under this agreement include research on safety assessment and risk management for the deep geological disposal of high-level radioactive waste, as well as scientific and technological cooperation related to Underground Research Laboratory (URL).
- The Japan-Taiwan Exchange Association assisted the Nuclear Safety Commission in a "virtual visit" to the Fukushima Daiichi Nuclear Power Plant in 2021.
- A "bilateral technical exchange meeting" between the Nuclear Safety Commission and the U.S. Nuclear Regulatory Commission was held in 2023.
- A "bilateral technical exchange meeting" between the Nuclear Safety Commission and the U.S. Nuclear Regulatory Commission was held in 2024.
- The National Atomic Research Institute (NARI) held a seminar on the final disposal of radioactive waste and natural analogy in 2024.
- A delegation led by a professor from De La Salle University in the Philippines visited the Nuclear Safety Commission (NSC) to gain an understanding of Taiwan’s nuclear power plant operations and radioactive waste management practices in 2024.
- The NSC held a technical exchange via video conference with Bel V, the Belgian nuclear safety control technical support agency in 2024.
- A Taiwan-Japan exchange event on "Dry Storage and Nuclear Power Plant Facilities" held in 2024.

K.4 Suggestions and Improvement from International Peer Review of the Previous Report

In order to master international trends and good practice of spent fuel and radioactive waste management, and feedback to the regulation measures in Taiwan, the NSC has professional researchers study the content of national reports published by each Contracting Party of the Convention.

The NSC invited the U.S. Department of Energy (US DOE) to review Taiwan's “2020 National Report” during the "TECRO-AIT JSC Meeting on Civil Nuclear Cooperation" in May 2021; the DOE replied with no comment. The NSC continuously updates relevant regulatory dynamics on the safety of spent fuel and radioactive waste management, and this report also includes updated information.

K.5 Challenges in the Future, and Planning for Improving Safety

Spent fuel dry storage and radioactive waste management and control are important issues that we are encountering in Taiwan. All of the stakeholders should have discussion and establish consensus to overcome the difficulties.

(1) Spent Fuel Dry Storage

The spent fuel dry storage facility is necessary for the decommissioning of NPPs. Regarding the outdoor dry storage facility of Chinshan and Kuosheng NPPs, TPC completed the hot testing of the outdoor dry storage facility of Chinshan NPP on December 18, 2024, and will subsequently apply for an operating license to the NSC. Additionally, construction of the outdoor dry storage facility of Kuosheng NPP began on January 2, 2025. The construction plans for the indoor dry storage facilities of Chinshan, Kuosheng, and Maanshan NPP have been approved by the Executive Yuan, and TPC will handle the application for construction permits, with the expectation that Taiwan will gradually have five dry storage facilities operating simultaneously in the coming years.

In order to conduct a thorough safety review of TPC's operating license for the outdoor dry storage facility of Chinshan NPP, the NSC will invite external experts and scholars, together with colleagues from the various divisions of the NSC, to form a project review team. They will rigorously execute the safety review process and only agree to issue the operating license after confirming that all application documents comply with the relevant provisions of the "Radioactive Materials Management Act." In the future, after the facility is in operation, the Nuclear Safety Commission will also strictly execute inspections of the spent fuel transportation and storage operations and the operational safety inspections of the facility to ensure the safety of spent fuel storage.

Regarding constructing the outdoor dry storage facility for Kuosheng NPP, the NSC will follow the experience gained from constructing the outdoor dry storage facility of Chinshan NPP. They regularly dispatch inspectors during the facility construction period to conduct construction inspections. For specific process control, the NSC will plan to entrust domestic industry experts to provide technical support to ensure the quality of facility construction. Regarding safety review for construction permits and operating licenses, the NSC has long collaborated with domestic academic, governmental, and industrial research sectors through the National Science and Technology Council's programs and commissioned research projects. The NSC conduct research on safety control technology for spent fuel dry storage and analyze the regulatory information and transportation experiences of advanced nuclear energy countries to establish and improve safety inspection technical capabilities and cultivate nuclear energy professionals.

Standing in the position of safety regulation, the NSC strictly reviews all related application documents for the dry storage facility, implements safety inspections for spent fuel transportation and facility operations, and ensures the safety of spent fuel storage.

(2) Spent Fuel Final Disposal

The TPC's "Spent Fuel Final Disposal Program Plan" entered its second phase, "Candidate Site Selection and Approval," in 2018, with site selection operations being carried out by the MOEA and the TPC. The MOEA established and issued "Directives for Establishment of Radioactive Waste Disposal Project Office of the MOEA" on May 10, 2024, to promote the related site selection

activities for the spent fuel final disposal in Taiwan. The office's tasks include site selection for the final disposal of spent fuel, public participation, and communication, among other duties.

The NSC is the competent authority responsible for overseeing and regulating nuclear safety, performing reviews and inspections related to the final disposal of spent fuel by the "Nuclear Materials and Radioactive Waste Management Act." The NSC strictly controls the TPC's implementation of the final disposal plan for spent fuel and has developed safety management rules and site standards for HLW disposal to guide the MOEA and the TPC in adhering to safety standards for site selection operations. The NSC continues to work with the MOEA to urge the TPC to strengthen communication and coordination regarding the site selection for spent fuel final disposal facilities, facilitating a smooth site selection process.

(3) Operation Safety of the LLW Storage Site

The LLW Storage Site holds 100,277 drums of low-level radioactive waste, all stored adequately in 23 trenches. The NSC conducts regular, monthly, and annual safety inspections. Since 1996, the site has implemented zero discharge measures for wastewater generated within the radiation control zone, and wastewater is treated by evaporators and reused on-site.

Since 2018, the NSC has convened discussions on relocating the site with representatives from the MOEA and the Council of Indigenous Peoples every six months, urging TPC to actively promote the construction of interim storage facilities for radioactive waste and to initiate social communication. The NSC has also requested TPC to prepare the preliminary work related to the relocation of LLW from Orchid Island, and in June 2022, Enacted and Promulgated the "Regulations on Radiation Safety for Ships Transporting Low-level Radioactive Waste by Sea" to guide the design of transport vessels for LLW by TPC.

The NSC has set up three environmental radiation monitoring stations on Orchid Island. Historical monitoring results indicate that environmental radiation levels are approximately 0.02 to 0.09 microsieverts per hour (μSv/h), which remain within the range of natural background values of 0.2 μSv/h. The radiation detection center of the Nuclear Safety Commission monitors the environmental radiation in the Orchid Island and around the storage site each

year, with monitoring items including direct radiation, drinking water, agricultural and fishery products, soil, seawater, and beach sand, with more than 500 samples tested annually, and no indications of radiation anomalies reported to date.

The NSC requires TPC to report and implement the "Implementation Plan for Enhancement of Operation Safety of LLW Storage Site," which involves re-packaging all existing 55-gallon waste drums in heat-galvanized containers to prevent corrosion issues preemptively and to prepare for relocation packaging. As of October 2022, TPC has completed the re-packaging and storage operations of all LLW drums, and the LLW storage site has reverted to a static storage mode. To ensure the safe storage of waste drums before the relocation of LLW from Orchid Island, the NSC has mandated that TPC conduct structural safety inspections and aging management assessments of the trench at the LLW storage site each year, as well as conduct accident drills to enhance the crisis awareness and response capabilities of the operating personnel.

(4) Control of Decommissioning Waste Facilities

The NSC has requested TPC to consider the "Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards (No. GSR Part 3)" recommended by the IAEA to establish a "Detection and Inspection Plan for the Main Generator and Related Equipment Departing from Chinshan NPP." After review and approval by the NSC, this plan will be utilized to implement the detection and inspection operations for the decommissioned waste from Chinshan NPP. The off-site standard of the aforementioned plan specifies that the annual radiation dose to the general public should be less than 10 μSv, which roughly translates to an activity concentration of about 100 Bq/kg for radioactive nuclides, by the international principles of low individual risk and the dosage standards of Taiwan's regulatory laws.

To enhance the safety control of the off-site detection operations for the decommissioned waste from Chinshan NPP, the NSC has developed a project inspection plan and will conduct a preparatory special inspection before operations; during operations, a special inspection for operational safety is carried out. At the same time, the NSC requires TPC to implement independent quality assurance operations and establish an independent verification mechanism. The relevant detection instruments and quality assurance

procedures must pass the National Accreditation Foundation (TAF) certification. Furthermore, the NSC commissions the NARI to verify the results of the off-site waste inspections from Chinshan NPP on an irregular basis. To date, the independent verification and the verification results from the NARI comply with the off-site standards, with no detection of anomalies. The NSC will continue diligently implementing safety control over the off-site detection at Chinshan NPP to ensure operational quality and public radiation safety.

To ensure the safe storage of decommissioned radioactive waste from nuclear power plants, the NSC rigorously reviews TPC's application for a construction license for the LLW storage facility of Chinshan NPP. By the law, a hearing involving the applicant, relevant authorities, local residents, and concerned groups is convened for this case. After review, the NSC confirmed that the case meets the provisions of the "Nuclear Materials and Radioactive Waste Management Act." Consideration of the hearing results led to the issuance of the construction license in July 2024, along with a requirement for regular safety assessments during the operation of the radioactive waste storage facility to ensure operational safety. In addition, the NSC rigorously reviews TPC's application regarding the characteristics of the decommissioned radioactive waste, specifically for using LLW containers. After confirming the structure and operational safety of these containers, the NSC approved TPC’s use of them in November 2024. Furthermore, during the decommissioning of the NPP, the NSC continues to conduct regular, routine, unannounced, and special safety inspections of various radioactive waste facilities to ensure the reduction of radioactive waste and safe operation, thereby ensuring public safety.

L. ANNEXES

L.1 Relevant Laws and Regulations

Table L-1. List of Laws and Regulations for Spent Fuel and Radioactive Waste

Legislation level	Title	Date of revision/ promulgation
Act	Atomic Energy Law	1971.12.24
	Nuclear Materials and Radioactive Waste Management Act	2002.12.25
	Act on Sites for Establishment of Low Level Radioactive Waste Final Disposal Facility	2006.05.24
Legal Order	Administrative Regulations for Nuclear Source Materials Mines and Minerals	1998.04.15
	Regulations on Clearance Level for Radioactive Waste Management	2004.12.29
	Commission Inspection Regulations for Radioactive Materials Facilities	2005.12.30
	Administrative Regulations for Waste Generated from Naturally Occurring Radioactive Materials	2007.01.05
	Regulations for the Review and Approval of Application for Construction License of Nuclear Source Material and Nuclear Fuel Production and Storage Facilities	2008.01.24
	Regulations for the Nuclear Source Materials Operational Safety Management	2009.10.30
	Regulations for the Nuclear Fuels Operational Safety Management	2009.10.30
	Regulations on Final Disposal of Low Level Radioactive Waste and Safety Management of the Facilities	2012.07.09
	Regulations on the Final Disposal of High Level Radioactive Waste and Safety Management of the Facilities	2013.01.18

	Regulations for the Operation Permit of Radioactive Waste	2014.09.19
	Range and Identification Standards of Low Radioactive Waste Final Disposal Restricted Area	2017.03.23
	Regulations for Awards for Radioactive Materials Research and Development	2018.05.18
	Operational Regulations Governing Nuclear Safeguards	2019.07.25
	Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act	2019.11.21
	Fees-charging Standard for Regulatory Services under the Nuclear Materials and Radioactive Waste Management Act	2024.08.12
	Regulations for the Review and Approval of Application for Construction License of Radioactive Wastes Treatment, Storage and Final Disposal Facilities	2020.08.07
	Regulations on Treatment and Storage of Radioactive Waste and Safety Management of the Facilities	2021.05.13
	Regulations on Qualifications of Personnel Operating Radioactive Waste Treatment Facilities	2023.12.21
	Radioactive Waste Management Policy	1997.09.02
Administrative Rule	Guides for Release Plans on Clearance Level for Radioactive Waste	2006.10.19
	Safety Analysis Report Guides for LLW Management Facility Application	2006.12.29
	Review Directives on Training Plan of Personnel Operating Radioactive Waste Treatment Facilities	2010.04.16
	Review Regulations on LLW Final Disposal Containers	2010.12.23
	Safety Analysis Report Guides for LLW Final Disposal Facilities	2016.09.02
	Regulations on Siting of High-level Radioactive Waste Final Disposal	2017.03.29
	Regulations on Siting of Consolidated Radioactive Waste Facilities	2017.03.29

	Safety Analysis Report Guides for Low-level Radioactive Waste Storage Facilities	2018.08.30
	Review Guides for Re-evaluation Reports of Low-level Radioactive Waste Storage Facilities	2018.09.27
	Review Guides for Safety Analysis Reports of Spent Fuel Dry Storage Facilities	2019.01.18
	Regulations on Radiation Safety for Ships Transporting Low-level Radioactive Waste by Sea	2022.06.22
	Application Guides for Utilization of LLW Containers	2022.06.22
	Procedures and Principles for the Approval of Research and Development Projects for Radioactive Materials Operation Technology and Final Disposal	2023.11.28
	Application Directives on Hearing Procedure for Construction of Radioactive Material Facilities	2023.12.01
	Regulations on Review of Application for Radioactive Materials Facilities Design Modification and Equipment Change	2023.12.14
	Review Guides on Safety Analysis Report for LLW Final Disposal Facilities	2023.12.25
	Safety Analysis Report Guides for Spent Fuel Dry Storage Facility Application	2023.12.21
	Directives for the implementation of the Nuclear Safety Commission's Radioactive Material Safety Operation Performance Award	2023.12.26
	Directives for Establishment the Nuclear Safety Commission's Radioactive Materials Safety Advisory Committee	2023.12.27

Remarks:
1. Updated to the end of December 2024.
2. For full text of the regulations please refer to the NSC Laws and Regulations Retrieving System (https://erss.nusc.gov.tw/law/EngNewsList.aspx).

Table L-2. List of Laws and Regulations for Radiation Safety

Legislation level	Title	Date of revision/ promulgation
Act	Ionizing Radiation Protection Act	2002.01.30
Legal Order	Standards for the Establishment of Radiation Protection Management Organizations and Radiation Protection Personnel	2002.12.11
	Administrative Regulations for Radiation Protection Personnel	2002.12.11
	Accreditation and Administrative Regulations for Personal Radiation Dose Evaluation Agencies	2002.12.11
	Special Health Checkup Program for Radiation workers	2003.01.22
	Safety Standards for Protection against Ionizing Radiation	2005.12.30
	Enforcement Rules for the Ionizing Radiation Protection Act	2008.02.22
	Regulations for the Safe Transport of Radioactive Material	2007.12.31
	Administrative Regulations for Operators of Radioactive Material or Equipment Capable of Producing Ionizing Radiation	2009.04.17
	Standards for Radiation-Caused Serious Environmental Contamination	2011.01.07
	Standards for Exemption from Regulation for Radiation Sources	2016.06.20
	Administrative Regulations for Radioactive Material and Equipment Capable of Producing Ionizing Radiation and Associated Practice	2018.12.22

Remarks:
1. Updated to the end of December 2024.
2. For full text of the regulations please refer to the NSC Laws and Regulations Retrieving System (https://erss.nusc.gov.tw/law/EngNewsList.aspx).

Table L-3. List of Laws and Regulations for Environmental Protection

Legislation level	Title	Date of revision/ promulgation
Act	Environmental Impact Assessment Act	2023.05.03
	Waste Disposal Act	2017.06.14
Legal Order	Regulations on Environmental Impact Assessment for Development Activities	2021.02.02
	Environmental Impact Assessment Enforcement Rules	2023.03.22
	Standards for Determining Specific Items and Scope of Environmental Impact Assessments for Development Activities	2023.03.22
	Waste Disposal Act Enforcement Rules	2019.11.06

Remarks:
1. Updated to the end of December 2024.
2. For full text of the regulations please refer to the MOENV Laws and Regulations Retrieving System (https://oaout.moenv.gov.tw/law/EngNewsList.aspx).

Table L-4. List of Laws and Regulations for Nuclear Reactor Facilities Regulation

Legislation level	Title	Date of revision/ promulgation
Act	Nuclear Reactor Facilities Regulation Act	2003.01.15
Legal Order	Quality Assurance Criteria of Nuclear Reactor Facilities	2003.06.25
	Enforcement Rules for the Implementation of Nuclear Reactor Facilities Regulation Act	2018.11.16
	Regulations on the Permit Application and the Management for Decommissioning of Nuclear Reactor Facilities	2018.11.16
	Standards of Fees for Regulatory Services under the Nuclear Reactor Facilities Regulation Act	2018.11.08
	Emergency Response Control Measures for Research Nuclear Reactor Facilities	2009.06.04
	Guides on Decommissioning Planning of Nuclear Reactor Facilities	2019.08.14
	Review Guides on Decommissioning Planning of Nuclear Reactor Facilities	2019.08.14

Remarks:
1. Updated to the end of December 2024.
2. For full text of the regulations please refer to the NSC Laws and Regulations Retrieving System (https://erss.nusc.gov.tw/law/EngNewsList.aspx).

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