Decommissioning Management of the First Nuclear Power Plant in Taiwan: Stakeholder Participation and Social Communication

I. Introduction

Stakeholder participation in decommissioning has become very important and proven to be useful since the decommissioning process would encounter lots of technical uncertainties, and after the Fukushima accident in 2011, public trusts on nuclear energy and radioactive waste management have also diminished tremendously in Taiwan. The third party-turnovers in this country happened once again in 2016, and thus the new government had announced 2025 Non-Nuclear Home Policy. The First Nuclear Power Plant (NPP) officially goes into decommissioning when the license of #1 Reactor is expired on December 5, 2018.

Decommissioning and radioactive waste management policies are not only scientific and technical consideration but they are also highly politicized issues. Over the past decades, institutions with the obligation to define decommissioning and radioactive waste management policies have become much more aware that technical expertise and technical confidences, on their own, are insufficient to justify them to a wider range of stakeholders and follow them through to successful implementation. Therefore, any decision regarding whether, when and how to implement decommissioning and waste management solutions typically requires thorough public examination and the participation of many relevant parties (IAEA, 2009: 3).

Based on the case of the First NPP decommissioning, this study utilizes both the stakeholder analysis and network theory approach to explore the relevant stakeholders, their policy standings and interactions during the decommissioning process. The findings would provide policymakers with a better understanding of the policy awareness and standpoints for those key stakeholders in decommissioning.
II. The Decommissioning of the First NPP in Taiwan

Nuclear decommissioning is a multi-disciplinary industry. The decommissioning includes a variety of elements both technological consideration, such as decontamination and dismantling techniques etc. and also organizational issues, such as preliminary and detailed planning, training, costing and funding etc. (Laraia, 2018). There currently have three Nuclear Power Plants in Taiwan. The operating licenses of reactors for the three NPPs will be terminated and go into decommissioning process one after the other; reactors for the First NPP out of service on 2018/12 and 2019/07, reactors for the Second NPP out of service on 2021/12 and 2023/03, reactors for the Third NPP out of service on 2024/07 and 2025/05. The third party-turnovers in Taiwan happened once again in 2016, and thus the new government had announced 2025 Non-Nuclear Home Policy. Refer to Figure 1 for details.

Figure 1. Decommissioning Schedule for Taiwan Nuclear Power Plants
Source: Taiwan Power Company

Figure 2 suggests the decommissioning plan specifically for the First NNP. The choice of decommissioning strategies is fully dismantled, temporary/intermediary storage of radioactive wastes in the outdoor dry storage yard and waste repository depot, and to maintain land-reuse for electric power business.
This plan typically includes three stages: (1) the planning and preparation about 3 years; (2) decommission implementation about 25 years; and (3) the end stage about six months. During the planning and preparation, Taiwan Power Company (TPC) is supposed to submit the First NNP Decommission Plan to the Atomic Energy Council (AEC) under Executive Yuan for review. And the Environmental Protection Administration (EPA) then conducts the Environmental Impact (EI) Assessment for decommissioning. Following by the license of #1 Reactor expired on December 5, 2018 and then #2 Reactor expired on July 15, 2019, the First NPP officially goes into decommissioning implementation which generally includes four different phases: Downtime transition, Decontamination and dismantlement, Site environmental radiation monitoring, and Factory site full recovery. The AEC has an obligation for monitoring the decommission operation while the EPA does the EI follow-ups. The decommissioning will be end in July of 2044, then the TPC prepares site environmental radiation monitoring report and finally approved by the AEC. And this is the official end of decommission operation.

Figure 2. The Decommissioning Plan for the First NPP
Source: Taiwan Power Company

III. Stakeholders Relevant to the Decommissioning Process
In the area of nuclear energy and waste management policy, stakeholders are defined as “Individuals or organizations which may have an interest in the results of a decommissioning decision or be affected by that decision” (IAEA, 2002). In another words, the stakeholder is a person or organization that has a vested interest, either positive or negative, in the decommissioning. According to the Environment Council in the United Kingdom, the following questions help identify a comprehensive range of stakeholders (Perret, 2006):

- Who is directly responsible for decisions on the issue?
- Who is influential in the area or hosting community?
- Who will be affected by any decisions on the issue?
- Who holds positions of responsibility in stakeholder organizations?
- Who can promote a decision providing they are involved?
- Who can obstruct a decision if they are not involved?
- Who has been involved in the issue in the past?
- Who has not had a voice in the issue before, but should have?

To identify possible stakeholders for the decommissioning project, it’s important to consider two useful models: (1) **Zones of influence** illustrate the importance of recognizing different types of stakeholders which typically include decision makers, key stakeholders, stakeholder representatives and general public. Refer to Figure 3 for details; (2) **Mapping stakeholders by influence and impact** suggest how different types of stakeholders might be engaged in a process of decision making. Refer to Figure 4.

![Diagram of Stakeholder Zones](image-url)
Based on the US Department of Energy programs,\(^1\) the stakeholder categorization have the following (ASME, 2004): (1) *Personally impacted stakeholders* are directly

\(^{1}\) Also refer to: THE ENVIRONMENT COUNCIL, multiple references and background including “BNFL National Stakeholder Dialogue”, www.the-environment-council.org.uk.
impacted by the proposed action in terms of health, employment, property value, or any other major aspect of life; (2) *Administratively impacted stakeholders* include the elected, appointed officials, or employed people, members of regulatory agencies, who must ensure the decommissioning comply with the laws, regulations, and permits; (3) *Generally concerned stakeholders* are interested in or concerned about a proposed decommissioning. This group is most often represented by a specific entity, such as public interest groups with a well-defined purpose; and (4) *Process concerned stakeholders* concern over the process to manage and complete the decommissioning. Both professional scientific and engineering organizations constitute an important core of this group.

There are different categorizations of stakeholders. Based on the areas of interest and concern specific for stakeholders involved, the categories by IAEA (2009) are Economic, Environmental, Social and Technical stakeholders; and stakeholders who have been identified as being relevant from a general point of view also include *Implementers of the decommissioning project, Regulators, Cooperating or co-interested, and those Affected by the project*. Following the latter approach, therefore, this study has identified relevant stakeholders in the decommission of First NPP. Refer to Figure 5 for details.

**A. Implementers of the Decommissioning Project**

The implementers are facility owner, funding entities, operations staff, and managers. With safety as a prerequisite, the major area of interest for facility owner normally is economic, and they are Ministry of Economic Affairs (MEA) and the TPC. The Nuclear Backend Fund Management Committee under MEA, together with shareholders and ratepayers, plays a role in providing funding for decommissioning. Part of First NPP employee and contractors are actual workforce and operations staff for the decommission while First NPP Director and Decommission Project Team are decommissioning managers.
Figure 5. Relevant Stakeholders in Decommission of the First NPP
Source: This research

B. The Regulators

This aspect covers five different kinds of stakeholders, including Government, Regulators, Institutions, Local Authorities, and Elected Officials. The Central Government not only has a controlling role in decommissioning project, but also is viewed by other stakeholders as an entity bearing responsibility for such projects. Two regulators mainly include the AEC and the EPA under Executive Yuan. Good relationships with the regulators can help maintain progress and keep costs reasonable. To pave the way to a timely and cost-effective transition, it is important that the environmental authorities be involved at an early stage before or during the decommissioning process (IAEA, 2009: 15).

The Institutions and public organizations generally refer to the Station Decommission Review Committee (SDRC) under First NPP and the First NPP
Decommission Community Supervisory Committee under New Taipei City Government. Local authorities comprise both New Taipei City Government at municipality level and regional authority, Shihmen District Office. Elected officials are represented normally by two members of the Legislative Yuan and several council members from the New Taipei City.

C. Cooperating or Co-interested Organizations

There are many cooperating or co-interested stakeholders pertinent to the First NPP Decommissioning, such as Trade Unions, Waste managers, Local enterprises, International parties, Contractors, Nuclear industry, Security and Emergency organizations. Taiwan Power Labor Union may represent the interest of First NPP employee. A number of different waste managers include Department of Nuclear Backend Management under TPC, Waste Treatment Unit at the First NPP, also Department of Nuclear Engineering and Fuel Cycle and Materials Administration under AEC, Executive Yuan. They typically involve doing the handling, treatment, storage, and disposal of radioactive and non-radioactive waste. Local enterprises are providers of local services in Shimen and Jinshan District.

Though Taiwan is not one of member states, the IAEA could still be is an international partner for technological assistance of First NPP decommissioning. In addition to international contractors and cooperation agency, the Institute of Nuclear Energy Research under AEC is one of major domestic contractors for actual decommissioning. The decommissioning of nuclear facilities also facilitates the development the nuclear and non-nuclear industry in Taiwan. The Security and Safeguard Team is the security force for the First NPP, while National Taiwan University Hospital Jinshan Branch and the 6th Corp of Fire Department, New Taipei City Government, are two of emergency organizations during the decommissioning process.

D. Those Affected by the Project

Local communities, general public, neighboring countries, research and scientists, media, pressure groups, and future generations are all possibly affected by the decommissioning project. The First NPP is located at Shimen District that is mostly affected by the decommissioning, while Jinshan and Sanzhi District are two neighboring
communities with secondary impacts. Therefore, at least two local organizations, the New Taipei City Shiwanjin Hometown Association and North Coast Anti-Nuclear Action Alliance frequently voice their concerns with the negative economic impacts and waste management issues caused by the decommissioning. While several national non-governmental organizations, such as Citizen of the Earth in Taiwan, Mothers' Alliance for Monitoring Nuclear Power Plants, Green Citizens Action Alliance, Taiwan Environmental Protection Union, Green Consumer's Foundation, and Green-Nuclear Citizens Self-Help Organization, speak for general public’s concern about the issues of nuclear waste final disposal site in Taiwan and also attempt to protect the interest of local communities in particular. These NGOs whether local or national do not represent a unified group of stakeholders but hold a wide range of opinions and positions.

Both China and Japan may be considered as two neighboring countries, but the decommissioning impact tends to be negligible since the nuclear facility is still far away from national boundaries. Researchers and scientists from the Institute of Nuclear Energy Research at AEC and Institute of Nuclear Engineering and Science at National Tsing Hua University may support the First NPP decommissioning since this project would allow space for research and development activities. The ethical basis for the choice of decommissioning strategies stated in IAEA’s Principles of Radioactive Waste Management directly refers to the protection of, and the burden on, future generations; therefore, future generations need to be considered. Finally, the media is also an important broker during the decommissioning process of stakeholder involvement given the following reasons (IAEA, 2009: 33):

*The media provides a useful communication channel to stakeholders. However, the media itself represents a potentially problematic stakeholder especially where there is a dialogue component to a stakeholder engagement plan. Stakeholders are more inclined to state their or their organizations positions when the media are present rather than enter into a discussion to identify common ground, which is the essence of dialogue. Therefore, special consideration needs to be given to the media as stakeholders in any engagement process.*

**IV. Key Issues for Stakeholder Participation in Decommissioning**
The Environment Council in the UK suggests four following steps for the involvement of stakeholders in the decommissioning project.² The first step is *information giving* to raise awareness of an issue, inform people of a decision which may affect them, and alert stakeholders to the opportunities for getting involved. The second is *information gathering*, using survey methods to gather information and inform the decision-making process. The third step is *consultation*, giving people the opportunity to consider and respond to the issues and options that governments have developed. And the finally is *dialogue* by bringing key stakeholders together to discuss and deliberate with governments before a decision is made (IAEA, 2009: 39).

Ideally, early analysis of who should be involved in decommissioning is essential and governments should try to ensure that all stakeholders are considered. Additionally, early engagement of stakeholders enables them to get involved in the development of the stakeholder management plan. Regarding stakeholder communication, it’s essential to first developing a strong communication plan and then effectively managing the expectations of all relevant parties. Also, the rules of governing stakeholder participation should be clear, fair and maintain an open and transparent approach to communication. The IAEA emphasizes the following key elements for the decision-making process of decommissioning (2009: 45):

- *Not give the impression that the decisions have all been made before the stakeholder engagement process started*;
- *If you are unsure whether to involve the public in a decision, ask them*;
- *Where pre-conditions exist or change over time these need to be shared and discussed with the stakeholders so they understand the boundaries to their engagement*;
- *That stakeholders must be aware of the process by which their input is considered and how it may be scored, so that they have confidence in the process, even though it may not satisfy their entire individual needs i.e. their individual aspirations may not be fully met (or not at all). The decision process must be unbiased*;
- *Organized opposition is often encountered, and the public involvement process should include it but not surrender to it*.

---

These principles sound reasonable and are essentially important for key stakeholder involvement of decommissioning. However, taking the decommissioning plan review by the AEC for example, stakeholder involvement through the local briefing at Shimen District and public participation platform of AEC, came to play pretty late on October of 2016; only several months away the final approval by the AEC. In addition, about the choice of decommissioning strategies, there exists great difference and expectation between the TPC, AEC and local communities and anti-nuclear groups. The TPC follows the practice of international decommissioning cases, such as San Onofre Nuclear Generating Station and Vermont Yankee Nuclear Power Station in the US, that typically adopted the on-site intermediary storage of radioactive waste approach, and after 30~40 years of temporary storage, the radioactive wastes then move to the centralized storage or final disposal site. Local communities and anti-nuclear groups, however, tend to be extremely uncomfortable and worrisome with such an approach for decommissioning; being distrust the safety of outdoor dry storage approach for high-level radioactive spent fuel rods; also worried about the temporary storage may become permanent and nightmare forever; and opposed to the planning of reserved area (about 98,000m², 4% area of First NPP) for the temporary storage of radioactive wastes. Instead, these stakeholders would prefer to be facilities completely decontaminated and dismantled, move out all of radioactive wastes after decommissioning implementation, and return clean land to the community and the people. One member of anti-nuclear groups said in the meeting of public participation platform by AEC³:

“Reserved area for the temporary storage of radioactive wastes may equal to the rebuild of a nuclear power plant; it’s unfair and injustice to local residents and future generation; the MEA and TPC keep lie for long time and lead to the people distrust. ”

Moreover, the First Phase Outdoor Dry Storage Facility for high-level radioactive spent fuel had been completed for several years (since 2013), but mainly given the distrust of local community and anti-nuclear groups, the New Taipei City Government

---

has refused to issue the Soil and Water Conservation Completion Certificate for Outdoor Dry Storage Facility, and thus keep blocking the following thermal test procedure of its start-up operation. The New Taipei City Government echoed to the concern of local communities and insisted that “No nuclear safety, no nuclear energy; the First NNP is not the final disposal site, and nuclear wastes must have other place to go.” And the First Phase Outdoor Dry Storage Facility was stuck there and no-use for long time till now.

V. Conclusion

As in decommissioning and radioactive waste management areas, an increasing demand for public participation in decision-making process leads to a search for new approaches to involving stakeholders. OECD-NEA (2012) emphasizes the role of nuclear safety regulators in the decision-making process of radioactive waste management, especially that early involvement for the safety regulators is possible and desirable. In addition, keeping the public informed, building and gaining confidence of the public and relevant stakeholders, is considered the key functions of safety regulators. Ideally, the nuclear safety regulator should provide independent, neutral, balanced, and factual information about issues related to safety.

Given the different expectation mentioned above between the TPC and local communities, the AEC as a nuclear safety regulator should reinforce its openness and transparency commitments and build up core competences for public communication. Following by OECD-NEA suggestion, the safety regulator should move from the background to the foreground, use of plain language to explain safety and procedural issues, and prepare to have the decisions probed and questioned in public forum (2012: 22).

---

REFERENCE

American Society of Mechanical Engineers (2004). *The Decommissioning Handbook*, ASME.


