

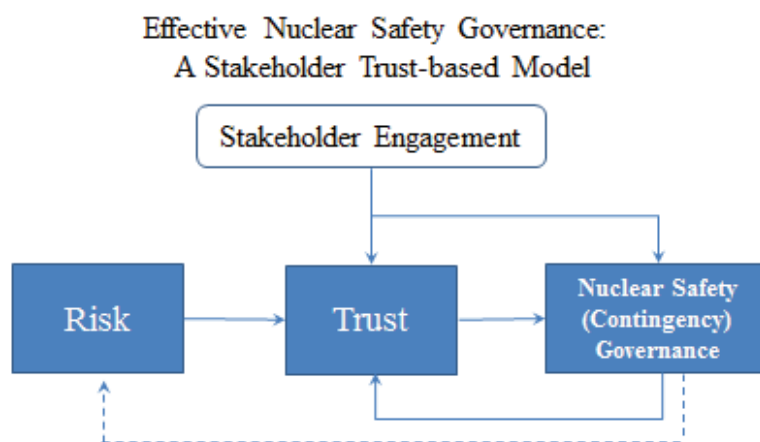
Nuclear Safety Contingency Governance: A Trust-based Framework and Recommendations for Hong Kong and Cross-Border Guangdong, China

Dr. Jamie Wardman, Dr. Jacqueline CK Lam, Prof. Victor OK Li

Department of Electrical and Electronic Engineering, the University of Hong Kong
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This summary sets out the trust-based nuclear safety emergency governance (NSEG) framework, the key challenges to NSEG in HK and cross-border Guangdong Province, and the recommendations re. the key priorities for addressing these challenges.

1. NSEG Framework



2. Recommendations for Effective NSEG in Hong Kong and Cross-border Guangdong Province, China

The challenges and priorities reported here were identified and discussed by participants at the HKU-Cambridge Symposium held at the University of Hong Kong in June 2014. This summary proceeds by, first, setting out the context in which nuclear safety and emergency planning has become a health security issue for Hong Kong, particularly in light of the Fukushima disaster. Second, the challenges facing Hong Kong with respect to this issue are outlined. Third, priorities for addressing those challenges are identified. Finally, conclusions regarding how nuclear safety contingency governance in HK and the cross-border Guangdong can be improved are made.

1. Background

In Hong Kong it is generally accepted amongst different stakeholders, including the public and private sectors and the general public that nuclear energy is needed to help address challenges of climate change. While the nuclear power stations in close proximity to Hong Kong in Daya Bay enjoy very good production and safety performance records, the disaster at Fukushima illustrates that even highly technologically advanced and sophisticated nuclear power plant designs and systems

can be subject to unforeseeable accidents that can lead to disastrous consequences. The Fukushima disaster accordingly had a big impact on the public profile of nuclear risks, and in Hong Kong in particular due to the close proximity of nuclear power stations in Daya Bay. With three more nuclear power facilities, including 10 more reactors due to come online by 2020, there is a pressing need for the Hong Kong Government to respond appropriately to this health security issue and address public concerns.

2. Challenges of Nuclear Safety Emergency Governance in Hong Kong

There are THREE major challenges confronting nuclear safety emergency governance in Hong Kong. The FIRST challenge is that nuclear power production resides just across the border in Daya Bay in Guangdong. This means that in the event of a nuclear emergency, besides nuclear plumes, there are important cross-border implications for Hong Kong in terms of the cross-border movement of people, food and water into Hong Kong. Accordingly, nuclear safety management and contingency planning are a cross-border risk issue requiring timely close collaboration between the Hong Kong and Chinese Mainland authorities. However, nuclear safety governance has historically been handled in a top-down fashion with low flexibility, which has limited the Hong Kong Government's role to local radiation monitoring, and sidelined public engagement and input into nuclear power plant development and contingency planning. The SECOND challenge, also related to this issue, concerns a public trust deficit. Local communities in Hong Kong are quite skeptical about the timeliness and reliability of cross-border risk notifications and the credibility of the government to deal with health and environmental problems. Since the general public feels it has been excluded from the mainly institutional lines of communication and coordination, there has been a failure to engage them as a key stakeholder in nuclear safety and contingency plans. The THIRD challenge, also closely associated with limited attempts at public engagement, is that Hong Kong citizens have little awareness, first, of the cross-border nuclear safety governance mechanisms that are in place, and second, of the current nuclear safety contingency plans, including actions to take and lines of communication to follow in terms of evacuation, sheltering and intake of protective substances such as iodine tablets.

3. Priorities for NS Emergency Governance

3.1 Public Education and Communication

Public engagement in nuclear safety governance emphasizes both public education and communication enhancement. For public education, in Hong Kong a Nuclear Resources Centre has been established as a one-stop learning platform with balanced information on nuclear energy. The center is divided into seven thematic zones with interactive videos, games and displays. It has received over 11,000 visitors since opening in May 2012. An Energy Summer School was conducted to engage 80 secondary students from 16 schools on a four-day learning experience, including visits to CLP facilities, and talks by energy experts and personal coaching. A Nuclear Energy Website was launched in March 2013 and has recorded more than

28,000 visits by June 2014. The Liberal Studies Project is Hong Kong's first e-learning liberal studies portal developed by CLP to provide students and teachers with comprehensive information on energy and the environment, with regular school talks featuring energy experts. There is also media publicity in the form of media briefings and contributed articles. For communication enhancement, a Non-emergency Licensing Operational Events (LOE) Notification Mechanism has been implemented. For example, to address public concern on nuclear safety of Daya Bay, a new notification mechanism was set up in 2011 to enhance transparency. The Nuclear Safety Consultative Committee (NSCC), established in 1988, with independent experts, professionals and academics, provides the Hong Kong public with regular updates on the safety and operational performance of the nuclear power stations. Moreover, Daya Bay Stakeholder Visits are organized. Around 1,000 visitors visited Daya Bay in 2013 including university students, engineers, professional bodies, government officials, etc.

3.2 Design and Construction

After the Fukushima nuclear disaster in March 2011, additional concerns about nuclear safety emerges, such as, do we need higher safety design provisions for tsunamis and earthquakes? For existing power plants, how do we remedy the safety deficits? Safety enhancement in nuclear power plants lies in higher standards of design provision and construction. To attain "Core Cooled" target, mobile close-loop water chilling system for nuclear power plant is proposed to take away the overall system heat. To reduce the chances of "terrorist attack" on nuclear power plants, enhanced security measures are urgently required, such as additional physical barriers and check points. There is also an urgent need for proposals to guard against flying objects which may be deployed to attack nuclear power plants, which demand cross-border international collaboration between neighboring countries, and neighboring states.

3.3 Public Health and Food and Water Safety

In view of the known carcinogenic risk of radioactive iodine in the plume or fallout, particularly to children of 15 or under, it is strongly recommended that the most conservative recommendation of WHO 1999 be followed, which is 10 mSv for easy calculation of public health & food & water safety. The dosage of non-radioactive iodine or potassium iodide should also be adjusted according to age, and should be administered before exposure and preferably within the first 4 hours after exposure. They should be given once a day until the radioactive cloud or fallout has passed, except in the case of neonates, pregnant and lactating women. Measures have been taken on nuclear accident issues recently. The HKSAR GDBCP is an excellent plan, which provides opportunities for the improvement nuclear safety, including upgrading the thyroid blocking level to 10 mSv, adequate dosage of thyroid blocking agent, sampling of food, ensuring radiation detection whole body counter, decontamination procedure & plan scrutinized by nuclear medicine physician experts, and treatment medication of acute radiation syndrome.

3.4 Cross-border Collaboration

The Hong Kong Government works closely with the relevant Mainland authorities in cross-border collaboration, with the goal of enhancing cross-boundary nuclear safety, strengthening notification mechanisms, maintaining smooth flow of information, enhancing emergency preparedness on both sides, and strengthening public confidence. Regular exchange and cooperation has been established between the Hong Kong Government and authorities in Guangdong, including annual reviews, regular meetings and seminars, participation in exercises, exchange of environmental radiation monitoring results, and Hong Kong participation in IAEA events as part of Chinese delegation. For emergency preparedness, an emergency response system, and the Daya Bay Contingency Plan have been established, following IAEA standards and international best practices. They aim at providing effective and efficient response, and regular training, review, and exercises are performed.

4. Emergency Response in the United Kingdom: Possible Directions for Hong Kong and Cross-border Guangdong, China

The nuclear safety emergency governance in the UK may be used as a reference for Hong Kong and cross-border Guangdong. First, there are local consultation mechanisms, including site stakeholder groups for each existing and shut down nuclear site, with groups reviewing quarterly reports from the reactor management (operation and incidents), safety regulator (nuclear safety regulatory actions), and environment agency (site releases).

Second, an emergency response plan, required by law, is developed by the local authority after public consultation, and is available online. Emergency response area and boundaries and emergency response levels are well defined. The local plan covers many aspects, including operator and local official responsibilities and tasks, radiation monitoring, arrangements for informing and warning, public countermeasures, and evacuation centre management. The national plan includes national coordination and communication with the government, safety regulator, and Home Office & Police.

Third, both local and national arrangements are tested by exercises regularly, to ensure that they are effective and the current managers and staff are knowledgeable and up-to date. Also international nuclear hazards are considered.

5. Conclusions and Recommendations

While recognizing the risk of a nuclear emergency affecting Hong Kong is small, it is not possible to ensure absolute safety. Therefore, the risks and benefits of nuclear power have to be balanced and appropriate and publicly accepted contingency plans have to be put in place to address the adverse consequences of a potential catastrophe. This includes balancing the risks and benefits of any actions taken to reduce radiation exposure and the consequences of those actions. Risks include severe deterministic effects, increase in stochastic effects, adverse effects on the environment and property,

and other adverse effects (e.g. psychological effects, social disorder, economic disruption). Balance between evacuation, sheltering, potassium and iodine tablets, and other protective measures should be taken for optimization of contingency planning.

Addressing these issues, from an international perspective, the Hong Kong and Mainland Chinese authorities should follow international conventions and IAEA safety standards, including such measures as: legislating for clear roles and responsibilities and who is the responsible coordinating authority; agreeing on clear criteria for action beforehand, developing the infrastructure at site, local, and national level and international co-operation; undertaking training drills and exercises, maintaining continued quality assurance of contingency plans and safety measures; early, clear international notification and assistance and co-operation between regions and across site-local, local-national and national-international industry and authority personnel; openness and transparency and prior public information so that people can understand the risks and what could happen in such an event, including nuclear emergency planning arrangements to increase public confidence, especially with the social media.

In many respects, many resources in Hong Kong have been mobilized by industry and government authorities accordingly. For example, the Hong Kong Government and relevant Mainland Chinese Authorities have undertaken a series of measures following IAEA standards and best practices to increase cross-border governance. These include such measures as: strengthening cross-border and international notification systems and maintaining smooth communication channels; enhancing emergency preparedness measures on both sides; regular cross-border exchange, meetings, training, monitoring, reviews and cooperation between authorities; joint participation in IAEA events; and enhanced public communication, education and transparency. Likewise the Hong Kong Nuclear Investment Company has also instigated a suite of measures to improve public information, communication and education. These include: the development of a Nuclear Resources Center providing a 'one-stop' learning platform; Energy Summer School particularly aimed for children; a new nuclear energy website; Daya Bay stakeholder visits; and a Non-emergency Licensing Operational Events Notification Mechanism which provides public notification of minor events within two working days to show an enhanced commitment to timely information and transparency.

Notwithstanding the value of these enhanced measures it is proposed that there are some further opportunities for improvement for Hong Kong, in particular:

First, given that there are limited opportunities for evacuation in Hong Kong, and additional risks associated with evacuation, greater attention should be paid to contingency measures such as sheltering and countermeasures such as the administering of iodine before radiation exposure, with dosage adjusted for factors such as age.

Second, the provision of more radiation monitoring equipment and greater scrutiny of decontamination procedures and plans by nuclear medicine physician experts should be undertaken.

Third, greater attention should be paid to the security of nuclear power plants from terrorist and airborne attacks.

Fourth, more openness, transparency and public engagement is required. This should include raising more awareness of nuclear safety measures and contingency plans as well as stating the core values of openness, honesty and transparency.

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