

Cooperation process between a local government and experts in official voluntary decontamination of environmental radioactivity

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ABSTRACT

Kashiwa city, inside the Tokyo metropolitan area and located ~200 km south of the Fukushima Dai-ichi Nuclear Power Plant, received a raised environmental ambient radiation dose due to the disaster relative to the rest of area. In this paper, the challenging process of the official voluntary decontamination activity in Kashiwa city, Chiba prefecture, which was carried out with strong cooperation between a local government and experts, is described and reviewed in terms of the effectiveness of the radiation protection. The support system for the official voluntary decontamination work was constructed by the citizens. It was completed within ~15 months after the accident, by way of the following five main steps. (i) A local forum was organized, commencing an open discussion. (ii) (a) Some civic groups started their own activities independent of the national and local governments' policies and measures, and (b) Kashiwa city office held information symposia and risk communication meetings with key persons as a kind of stakeholders as well as education and training of official leaders for voluntary decontamination work. (iii) Joint positive discussion and work projects between civic groups and the local government were started by key personnel. (iv) Local government planned and fixed its official decontamination strategy based on the results of several open discussions. (v) A guidance book for official voluntary decontamination by citizens was distributed by Kashiwa city office. The systematic framework for voluntary decontamination by citizens in Kashiwa city was developed through cooperation between a local government and decontamination experts, which was rare at that time. The authors believe that the process is valuable and should be shared with experts from various fields around the world.

Keywords: voluntary decontamination of environmental radioactivity; radiation protection; Kashiwa city, Chiba prefecture, Japan; Fukushima Daiichi Nuclear Power Plant disaster

INTRODUCTION

The accident at the Fukushima Dai-ichi Nuclear Power Plant (NPP) after the Great East-Japan Earthquake (11 March 2011) elevated the background level of environmental radiation in the Tokyo metropolitan area to some degree. Kashiwa city, located inside the metropolitan area of Tokyo and located ~200 km south of the NPP site, with a population of ~0.4 million, was particularly affected [1–6]. The ambient dose equivalent rate in the city immediately after the

accident was ~0.1–1 $\mu\text{Sv/h}$, and the maximum natural background level was ~0.04 $\mu\text{Sv/h}$ at that time. Figure 1 shows the locations of Kashiwa city (circle symbol) and TEPCO Fukushima Daiichi Nuclear Power Plant (star symbol), and the environmental dose level as at 31 May 2012, as obtained from the website of the Nuclear Regulation Authority of Japan [7].

In this paper, the challenging process of the official voluntary decontamination work in Kashiwa city, Chiba prefecture, which was

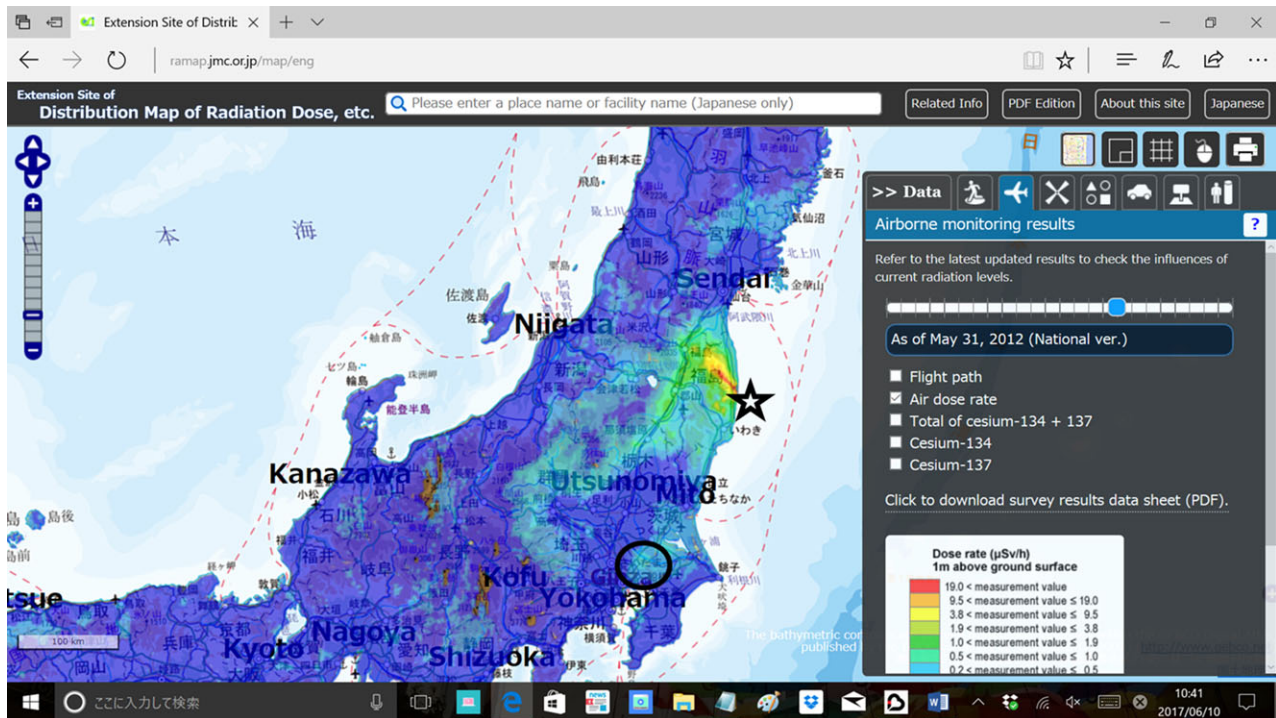


Fig. 1. Location of Kashiwa city (circle symbol) and TEPCO Fukushima Daiichi Nuclear Power Plant (star symbol), and environmental dose level as at 31 May 2012 (from the website of the Nuclear Regulation Authority of Japan).

carried out with strong cooperation between the local government and experts from various fields, is described and reviewed in terms of the effectiveness of the radiation protection [8].

OFFICIAL VOLUNTARY DECONTAMINATION WORK

Process of constructing a local government support system

The support system for the official voluntary decontamination work by the citizens in Kashiwa city was completed by ~15 months after the accident and consisted of the following five main steps:

(i) First step (post 0–4 months)

A local forum was organized and an open discussion was commenced. The six local governments, including that of Kashiwa city, established a new consolidated organization named the 'Conference on Radiation Countermeasures in the Tohatsu area (CRCT)' on 8 July 2011 [4, 5]. The purpose of the CRCT was to find solutions to the common problem of the elevated environmental radiation level due to the disaster, officially in their agreement on a unified policy. The CRCT determined their common strategy and procedure for determining the environmental radiation dose rate, and presented their position statement for overcoming the situation (Fig. 2).

(ii) Second step (post 0–11 months)

(a) Some civic groups started their own activities independent of the national and local governments' policies and measures, and (b) Kashiwa city office held information symposia and risk

communication meetings as well as education and training of official leaders for the voluntary decontamination work. Parts (a) and (b) were largely carried out in parallel. Some civic groups were not satisfied with the speed and content of the countermeasures proposed by the national/local government. They monitored their circumstances themselves, presented the data on their websites, and began decontamination work using their own understanding, judgment and methods. That period saw a confusing flood of information being disseminated, including scientifically incorrect explanations and data. Kashiwa city office, however, shared the official data monitored according to the CRCT strategy, according to the various fields experts' explanations, in symposia as well as in small consultation meetings in kindergartens. In addition, the Kashiwa city office commenced education of the city staff, as well as of appropriate non-profit organization (NPO) and non-government organization (NGO) members to become official zone-leaders for the future voluntary decontamination. These persons were especially important, not only as stakeholders but as contact persons for general citizens. Once they understood the principles of radiation protection, knowledge of basic radiation and adequate countermeasures to an elevated radiation situation could be communicated to citizens more quickly and widely. Restoration work by the local government could also be accelerated by these persons. The 3–5 h lectures covered the basics of radiation science, including the effects of radiation exposure on health, a radiation protection strategy, the actual process of decontamination of environmental radioactivity, and the basics of risk communication. Figure 3 shows an overview of the lecture offered to all officers of the city.



Fig. 2. Overview of the CRCT meeting (round table discussion).



Fig. 3. Overview of the education meeting with city officers (big meeting).

Third step (post 6–9 months)

Joint positive discussion and work involving both civic groups and the local government were started with key persons as a kind of stakeholders. This type of meeting was held repeatedly, sometimes open to the public and sometimes closed. A spokesperson for the city mayor, representative persons of city office staff, active civic group members and radiation experts discussed the way forward, thus creating the official strategy for the decontamination work in Kashiwa city. By this time, some of the civic groups understood the city strategy and cooperated with the city in positive discussion, all parties seeking to reduce the environmental dose and the citizen's anxiety as quickly as possible. These civic groups would come to play a vital role in the realization of the official voluntary decontamination work of Kashiwa city.

Fourth step (post 8–12 months)

Local government discussed and agreed upon its official decontamination strategy, based on the results of several open discussions. Kashiwa city office held two open-hearing meetings to discuss and determine their roadmap for effectuating decontamination in accordance with new Japanese regulations regarding land restoration

strategy. The mayor of Kashiwa city proposed the draft plan of the official decontamination strategy and the roadmap based on the Third Step discussion. He received questions and opinions from the participants in the meetings, which went on until questions and opinions from participants stopped coming, and scientific input was provided by radiation protection experts. Based on the information provided at the open-hearing meetings, the plan for the decontamination strategy and the roadmap were revised.

Fifth step (post 9–15 months)

A guidance book for the official voluntary decontamination by citizens was distributed by Kashiwa city office, and was fully equipped by the local government. Figure 4 shows the top page of the guidance book for the official voluntary decontamination work of Kashiwa city. It can be downloaded via the website of the city [9]. The main contents of the guidance book entitled *For Our Children and Future – Basics of Radiation and Countermeasure* are as follows; the official strategy and roadmap for decontamination work for reducing environmental radioactivity in Kashiwa city, the actual environmental conditions with respect to radioactive materials in Kashiwa city, what is decontamination, how to decontaminate general dwellings, how to decontaminate a zone by a neighborhood association or a residents' association, basic information about radiation, and contact details for inquiries regarding the radiation countermeasures for Kashiwa city.

The above five steps evolved over ~15 months, and were strongly supported and influenced by radiation protection experts with connections to the city. The guiding principles for this process can be seen in *ICRP Publication 111* [8]. At that time precisely, this publication was the basic textbook for decontamination work. Key excerpts from this report are as follows:

“The dissemination of a ‘practical radiological protection culture’ within all segments of the population, and especially within professionals in charge of public health and education, is also an important element of the strategy.” (in paragraph 62 of *ICRP Publication 111*).

“Authorities should facilitate the setting-up of local forums involving representatives of the affected population and relevant experts (e.g., health, radiation protection, agriculture authorities, etc.). These forums will allow gathering and sharing of information, and favor a common assessment of the effectiveness of strategies driven by the population, and the authorities” (in paragraph 71 of *ICRP Publication 111*).

Since the time of the work, additional information, and guides have been reported and published, based mainly on the experiences in Fukushima prefecture [10–12]. Most of these are consistent with *ICRP Publication 111*, and also support our strategy.

Official procedure for voluntary decontamination work

In parallel with determining the strategy and roadmap for decontamination in Steps 4 to 5, Kashiwa city office began to organize a new system for assisting the voluntary decontamination work in and around people's homes. A Decontamination Support Coordinator was nominated and placed in charge of the system. He was the agent of the mayor. In addition, ~20 to a maximum of 28 Kashiwa city officers were named as Decontamination Advisors, also nominated by the mayor. They were young city office staff members living in



Fig. 4. Cover page of the guidance book for the official voluntary decontamination of Kashiwa city.

the city. Under their guidance, several active voluntary civic groups, NPO or NGO joined the process of assisting with getting citizen's requests into the action plan, wherever appropriate and possible. Led by the Decontamination Support Coordinator and the Decontamination Advisors, neighborhood associations started playing an active part in the voluntary decontamination work.

Kashiwa City office recommended that citizens simultaneously decontaminate certain portions of a large area of their community, particularly frequently used places, such as roads and common areas for condominiums, the reason being that this strategy would lead to the most effective reduction of the environmental radiation dose in the region. Kashiwa city office dispatched the Decontamination Support Coordinator and/or Decontamination Advisors to local communities such as town councils and condominium management associations, according to the official roadmap. Figure 5 summarizes the official procedure for voluntary decontamination of Kashiwa city.

The main steps in the self-decontamination as supported by the city (Fig. 5) were as follows:

- (i) Start consultation with a neighborhood association [1–5]:
 - consult with the Decontamination Support Coordinator and Decontamination Advisor
 - lend survey meters to the volunteer citizens
 - measure the radiation dose rate around the target area's environment (carried out by citizens and Decontamination Advisors together). (In the case of town councils of 50 households in one group, this would take ~1 h.)
- (ii) Make a decontamination action plan [6–9]:

- determine the action plan for decontamination (working range, method, etc.). Kashiwa city office to provide the needed items and tools by for decontamination work. It would take ~3 weeks from the start of planning to the decontamination work (preparing items and tools, etc.) in the case of town councils of 50 households in one group.
- (iii) Carry out decontamination work and post-measurement [10–12]:
 - conduct decontamination work following the action plan, with the assistance of Decontamination Advisors, etc.
 - measure the radiation dose rate after the decontamination work. The decontamination work and post-measurement in the environment would take 2 h on average in the case of town councils of 50 households in one group.

LESSONS LEARNT

We can now look back on the confusion at the time, and reasons for the behaviors and feelings of stakeholders, through the *Kashiwa City Public Relations Magazine* [13] issued on 15 March 2013. This magazine, written in Japanese, summarized the events of the time, reporting the dialogue of four people, including the Mayor of Kashiwa city, the Decontamination Support Coordinator, a representative of the civic groups, and a radiation protection expert, who is one of the authors of this paper. Several matters related to the actions, etc. of stakeholders mentioned in the current paper are based on the descriptions provided in this magazine.

The main lessons learnt, based on the work described in this paper, are as follows:

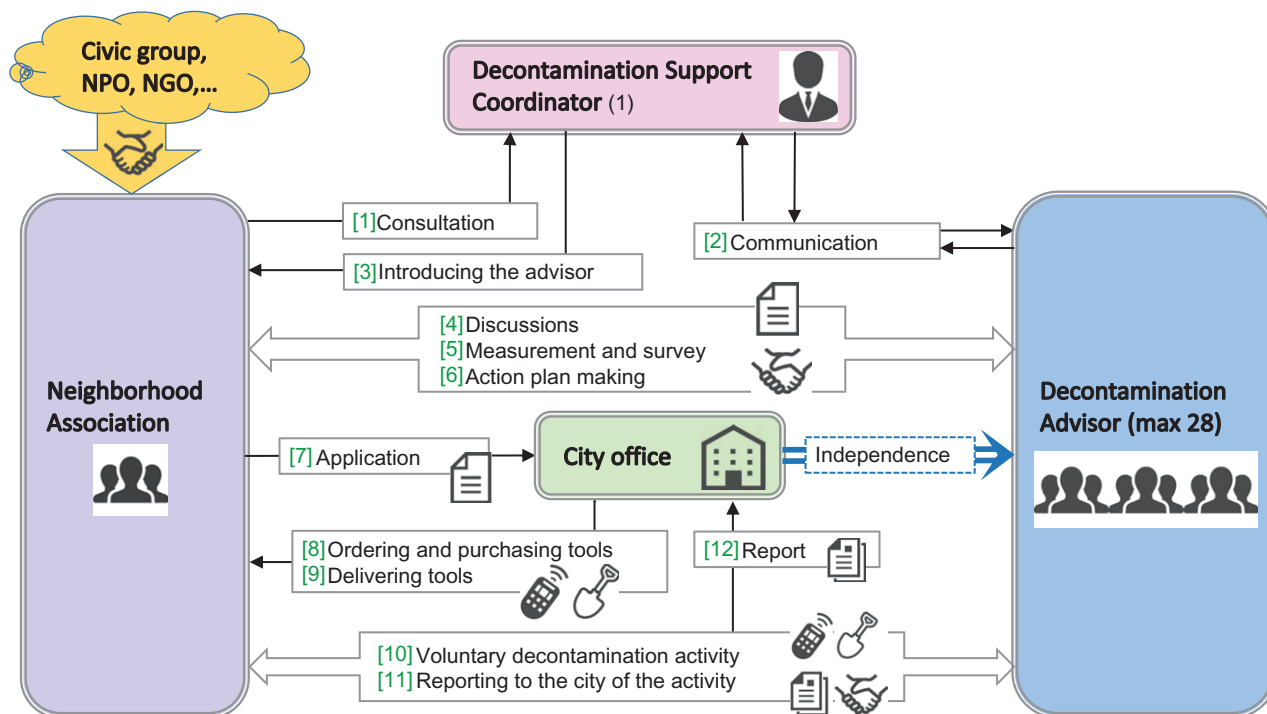


Fig. 5. Official procedure for voluntary decontamination of Kashiwa city.

- Stakeholders should be aware that citizens in an emergency situation seek aggressive countermeasures from a city administration because a city is more psychologically close to the residents compared to their country and their prefecture.
- It is important that administrative staff, city staff, citizens and experts cooperate with one another under a visible relationship.
- As time passes after an emergency situation, the knowledge, experience, and technical capabilities of stakeholders builds, and the ideas and opinions of citizens and policy-makers change dramatically. It is important that stakeholders recognize that there will be change and make efforts to modify actions as appropriate. Policy-makers need to have the courage to reconsider policies and countermeasures when necessary.
- The demand by citizens for public disclosure of information is extremely large. It is important for stakeholders to understand the role of forums, publicity magazines, homepages, study sessions, consultation meetings, etc. and utilize them at appropriate times.

CONCLUSION

In this paper, the challenging process of the official voluntary decontamination activity in Kashiwa city, Chiba prefecture, which was carried out with strong cooperation between a local government and experts from various fields, is described and reviewed. They put into practice some of the recommendations of *ICRP Publication 111*; “It is the responsibility of the authorities, particularly at the regulatory level, to establish the conditions and to implement the means to allow the effective engagement of the affected population in the protection strategies and more globally in the rehabilitation programme.

Past experience of the management of contaminated areas has demonstrated that the involvement of local professionals and inhabitants in the implementation of protection strategies is important for the sustainability of the rehabilitation programme.” (Paragraph 55 of *ICRP Publication 111*).

The process followed in Kashiwa city is a good example of putting these recommendations into practice. On the other hand, decontamination of the living environment would usually be performed by the national government or a local government. The systematic framework for the voluntary decontamination by citizens in Kashiwa city, developed through cooperation between a local government and experts, was rare at that time. The authors believe that the experience gained from the process developed by the city office and the participant experts is valuable and should be shared with other stakeholders around the world. We hope all related stakeholders in the world will refer to the process followed and the experience gained in Kashiwa city of Chiba prefecture.

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