

## Report

# Expert Meeting on the Long-term Healthcare of Workers at the TEPCO Fukushima Daiichi Nuclear Power Plant

September 2011

## **Report from the Expert Meeting on the Long-term Healthcare of Workers at the TEPCO Fukushima Daiichi Nuclear Power Plant**

### **1. Background**

In the recovery from the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant due to the Great East Japan Earthquake on 11 March 2011, many workers have been engaged in the emergency work.

The work toward restoration from the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant has extended for a long period of time, and there is a concern regarding the increased health risks to many workers engaged in the emergency work. They are feeling mental and physical long-term concerns due to radiation exposure in the medium-to-long-term. Therefore long term health care is required to be provided for these workers.

On 17 May 2011, the Nuclear Emergency Response Headquarters issued a report entitled “Policy for Actions to Respond to Nuclear Disaster Victims in the Immediate Future”, which indicated the need to make efforts toward restoration from the accident in the earliest possible way with consideration for the impact on safety and the surrounding environment, and also the work environment. Especially for the long-term health care of workers, it was reported in the policy that “to implement the long term health care, a database will be developed that allows tracing the radiation exposure dose of all workers engaged in emergency work, including after they left the job”.

Based on the above conditions, the Ministry of Health, Labour and Welfare established the “Expert Meeting on Long-term Health Care of Workers at the TEPCO Fukushima Daiichi Nuclear Power Plant” in June 2011, and started discussions on the following issues:

- (a) Information to be included in the database
- (b) Preferred way of the long-term health care of workers, including the period after leaving the job, such as implementing medical examinations.

This report compiled the findings of the Expert Meeting on the preferred way of the long-term health care of workers at TEPCO Fukushima Daiichi Nuclear Power Plant.

### **2. Basic Policy**

The database should have a mechanism that allows for registering not only radiation exposure doses but also workers’ other health information. It will also enable inquiries by workers themselves, so that workers who were engaged in emergency work would be able to understand the condition of their own health over time even after they left their work places, and receive health consultation or

guidance to maintain their health in an appropriate manner.

In addition, given that those workers will have concerns about their health due to their engagement in emergency work, and the fact that there is an incremental risk of health impairment along with an increase in radiation exposure dose, in principle it will be appropriate for the employer to provide medical examinations to those who were exposed to radiation doses above a certain level.

In addition, in order to manage workers' health even after they resign from their jobs, the national government should establish health consultation service desks and provide these workers with opportunities for health guidance from medical professionals, and implement examinations for those who were exposed to radiation doses above a certain level.

### **3. Development of a database**

#### (1) Information to be included in the database

The following information from (a) to (e) below should be managed in the database to be utilized for worker's long-term health care;

- (a) Information to identify individuals (ID number, name, affiliation, address).
- (b) Radiation exposure doses before during and after the emergency work, and work description.
- (c) Information from medical examinations
- (d) Information from health consultation and guidance
- (e) Other information necessary for health care (lifestyle, etc.)

Among information listed above, information shown below will be provided by employers.

- (a) Information to identify individuals (ID number, name, affiliation, address).
- (b) Radiation exposure doses and work description during engagement in emergency work or radiation work.
- (c) Results of specified health checks for workers engaged in radiation work, and results of general medical examinations and special medical examinations provided to workers during emergency work and radiation work.

Upon obtaining workers' agreement, it is desirable to utilize workers' information related to the exposure dose registration and management system operated by the Radiation Effects Association, and the radiation management record system.

Data items in the database are shown in Table 1, however, these should be reviewed as appropriate. These include both items which are tested in the regular routine medical examination, such as those

specified in the Industrial Safety and Health Act, and items that are tested on a discretionary basis. The results of examinations conducted on a discretionary basis, such as examination conducted appropriate for the radiation exposure doses and results of test conducted as a part of medical care, should be registered only upon obtaining worker's agreement.

The database assumes that information managed in this database will be utilized for epidemiological research on certain conditions in the future. Such research must be implemented based on appropriate research plans.

It is advisable to have comprehensive procedures to the extent possible where the necessary agreement with workers should be obtained when the notification of registration of the information into the database is made.

#### (2) Access to the data

Workers engaged in emergency work should be able to access to their own health information, including radiation exposure dose in the database. The information should be available from information desks directly to the workers themselves with the view of protecting personal information. Given that many of those workers are from many different regions in the country, a certain number of information desks will be set up throughout the country for their convenience.

A database registration certificate should be issued to each of all workers who have engaged in emergency work, so that it allows for the smooth and appropriate identification of individuals for whom health care is provided, or who attempt to access the database.

Further, a pocketbook should be issued to workers to whom medical examinations provided appropriate for their radiation exposure doses, so that they can easily confirm examination results or radiation exposure doses in the past.

When primary doctors or employers require the information, it will be provided through the workers.

### **4. Approach for managing long-term health care including after they resign from jobs**

#### **(1) Basic concept**

Some emergency workers received exposure doses exceeding 50 mSv, the limit for radiation exposure in a year for radiation workers specified in the Ordinance on Prevention of Ionizing Radiation Hazards (hereinafter referred to as "Ionizing Radiation Ordinance"). And some of them

received radiation exposure doses even exceeding 100 mSv, the limit for radiation exposure during emergency work specified in the Ordinance. There is a concern that the increased radiation exposure doses may cause health impairment for them. Therefore, examinations of workers appropriate for the radiation exposure doses will be required based on medical opinions at the present moment. Further, the usage of stable iodine preparations should take into consideration that they have been engaged in emergency work from an early stage after the accident.

Assuming that workers will be concerned about their long-term mental and physical health because they have been engaged in highly urgent work under an environment different from their regular radiation work, the government should establish health consultation service desks and provide opportunities to consult with medical professionals for those who are currently unemployed or do not receive regular health care by their employers, regardless of their radiation exposure doses. In principle, their health is to be managed by their employers while they are still in their jobs, but the government should provide the health consultation desks, etc. for those who have resigned.

In principle, medical examinations appropriate for radiation exposure doses should be provided by the employer for workers who have been continuously employed by a company to which they belonged to when engaged in the emergency work, and for those who are now engaged in emergency work and radiation work by their companies,. Meanwhile for workers who are not engaged in radiation work at small and medium-sized companies and for those who changed their job to a company not involving radiation work, it will be appropriate that their company provides the usual health care and the government provides opportunities to have examinations appropriate for their radiation exposure doses. It is advisable that sufficient explanation be provided to the examinees in advance on specific examination items, and the necessity of the examinations.

## **(2) Specific examination items for health care**

- (a) Health care items to be conducted regardless of the level of the radiation exposure dose during emergency work:
  - (i) Regular health care including mental care should be provided to workers who were mentally affected by engaging in highly urgent work under an environment different from that of their normal radiation work. For workers who resigned from their jobs or those who transferred their job to a company which does not involve radiation work, the government should establish health consultation desks, as well as provide opportunities to consult with medical doctors and health nurses.
  - (ii) The government or appropriate organizations responsible for health care should introduce and solicit participation in their health care program (including health care for some of the

emergency workers). When such a program may be a type of research, the intention of the research should be well informed to participants in the program after following appropriate procedures, and considering ethical aspects.

- (b) Health care items intended for emergency workers who received effective doses exceeding 50 mSv, in addition to the items shown in (a) above:
  - (i) Provide opportunities once a year for eye examinations, in addition to routine medical exams.
  - (ii) Provide slit lamp microscopy eye examinations for detecting cataracts. It is advisable that photographs of their lenses will be taken by the method standardized among institutions at different areas that implement the examination.
- (c) Health care items intended for emergency workers who received effective doses exceeding 100 mSv, in addition to items shown in (a) and (b) above.
  - (i) Provide an opportunity once a year for thyroid examinations and cancer screenings (stomach, large intestines and lungs).
  - (ii) Provide thyroid tests using blood samples with respect to thyroid stimulation hormone (TSH), Free triiodothyronine (free T3) and Free thyroxin (free T4). Ultrasonic inspection on neck shall also be conducted in cases where a medical doctor considers it necessary based on the above test results and radiation exposure dose.
  - (iii) Implement gastric X-ray fluoroscopic examinations or gastric endoscopic examinations for gastric cancer examination
  - (iv) Examine fecal occult blood for large intestinal cancer examination
  - (v) Implement a chest X-ray and examine sputum cells for lung cancer examination
  - (vi) It is recommended to examine the white blood cell count and differential leukocyte count once a year, in addition to (i) – (v) above. It should be noted that the said examination is included in the health check conducted pursuant to the Ionizing Radiation Ordinance for workers who are currently engaged in radiation work. For other workers, it will be appropriate to implement the said examination together with the red cell count and hemoglobin content from blood samples taken at general periodic medical examinations.

### **(3) Periodic reviews**

The health care items should be reviewed after approximately three years since medical progress and changes of examination methods are expected.

For example, the relationship between radiation exposure and the development of various cancers is unknown in many ways. Generally speaking, the cancer screening methods mentioned in (2)-(c) have been established for male examinees. Therefore, medical attention and the details of the

examination should be reviewed in accordance with current medical progress.

#### **5. Organization responsible for administration of managing the database and medical examination**

In order to achieve appropriate health care on a long-term basis, a system should be established in which not only radiation doses but also other health information is continuously reflected in the database for an extended time. To that end, information before they leave their job should be prepared by their former employers and results of medical examinations after they left the job should be incorporated into the database to the extent possible, while avoiding a heavy burden to workers.

Functions required for an organization responsible for administration of managing the database appropriately and medical examination appropriate for the exposure dose are to continue its missions on a long-term basis, to have a certain number of service desks across the country for responding to inquiry about the data, and to have the capability to closely cooperate with institutions providing the examinations appropriate for the exposure dose. It is, therefore, appropriate that an organization with such conditions should be selected as a responsible organization.

The institutes chosen to conduct examinations appropriate for the exposure dose should be selected considering actual medical systems in the area in order to ensure high quality examination levels.

**Table 1 Data items in the database**

1. Personal identification data

ID	
Name	
Date of birth	
Sex	
Address	
Telephone number	
Possession of Radiation Management Record	
Registration number (of the Radiation Effects Association)	
Work place during the emergency work	
Contact person and phone no. of the section of the work place during the emergency work	
Current work place	
Contact person and phone no. of current work place	

\* Personal identification data

2. Information on works and radiation exposure

Date started measurement of radiation exposure dose	
Date finished measurement of radiation exposure dose	
Site	
Work place	
Work descriptions	
Normal work or emergency work	
Work application receipt number	
Date when a work application is submitted	
Name of the work	
Name of the principal contractor	
Name of contract	
Name of work	
Equivalent dose to eyes	mSv
Equivalent dose to skin	mSv
Equivalent dose to thyroid	mSv
Effective dose	mSv

Effective external exposure dose	mSv
Committed effective internal exposure dose	mSv
Evaluation method of internal exposure	
Measurement date of internal exposure	
Measured values	
Nuclides	
Date when blood sample is taken (chromosome of lymphocytes)	
Biodosimetry	
Abnormal chromosome findings	
Intake of stable iodine	

\*Radiation exposure doses and work descriptions before, during and after engagement in emergency works.

### 3. Data on health consultation/guidance

Date of service			Types of health consultation	
Occupational history				
Note				

### 4. Data on medical examination and tests (including life style)

Date of examination		<White blood cells>*	
Types of Examination		WBC count	
Medical doctors and institution for examination		Neutrophil	%
Past illness		Eosinophil	%
Alcohol intake		Basophil	%
Age when started alcohol drinking		Monocyte	%
Age when stopped alcohol drinking		Lymphocyte	%
Daily amount of alcohol drinking (equivalent to Japanese sake)		<Eye (cataract)>*	
Smoking		Examination method	
Age when started smoking		Eye findings	
Age when stopped smoking		<Skin>*	
Daily amount of smoking		Dermatological findings	
Subjective symptoms		<Thyroid>	

Objective symptoms		TSH	
Diagnosis and opinions from a medical doctor		FT3	
Name of medical doctor providing an opinion		FT4	
<b>&lt;General routine examination&gt;</b>		TRAb	
Height	cm	MCPA	
Weight	kg	Anti-TPO antibody	
Abdominal circumference	cm	TgAb	
Eyesight (right)		Thyroid ultrasound	
Eyesight (left)		<b>&lt;Upper digestive tract(stomach)&gt;</b>	
Hearing 1000 Hz (right)	dB	Stomach fluoroscopy	
Hearing 1000 Hz (left)	dB	Stomach endoscopy	
Hearing 4000 Hz (right)	dB	Helicobacter pylori	
Hearing 4000 Hz (left)	dB	Pepsinogen 1	ng/mL
Chest X-ray		Pepsinogen 2	ng/mL
Sputum		Pepsinogen 1/2 ratio	
Blood pressure (systolic)	mmHg	<b>&lt;Lower digestive tract (large intestine)&gt;</b>	
Blood pressure (diastolic)	mmHg	Occult blood	
Red blood cell count	/mm <sup>3</sup>	Large intestine fluoroscopy	
Hemoglobin	g/dL	Large intestine endoscopy	
Hematocrit	%	<b>&lt;CT, MRI, others&gt;</b>	
Platelet count	/mm <sup>3</sup>	Head and Neck	
GOT (AST)	U/L	Chest	
GPT(ALT)	U/L	Abdomen	
γ-GTP	U/L	Other regions	
Total cholesterol	Mg/U/L	<b>&lt;Others&gt;</b>	
HDL cholesterol	mg/dL	HBsAg	
LDL cholesterol	mg/dL	HBsAb	
TG	mg/dL	HBcAb	
Blood glucose	mg/dL	HBeAg	
HbAlc	%	HBeAb	
Urinal glucose		HCV Ab	
Uric protein		High sensitivity CRP	mg/dL

Uric blood			
ECG			

\*These (white blood cells, eye, skin) are included in the medical examination pursuant to the Ordinance on Prevention of Ionizing Radiation Hazards

**(Reference)**

**Note on data items in the database**

**General routine medical examination**

Includes tests included in the routine medical examination conducted pursuant to the Industrial Safety and Health Act and those which are conducted at the same time as the said test items (e.g. platelet count, uric blood).

**White blood cells**

Includes WBC count and differential leukocyte count in the peripheral blood.

**Thyroid**

Includes examinations of typical thyroid hormone and autoantibody levels that change due to thyroidal illness, and ultrasound examination of the thyroid.

**Upper digestive tract (stomach)**

Includes typical stomach imaging examinations, those related to Helicobacter pylori and pepsinogen tests (a blood test to determine contraction of gastric mucosa, a high risk for stomach cancer).

**Lower digestive tract (large intestine)**

Includes occult blood examination for bowel cancer screening and typical imaging examinations.

**Others**

Includes examination on hepatitis B and C, and those for inflammation (high sensitivity CRP test).

**Expert Meeting on the long-term health care of workers at  
the TEPCO Fukushima Daiichi Nuclear Power Plant**

**Attendants**

Yoshiharu Aizawa	Vice President Kitasato University
Makoto Akashi	Board Member National Institute of Radiological Science
Satoshi Imamura	Board Member Japan Medical Association
Tomoko Kusama	President Oita University of Nursing and Health Science
Kazunori Kodama	Principal Researcher Radiation Effects Research Foundation
Gen Suzuki	Professor International University of Health and Welfare Graduate School
Tomotaka Sobue	Head of Cancer Statistics Research Department Centre for Cancer Control and Information Service National Cancer Center

## **Timeline of discussions in the past**

1<sup>st</sup> Meeting: 27 June 2011

- Long-term health care of workers at TEPCO Fukushima Daiichi Nuclear Power Plant

2<sup>nd</sup> Meeting: 21 July 2011

- Grand design of the long-term health care of workers at TEPCO Fukushima Daiichi Nuclear Power Plant (draft)

(3 August 2011)

“Grand design of the long-term health care of workers at TEPCO Fukushima Daiichi Nuclear Power Plant” finalized

3<sup>rd</sup> Meeting: 9 August 2011

- Health care in accordance with radiation exposure doses

4<sup>th</sup> Meeting: 21 September 2011

- Report from the Expert Meeting (draft)