

Manual for Relief Activities under Nuclear Disasters

November 2018



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Chapter 1 Activity Principle and Action Standards on Relief Team Activities

1. Activity Principle

In the event of a nuclear emergency, relief activities of the Japanese Red Cross Society (hereinafter called "JRCS") shall be carried out outside of the area where public access is restricted by the Japanese government or other public authorities (hereinafter called "restricted areas"), provided that the total radiation dose accumulated over the relief activities does not exceed 1 mSv (see Reference 1 and Reference 2).

2. Action Standards

- (1) In the event that a nuclear disaster occurred or is likely to occur, relief team members shall undergo a non-routine health check, constituting mainly a clinical interview, prior to deployment (see Reference 3). The permission for deployment to affected areas shall be determined and authorized by the superintendent of the Red Cross facility to which the relief team members belong.

Furthermore, if feasible, the formation of each relief team shall include a radiological technologist to ensure safety in the relief activities.

- (2) Each relief team member shall wear/carry a personal digital dosimeter, protective clothing, iodine tablets, and other equipment that are required for radiation protection.

In addition, if feasible, each relief team shall carry a survey meter for measuring ambient dose rate and a Geiger-Muller (GM) survey meter for the detection of whole-body contamination.

In order to measure the individual dose received by each relief team member accurately, the radiation measurement devices such as the personal digital dosimeter shall be examined before use to ensure accurate functioning and be calibrated as needed.

- (3) At the headquarters of disaster control of the local chapter in the affected area (hereinafter called "JRCS chapter HDC in the affected area"), the relief team members shall gather information on the ongoing nuclear disaster and the relevant preparedness for safety, while confirming instructions or matters to bear in mind in their activities.
- (4) Each relief team member shall measure his/her radiation doses on a continuous basis over the activity period and record the readings at the end of the activities for the day (see Reference 4)

If there is a fear that cumulative doses may exceed the 1 mSv limit for a given relief team member, the relief team leader shall order the individual to discontinue the relief activities and evacuate to a safe area.

- (5) When treating evacuees from the restricted areas, the relief teams shall perform their relief activities in the consolidated resident acceptance framework consisting of screening, decontamination and medical aid provided by the local municipalities, etc., following the instruction from the experts engaged in these undertakings.

Furthermore, the relief teams shall define the scope of their medical relief activities and ensure that each relevant organization is fully informed of the definition.

- (6) When withdrawing from the affected area upon completion of relief activities, the relief teams shall submit the records of exposure received by individual team members to the JRCS chapter HDC in the affected area.

When the relief operation period has ended, the JRCS chapter HDC in the affected area shall submit the records of exposure received by individual relief team members (hereinafter called "exposure records") to the JRCS Headquarters. The JRCS Headquarters shall keep the exposure records while sending a photocopy of the records to the facilities that the relief team members belong to.

- (7) The superintendents of the Red Cross facilities where the relief team members work, shall ensure that any individual who has been presented with a cumulative radiation dose exceeding 1 mSv, does not engage in any nuclear disaster relief activity for a period of 1 year from the date the limit has been reached. However, the criteria shall not apply to the Radiation Workers, etc. for whom the standards have been set separately by the Japanese government.

Reference 1: The rationale for establishing the protection criteria at a cumulative dose of 1 mSv

1. Abiding by the concept of individual dose limits that are recommended by the International Commission on Radiation Protection (ICRP)

- The dose limits presented by the ICRP were established as the criteria to restrict the effective dose delivered to an individual from multiple radiation sources by the sum of doses. The specific values for protection criteria have been established in line with the concept of preventing deterministic effects^{*1} and limiting the probability of stochastic effects^{*2} as low as reasonably achievable.

For the specific tissues such as the lens of the eye and skin, the dose limits provided are based on the respective dose thresholds from the perspective of the prevention of deterministic effects.

Regarding the stochastic effects such as induction of cancer and genetic diseases, the dose limit for occupational workers is set at 20 mSv per year (an approximate lifetime dose of 1 Sv), which correlates to the lower limit of unacceptable risk level. Meanwhile, the dose limit recommended for members of the public is set at an effective dose of 1 mSv in a year, taking into account the mortality risk estimates by age associated with lifetime low-dose radiation exposure, as well as the natural background radiation dose of 1 mSv each year (excluding background exposure from radon).

Thus, the dose limits were established in order to restrict the radiation dose received by individuals. Therefore, it restricts the sum of doses from all sources, except medical exposure and natural background exposure.

2. Taking advice from the International Committee of the Red Cross (ICRC)

On March 19, 2011, in the wake of the Fukushima Nuclear Power Plant Accident, the JRCS received a visit from a team of ICRC's nuclear emergency experts, who gave advice on nuclear disaster response including the following:

- Relief team members that have not received the training in nuclear disaster should be deemed as members of the public and therefore, based on the ICRP recommendations, they should be protected according to the standards wherein the upper limit of exposure is 1 mSv per deployment.
- Relief team members should wear a personal dosimeter when undertaking relief operations.
- In order to shorten the time period of exposure, the relief team members should shelter in a safe place and take a rest at night.
- Ensure a setting in which the experts are readily available for advice.
- For each relief team member, keep records of the time periods and locations of relief operations, as well as the radiation doses he/she received.

The JRCS's relief activities in Fukushima prefecture were conducted according to the advice as above.

*1, *2: Refer to Appendix, *Basic Knowledge about Radiation for Relief Activities*.

Reference 2: Range of activities according to the criteria for cumulative dose at 1 mSv
(Specification is based on the circumstances of the Tokyo Electric Power Company's Nuclear Power Plant Accident in Fukushima)

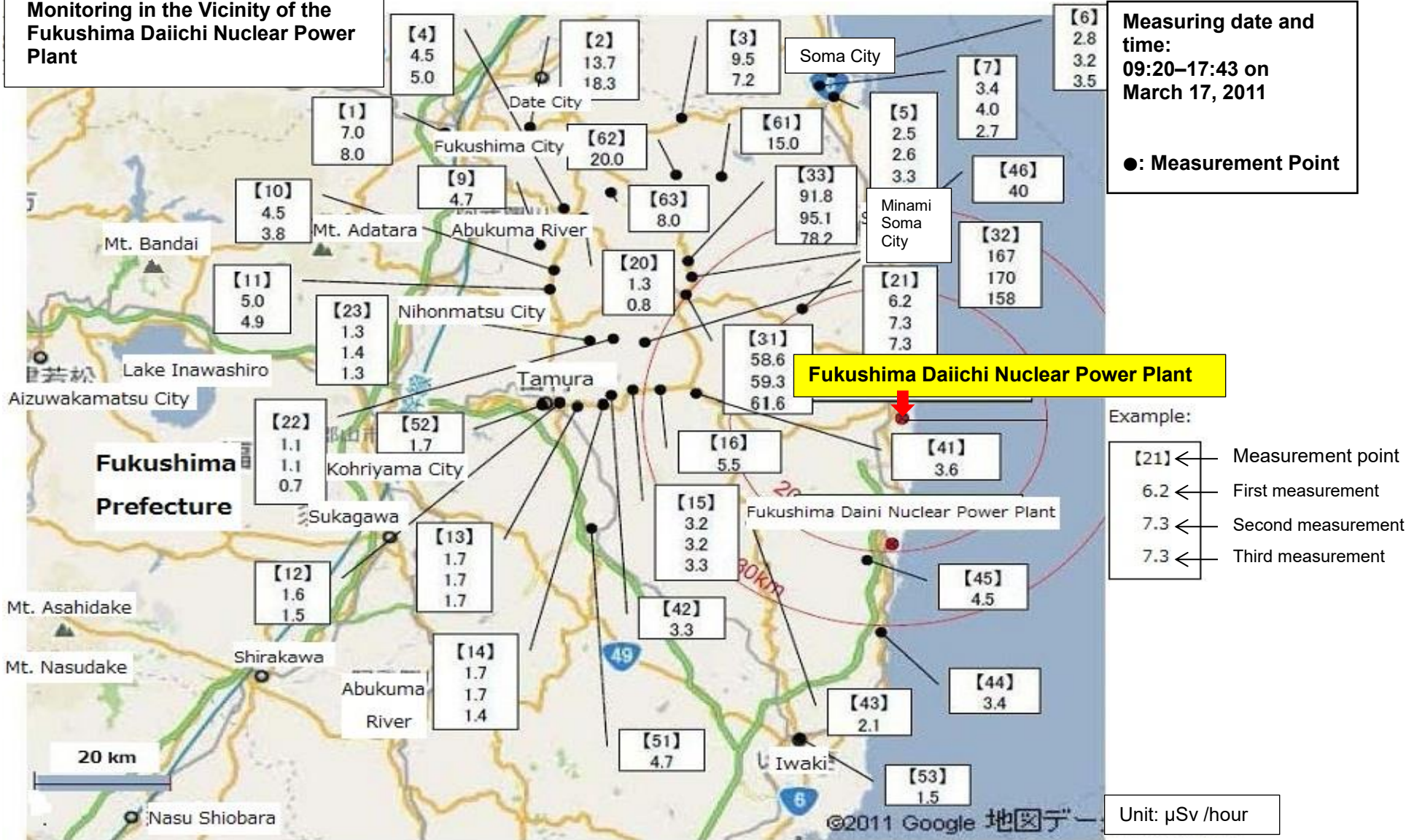
- As a benchmark in general, activity durations for a JRCS relief team are as follows; 3 days for the first deployment in the initial phase, 5 days for the second deployment, and 1 week or less thereafter.
- Suppose a given relief team continues their relief activities uninterruptedly for 3 days at a site where the ambient dose rate is 10 $\mu\text{Sv}/\text{hour}$ on average, the cumulative dose is calculated at 720 μSv (10 $\mu\text{Sv}/\text{hour}$ x 24 hours x 3 days). Note that this hypothesizes that the relief team members continued to stay outdoors for a maximum duration of 24 hours each day. Therefore, if they move to a place with a lower dose rate at night, the effects of radiation exposure can be further reduced.
- Figure 1 on page 4 shows the measurement points in a zone at a distance of 20 km and beyond from the Tokyo Electric Power Company's Fukushima Nuclear Power Plant, together with the ambient dose rates determined at the points on March 17, 2011 (source: Ministry of Education, Culture, Sports, Science and Technology).

Some places, like Measurement Point 32, exhibited high ambient dose rates over 100 $\mu\text{Sv}/\text{hour}$, which demonstrates that, even outside of the evacuation zone (later termed "restricted areas"), conducting relief activities below the cumulative dose criteria at 1 mSv is infeasible (although, even in that case, it would allow relief teams to have adequate time to move to a safe area).

Meanwhile, in most areas, the ambient dose rates were 10 $\mu\text{Sv}/\text{hour}$ or less, which clearly suggests that relief activities could be carried out for a duration of 3 days or more in many areas.

- Additionally, when these readings were obtained, the outdoor ambient dose rates in the vicinity of Fukushima Red Cross Hospital were 8 to 10 $\mu\text{Sv}/\text{hour}$, whereas the ambient dose rates inside the hospital were 1 $\mu\text{Sv}/\text{hour}$ or less. Therefore, it is likely that relief activities, if conducted indoor, could be subjected to fairly low radiation doses.
- Thus, what is imperative in relief operations in the event of a nuclear emergency is to keep composure and carry out the activities in a self-controlled manner, maintaining a grasp of the ambient dose rate in the activity area and the cumulative dose for oneself.

Results of the Ambient Dose Rate Monitoring in the Vicinity of the Fukushima Daiichi Nuclear Power Plant



Source: The Ministry of Education, Culture, Sports, Science and Technology website. Translated by the Japanese Red Cross Society.

Reference 3: Non-routine Health Check

A non-routine health check shall be performed centering on a clinical interview, in which the examinee's medical history of radiation exposure and presence of subjective symptoms shall be checked for and evaluated. If deemed necessary by a physician, an examination complying with the one applicable to radiological workers shall be carried out pursuant to the requirements of the *Regulation on Prevention of Ionizing Radiation Hazards* shown below.

<Translation by Ministry of Justice, Japan>

Regulation on Prevention of Ionizing Radiation Hazards

(Law number: Ministry of Labour Order No. 41 of 1972)

Chapter VIII Medical Examinations

Article 56

- (1) An employer must conduct medical examinations of the following items by a physician for workers constantly engaging in Radiation Work who enter Controlled Areas, at the time of employment or transfer to the work and periodically once every period within six months thereafter:
 - (i) investigation and evaluation of radiation exposure history (or, for workers having a radiation exposure history, the location of work, details and period of work, whether there is any Radiation hazard, whether there are any subjective symptoms and other matters concerning Radiation exposure);
 - (ii) examination of white blood cell count and percentage;
 - (iii) examination of red blood cell count and examination of hemoglobin or hematocrit value;
 - (iv) examination of eyes for cataract; and
 - (v) examination of skin.
- (2) Among the medical examinations provided for in the preceding paragraph, the medical examination of item (iv) of the same paragraph, which must be conducted at the time of employment or transfer to the work, may be omitted depending on the type of the radiation source to be used.
- (3) Among the medical examinations provided for in paragraph (1), all or some of those listed in items (ii) through (v) of the same paragraph, which must be periodically conducted, may be omitted if the physician considers them unnecessary.
- (4) Notwithstanding the provisions of paragraph (1), the medical examinations listed in item (ii) to item (v) of the same paragraph are not required for workers whose exposed effective dose for the one-year period preceding the year to which the day of the medical examinations of the same paragraph (limited to those required to be conducted periodically; the same applies hereinafter in this paragraph) belongs did not exceed 5 mSv and exposed effective dose for the one-year period to which the day of the medical examinations belongs is not expected to exceed 5 mSv if the physician considers them unnecessary.
- (5) At the time of the medical examinations provided for in paragraph (1), an employer must present to the physician the exposed doses of the workers after the last medical examinations (or if the doses cannot be determined by calculation, necessary data to estimate them (or if the data are not available, necessary data to ascertain the situations in which the workers were exposed to the Radiation)).

Source: e-Gov, the official web portal of the government of Japan (available only in Japanese)
(https://elaws.e-gov.go.jp/search/elawsSearch/elaws_search/lsg0500/detail?lawId=347M50002000041&openerCode=1)

Chapter 2 Nuclear Emergency Medical Care Advisors

1. Appointment and Placement of Nuclear Emergency Medical Care Advisors

- (1) In order to perform relief activities safely and appropriately in radioactive environments, the President of the JRCS shall appoint Nuclear Emergency Medical Care Advisors, a group consisting of radiological experts (physicians) and radiological support members (radiological technologists). The appointment shall be made based on recommendations given by the Presidents of the JRCS local chapters.
- (2) In the event that a nuclear emergency has occurred or is likely to occur, the JRCS shall, as needed, place Nuclear Emergency Medical Care Advisors at the headquarters of disaster control established at the JRCS Headquarters (hereinafter called "JRCS HQ HDC") and the JRCS chapter HDC in the affected area.

2. Roles of Nuclear Emergency Medical Care Advisors

(1) Radiological Experts (physicians)

- A. Provide relief team members with preliminary education on preparedness for safety
 - (a) Knowledge of radiation
 - (b) How to put on/remove a protective suit
 - (c) How to use radiation measurement instruments
- B. Counsel relief teams on their activities, etc.
 - (a) Advice on the principles in expanding relief activities
 - (b) When to wear a protective suit
 - (c) When to carry out an emergency evacuation
 - (d) When to take the iodine tablets
- C. Provide relief team members with post-deployment education on preparedness for safety
 - (a) Health management based on the readings given by dose measurement instruments
 - (b) Points to be noted in future daily life
- D. Form alliance and collaborate with the JRCS disaster medical care coordination team
- E. Follow up with other affairs as needed upon instruction or request of the JRCS Headquarters

(2) Radiological Support Members (radiological technologists)

- A. Provide relief team members with preliminary education on preparedness for safety
 - (a) Perform tasks as directed by Radiological Experts
- B. Take charge of the record of ambient dose rates in the activity area and the individual radiation doses, etc.
 - (a) Watch the information provided by public administrative bodies, etc., as well as the ambient dose rates measured by radiation survey meters
 - (b) Administer the record of radiation doses received by relief team members
- C. Take charge of radiation measurement instruments and protective suits, etc.
 - (a) Maintenance of radiation measurement instruments, etc.
 - (b) Take charge of the records of loan/return of radiation measurement instruments, etc.
 - (c) Replenish stocks of protective suits, supply the suits to relief team members, and take charge of the records of their loan/return.
- D. Perform other tasks directed by Radiological Experts

3. Deployment of Nuclear Emergency Medical Care Advisors

- (1) In the event that a nuclear emergency has occurred or is likely to occur, the JRCS Headquarters shall, if needed, immediately select the Nuclear Emergency Medical Care Advisors to be deployed to the JRCS HQ HDC and the JRCS chapter HDC in the affected area. Also the JRCS Headquarters shall request the chapters who have administrative control over the facilities where the chosen individuals belong, to deploy them.
- (2) The chapters that received the request shall deploy the relevant individuals to the JRCS HQ HDC or the JRCS chapter HDC in the affected area.
- (3) The JRCS HQ HDC shall formulate a course of action and a plan for disaster relief activities according to the system described in the *Guidelines for Disaster Relief Activities* established by the JRCS Headquarters. In the process, the JRCS HQ HDC shall ensure safety of the relief teams and other emergency responders, based on the advice of the Nuclear Emergency Medical Care Advisors deployed to the JRCS Headquarters.
- (4) The JRCS chapter HDC in the affected area shall undertake medical aid activity of the relief teams in accordance with the advice of the Nuclear Emergency Medical Care Advisors deployed to their office, while ensuring that the preparedness for safety are in place. The JRCS chapter HDC shall also watch the status of radiation doses received by relief team members, etc. taking into account the potential radiation exposure during operation.

Chapter 3 Nuclear Emergency Response

1. Medical Care System for Nuclear Emergency

The medical care system established by the Japanese government in the event of a nuclear emergency is described in Reference 5. The structure consists of “Nuclear Emergency Medical Support Centers” (national designation), “Advanced Radiation Emergency Medical Support Centers” (national designation), “Nuclear Emergency Core Hospitals” (prefectural designation), and “Nuclear Emergency Medical Cooperative Institutions” (prefectural registration).

Meanwhile, the JRCS shall undertake the nuclear emergency medical care centering around Hiroshima Red Cross Hospital & Atomic-bomb Survivors Hospital as well as the local chapters and hospitals that have been designated as nuclear emergency core hospitals, etc. (see Reference 6).

2. Deployment of Nuclear Emergency Medical Care Specialists, etc. from Nuclear Emergency Core Hospitals, etc.

On request from the chapter in the affected area, the JRCS Headquarters shall, if they deem it necessary, request chapters in the non-affected areas where a nuclear emergency core hospital, etc. are sited to deploy nuclear emergency medical care specialists, etc.

The chapters that have received such request shall, if feasible and acceptable, deploy the nuclear emergency medical care specialists such as physicians, radiological technologists and nurses, to the medical facilities sited in the area(s) under administrative control of the chapter in the affected area that requested the deployment.

**Medical Care System for Nuclear Emergency
Set Forth in the Nuclear Emergency Response Guideline (laid down by the Government)**

**Key Advanced Radiation Emergency
Medical Support Centers**
(National designation)

- **Play a central/leading role**
- Institutions: - National Institute of Radiological Sciences
- National Institutes for Quantum and Radiological Science and Technology



**Advanced Radiation Emergency
Medical Support Centers**
(National designation)

- Outline:
 - Provide medical consultation and treatment/long-term follow-up of internally contaminated patients requiring long-term/specialized treatment
 - Provide diagnostic consultation of contaminated patients who are difficult to cleanse and may cause secondary contamination
 - Accept patients who are difficult to attend to at nuclear emergency core hospitals
 - Provide expert advice to nuclear emergency core hospitals
 - Provide training to nuclear emergency medical care deployment teams
 - Establish a nationwide network with relevant institutions
 - Retain a team of nuclear emergency medical care experts available for deployment ...and other functions
- Institutions: Nagasaki University, Fukushima Medical University, Hiroshima University



Nuclear Emergency Medical Support Centers
(National designation)

- Outline:
 - Provide medical consultation and treatment to victims affected by high-dose exposure
 - Provide advanced acute/critical care to victims affected by overexposure (including bone marrow transplantation and severe burn, etc.)
 - Accept patients who are difficult to attend to at nuclear emergency core hospitals
 - Provide expert advice to nuclear emergency core hospitals, etc.
 - Provide training to nuclear emergency medical care deployment teams
 - Establish a nationwide network with relevant institutions
 - Retain a nuclear emergency medical care deployment team ...and other functions
- Institutions: Nagasaki University
Fukushima Medical University
Hiroshima University
Hirosaki University



Nuclear Emergency Core Hospitals

(Designated by prefectures located in the Nuclear Emergency Preparedness Focus Zone)

- Outline:
 - Provide advanced medical consultation and treatment to victims regardless of the presence or absence of contamination
 - Carry out dosimetry/decontamination of victims for whom measures for OIL4 or above are applicable.
 - Carry out dosimetry/intensive treatment of victims affected by overexposure and other patients.
 - Accept victims affected by overexposure and other patients who were transferred from nuclear emergency medical cooperative institutions.
 - Transfer patients to advanced radiation emergency medical support centers
 - Accept the support provided by nuclear emergency medical care deployment teams
 - Provide training to the employees and other staff of nuclear emergency medical cooperative institutions
 - Cooperate with the prefectures located in the Nuclear Emergency Preparedness Focus Zone in their training programs. ...and other functions
- Institutions: Core hospitals in the relevant area (e.g., university hospitals, etc.)



Nuclear Emergency Medical Cooperative Institution

(Designated by prefectures located in the Nuclear Emergency Preparedness Focus Zone)

- Outline:
 - Provide primary care and emergency care to victims affected with contamination, etc.
 - Measure radiation dose received by affected population
 - Deploy medical teams (or healthcare professionals) to shelters
 - Help distribute the iodine tablets provided by the prefectures located in the Nuclear Emergency Preparedness Focus Zone
 - Provide training to their own staff employees, or participate in the training given by nuclear emergency core hospitals, etc.
 - Cooperate with the prefectures located in the Nuclear Emergency Preparedness Focus Zone in their nuclear emergency preparedness programs ...and other functions
- Institutions: Related organizations in the relevant area

*Source: Nuclear Regulation Authority Website

As of March 31, 2018

Name of Chapter/Facility	Designated/Registered as:
Date Red Cross Hospital (Hokkaido Chapter)	Nuclear Emergency Medical Cooperative Institution
JRCS Hokkaido Chapter	Nuclear Emergency Medical Cooperative Institution
Hachinohe JRC Hospital (Aomori Chapter)	Nuclear Emergency Medical Cooperative Institution
JRC Ishinomaki Hospital (Miyagi Chapter)	Nuclear Emergency Core Hospital
JRC Sendai Hospital (Miyagi Chapter)	Nuclear Emergency Medical Cooperative Institution
JRC Fukushima Hospital (Fukushima Chapter)	Nuclear Emergency Core Hospital
JRC Mito Hospital (Ibaraki Chapter)	Nuclear Emergency Medical Cooperative Institution
JRC Fukui Hospital (Fukui Chapter)	Nuclear Emergency Core Hospital
JRC Nagahama Hospital (Shiga Chapter)	Nuclear Emergency Core Hospital
JRC Otsu Hospital (Shiga Chapter)	Nuclear Emergency Core Hospital
JRCS Shiga Chapter	Nuclear Emergency Medical Cooperative Institution
Maizuru Red Cross Hospital (Kyoto Chapter)	Nuclear Emergency Medical Cooperative Institution
JRCS Kyoto Chapter	Nuclear Emergency Medical Cooperative Institution
JRC Tottori Hospital (Tottori Chapter)	Nuclear Emergency Medical Cooperative Institution
JRC Matsue Hospital (Tottori Chapter)	Nuclear Emergency Medical Cooperative Institution
Matsuyama Red Cross Hospital (Ehime Chapter)	Nuclear Emergency Core Hospital
JRCS Ehime Chapter	Nuclear Emergency Medical Cooperative Institution
Karatsu Red Cross Hospital (Saga Chapter)	Nuclear Emergency Core Hospital
JRC Nagasaki Genbaku Hospital (Nagasaki Chapter)	Nuclear Emergency Medical Cooperative Institution
JRC Kagoshima Hospital (Kagoshima Chapter)	Nuclear Emergency Medical Cooperative Institution

*Source: Nuclear Regulation Authority Website, etc.

Chapter 4 Training for Relief Team Members, etc.

1. Nuclear Disaster Response Basic Training Sessions in Each Bloc

To ensure that the relief team members carry out relief activities safely and without concern in radioactive environments, each bloc shall organize the Nuclear Disaster Response Basic Training Sessions so that the relief team members will acquire basic knowledge of radiation and the nuclear emergency medical care system, etc. and learn how to use radiation protection equipment and gear.

Refer to Appendix, *Materials for JRCS Nuclear Disaster Response Basic Training Sessions*.

2. Disseminating of the Basic Knowledge of Nuclear Disaster Response in Each Chapter

Each chapter shall promote preparedness of safety for relief activities in radioactive environments through general training seminars, etc. that will be held for relief team members in the area under their administrative control.

3. Information Sharing with Nuclear Emergency Medical Care Advisors

The JRCS Headquarters shall follow development and progress in the nuclear disaster response and other programs undertaken by the Japanese government, and keep Nuclear Emergency Medical Care Advisors, etc. posted with necessary information and other updates.

Chapter 5 Basic Knowledge of Radiation

For relief activities in the event of nuclear emergencies, knowledge of radiation and radiological protection is of critical importance. It is imperative for relief team members to have accurate knowledge of radiation and rid themselves of excessive concern about it.

For basic knowledge of radiation, refer to the following materials:

- Appendix, *Basic Knowledge about Radiation for Relief Activities*
- Appendix, *Relief Team Activities during a Nuclear Disaster and Collaboration with Nuclear Emergency Medical Care Advisors*
- Pocket-sized leaflet, *For Protecting Yourself and Your Family in the Event of a Nuclear Disaster** (Japanese Red Cross Society)

*: Downloadable from the website of Red Cross Nuclear Disaster Resource Center Digital Archives (<http://ndrc.jrc.or.jp/>).

Reference 7:

Background of the Manual

(The “*Introduction*” formerly included in the present Manual. Written by Hiroki Tomita (Executive Director General of the JRCS Operations Sector) when the document was first produced in May 2013.)

It has been 2 years since the Great East Japan Earthquake and Tsunami. I once again would like to offer my sincere condolences to those who have lost loved ones and extend my heartfelt sympathy to all those affected by the calamity.

On day one of the disaster, the Japanese Red Cross Society (JRCS) deployed our relief teams around the country to the affected area including Fukushima prefecture, where the relief activities launched in the cities, towns and villages along the coast.

At that point, the JRCS had no clear action standards on relief activities in the event of nuclear emergencies. Therefore, in the wake of the accident at Tokyo Electric Power Company’s Fukushima Daiichi Nuclear Power Plant, it turned out that we could no longer ensure the safety of the relief teams, who were out there unprepared to respond to the radiological emergency in progress.

Consequently, on the evening of March 13, 2011, the Fukushima chapter personnel, all the relief teams and other staff convened at the chapter’s office to discuss a course of action for undertaking the relief operations in radioactive environments. Given that the Fukushima chapter was unable to make a commitment to their safety under radioactive conditions, it was decided that each relief team should seek instruction on the next step from the chapter or hospital they were deployed from. As a consequence, teams from outside Fukushima prefecture withdrew from the area one by one.

Subsequently, on March 15, the JRCS decided on a principle of response that no relief activities should be carried out within a radius of 30 km from the wrecked nuclear power plant. On March 22, deployment of nuclear emergency experts to Fukushima chapter started, combined with the dispatch of radiation protection equipment and gear that were needed. It was not until April 22, with a notice issued by the JRCS Headquarters, that the framework of safety measures for relief teams working in Fukushima prefecture was finally established. As the preparedness for safety was thus implemented, the JRCS first responders in Fukushima began to gradually resume their activities.

Regretfully, the fact that no clear standards had been in place for the JRCS to ensure the safety of relief teams working in radioactive environments, and that we had no apparatus prepared that was required therein, impeded our relief activities in Fukushima prefecture. This salutary lesson drawn from the Great East Japan Earthquake and Tsunami has taught us the critical importance of keeping necessary equipment properly in stock and providing the relief teams with correct knowledge of radiation, as well as of establishing explicit action standards for relief teams, in case a nuclear emergency occurs.

The JRCS’s relief teams are in no way expert groups specializing in radiation emergency medicine, which justifies our limit in responding to nuclear emergencies.

However, when radiation has actually caused human damages as part of a complex disaster, what is of crucial importance is the alliance among relevant medical institutions, that is, the collaborative relationship between the radiation emergency medical care sector and the sector of disaster medicine. Accordingly, as a first step, we need to clarify what is feasible and what is not for the JRCS in such circumstances.

The *Manual for Relief Activities under Nuclear Disasters* was formulated for the JRCS relief teams in such background, with guidance from the internal and external experts including Dr. Masao Tomonaga, President of JRC Nagasaki Genbaku Hospital, Dr. Makoto Akashi, Executive Director of National Institute of Radiological Sciences, and Dr. Hisayoshi Kondo, Director of National Disaster Medical Center. In accordance with this manual, starting in the fiscal year 2013, we will set about strengthening our disaster response capabilities by supplying necessary equipment such as protection instruments and gear, and providing opportunities for relief teams to learn preparedness for safety.

[Revision History]

First edition: Formulated in May 2013

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