Opinions on the Draft Ministerial Ordinance to Revise Part of the Ordinance on Prevention of Ionizing Radiation Hazards

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We invited public opinions on the revised contents of the Draft Ministerial Ordinance, etc. through our web pages and the like, and we received 30 letters (74 opinions in total). A summary of the opinions and response to them from the Ministry of Health, Labour and Welfare (MHLW) is shown below.
We are deeply grateful for your cooperation in sending these opinions.

[Opinions on the revised contents of the Draft Ministerial Ordinance]

No.	Summary of opinions	Number of comments	Response to the opinions
1	<Basis for the exceptional emergency dose limit of 250 mSv> - No basis is shown that a worker's health is protected by the exceptional emergency dose limit of 250 mSv. Despite that the medical rationale is not clear by the data shown by the MHLW, it has been concluded that the exposure doses will be certainly less than a threshold value. The logic is completely unclear. In particular, the data in the accident at Oak Ridge Y-12 shows "it is a question whether it is scientifically correct or not, since there is a small number of people involved." Such data cannot become a basis to accept the exposure. - No basis is shown that a worker's health is protected by the exceptional emergency dose limit of 250 mSv. Moreover, the epidemiological	2	- The report by the expert meeting established by the MHLW hereinafter referred to as “Expert meeting” reviewed the data of exposure, besides the accident of Oak Ridge Y-12, by the nuclear tests in the Marshall Islands, research for those who underwent the radiotherapy, and animal experiments, etc. As a result, from a viewpoint of preventing certain failing of the immune function by the lymphocyte reduction in an emergency work, it was judged to be conservative and appropriate to have adopted 250 mSv which is certainly lower than the threshold as an emergency dose limit in the case of the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. - Based on this, in this revision, in cases where a nuclear emergency situation, etc. could occur, the Minister of Health, Labour and Welfare is going to revise the ordinance that allows the

	survey of those who were engaged in the emergency works has just started, and there is no factor that allows the evaluation.		Minister of Health, Labour and Welfare to set an exceptional emergency dose limit within the exposure dose of 250 mSv with respect to the effective dose separately from the emergency dose limit considering the accident and other situations. - Together with this, the MHLW is going to obligate employers to provide a monthly ionizing radiation medical examination and measurement of an internal exposure dose, etc. of workers engaged in emergency works, as well as give special education to exceptional emergency workers and submit a status report on the implementation of emergency works during the emergency work period. In addition, the cancer screening according to the exposure dose during the emergency works, etc., and the lifetime dose control will be obligated by the Ministerial Guideline. In order to prevent the health hazards of the workers in case of a nuclear emergency situation, etc., the MHLW will instruct employers to surely take the above mentioned measures.
2	<The value of an exceptional emergency dose limit> - The "exceptional emergency dose limit" is set as 250 mSv in response to the report "Expert Meeting on the long-term Healthcare of workers at the TEPCO Fukushima Daiichi Nuclear Power Plant". It is said in Discussion 4 (4) of Annex 2, in the report, that "taking the fact into account that it was possible to manage the emergency under the emergency dose limit of 250 mSv even in the severe accident at the TEPCO Fukushima Daiichi Nuclear Power Plant, which resulted in core meltdown of multiple reactor units." However, according to the report by TEPCO	3	- In the report by the Expert meeting, from a viewpoint of preventing certain failing of the immune function by the lymphocyte reduction in an emergency work, it was judged to be conservative and appropriate to have adopted 250 mSv which is certainly lower than the threshold as an emergency dose limit in the case of the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. - It should be noted that the report by TEPCO indicates that exposure of the workers who exceeded 250 mSv, the exceptional dose limit at the time of the report, are mainly due to internal exposure, and exceeding the limit could have been prevented if all those workers wore the

	("Fukushima Nuclear Power Plant Accident Analysis Report" TEPCO, 20 June 2012), there were workers who exceeded 250 mSv which was the exceptional dose limit at that time. In addition, those workers were key persons to respond to the emergency situation including operators. The employer also said, "It was the maximum dose that they could be exposed to in the limited time." Considering these facts, the exposure dose limit of 250 mSv will be too conservative to avoid "a destructive situation". I think that a maximum value which ICRP permits should be adopted. - The "exceptional emergency dose limit" at the time of emergency works should be 0.4 or 0.5 Sv according to the statement of ICRP Pub. 118. - The emergency dose limit for workers under a designated dose rate is 100 mSv per seven days which is within the dose limit of "100 mSv per five years" for regular radiation works, though it exceeds the restriction of "50 mSv per year." However, if the emergency dose limit is raised to 250 mSv, it will exceed all dose limits for regular radiation works.		protective mask appropriately according to the regulation. From now on, in case of emergency works, it is hard to foresee at this point any necessity of working in response to a radiation exposure dose beyond 250 mSv. - Based on this, in this revision, in cases where a nuclear emergency situation, etc. could occur, the Minister of Health, Labour and Welfare is going to revise the ordinance that allows the Minister of Health, Labour and Welfare to set an exceptional emergency dose limit within the exposure dose of 250 mSv with respect to the effective dose separately from the emergency dose limit considering the accident and other situations.
3	<Reduction of an exceptional emergency dose limit> - As ICRP has stated, the dose limit for regular radiation works is derived from the optimization in the condition where the radiation level is low based on the concept of ALARA, not showing the safety and non-safety boundary. The concept to try to return to the dose limit for regular radiation works early when a large-scale accident should have occurred; i.e. radiation	1	- In this revision, in cases where a nuclear emergency situation, etc. could occur, the Minister of Health, Labour and Welfare is going to revise the ordinance that allows the Minister of Health, Labour and Welfare to set an exceptional emergency dose limit within the exposure dose of 250 mSv with respect to the effective dose separately from the emergency dose limit considering the accident and other situations. - The revision will allow the Minister of Health,

	sources could not be confined; environment dose rate at the work place went up, and; distribution of radioactivity is not specified, is significantly different from the concept of ALARA or optimization. Therefore, the lifting of a designated exposure dose limit or its step-by-step reduction will be desirable to judge carefully based on the situation of the plant from a viewpoint of nuclear safety.		Labour and Welfare to reduce the set exceptional emergency dose limit by taking into consideration the exposure dose which workers who were engaged in the exceptional emergency works received, contents and other situations of the works which is required to bring the accident under control concerning the exceptional emergency work concerned. Specifically, a notification will be issued to make clear that, from a viewpoint of optimization of the radiation exposure dose, applicable works will be limited and the exposure dose limit to new workers after a certain time will be reduced step-by-step according to the progress of the works, and transition of worker's radiation exposure dose, etc. - The Ministerial Ordinance also states clearly that the Minister of Health, Labour and Welfare should lift the exceptional emergency dose limit as early as possible. Specifically in the notification, it clarifies that the exceptional emergency dose limit shall be lifted even before ending the nuclear emergency situation declaration when the stability of a nuclear reactor is secured.
4	<An emergency dose limit and probabilistic effect> - No discussions or explanations are provided about probabilistic effects. Any expert accepts that a clear probabilistic effect is seen at 100 mSv or higher. It is certain that the risk significantly increases at 250 mSv. However, the expert meeting discusses only an acute condition, specifically reduction in the lymphocyte count. The expert meeting gets the increase in a probabilistic risk off the chopping block after all. Who determined that the	3	- ICRP 1990 recommends, considering that the risk that could be accepted will be that of the total effective dose of about 1 Sv during the time engaged in work based on the calculated probabilistic effect of radiation exposure using data of atomic bomb victims, a maximum 100 mSv per five years under the condition that it does not exceed 50 mSv per year, while dividing the whole working period into ten terms, so that a lifetime radiation exposure dose may not exceed 1 Sv. - In the ICRP1990 recommendation, ICRP states that "the control over regular radiation works

	probabilistic effect may really be disregarded in the discussion of the emergency works? Please explain a good reason for ignoring other deterministic effects. - You should not conclude that raising the dose limit in the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant "is appropriate and conservative." No basis is shown that a worker's health is protected by the setting a dose limit of 250 mSv. In order to reduce a worker's danger, you should have a sense of crisis in a risk increased by raising the dose limit to 250 mSv. - A risk which cannot be overlooked is seen even at comparatively low radiation exposure dose. Under such situation, we cannot accept the establishment of an exceptional emergency dose limit and raising the exposure limit at the time of an emergency work to 250 mSv. It is an invasion of human rights.		could in some degree be mitigated without lowering the long-term level of protection in case of a severe accident"; however "the effective dose should not exceed about 0.5 Sv." - In addition, ICRP2007 advised to pay attention especially to prevention of serious deterministic effect, since the radiation exposure dose may reach a high level in a short period in the emergency exposure situation. - Based on these ICRP recommendations, the MHLW held the expert meeting, and, on the premise that a dose limit for regular radiation work (100 mSv per five years) is observed and that the long-term control is provided for total effective dose from exposure during emergency and regular radiation work so that they may not exceed about 1 Sv during the whole working period for preventing probabilistic effects by ionizing radiation, discussed the acute disorder of the hematopoietic functions which affect the health condition of the whole body for deterministic effect. And as a conclusion, from a viewpoint of certainly preventing failing of the immune function by the lymphocyte reduction in an emergency work, it was judged to be conservative and appropriate to have adopted 250 mSv which is certainly lower than the threshold as an emergency dose limit in the case of the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. - Based on this, in this revision, in cases where a nuclear emergency situation, etc. could occur, the Minister of Health, Labour and Welfare is going to revise the ordinance that allows the Minister of Health, Labour and Welfare to set an exceptional emergency dose limit within the exposure dose of 250 mSv with respect to the effective dose separately from the emergency

			dose limit considering the accident and other situations. - Together with this, the MHLW is going to obligate employers to provide a monthly ionizing radiation medical examination and measurement of an internal exposure dose, etc. of workers engaged in emergency works, as well as special education to exceptional emergency workers and submit a status report on the implementation of emergency works during the emergency work period. In addition, the cancer screening according to the exposure dose during the emergency works, etc., and the lifetime dose control will be obligated by the Ministerial Guideline. In order to prevent the health hazards of the workers in case of a nuclear emergency situation, etc., the MHLW will instruct employers to surely take the above mentioned measures.
5	<An emergency dose limit and deterministic effect> - It is also accepted by ICRP that even at the exposure dose of 150 mSv, for example, which is lower than 250 mSv, sperm count is decreased. Acute symptoms are also seen by exposure of 250 mSv or less among the atomic bomb victims in Hiroshima and Nagasaki.	1	- In the ICRP1990 recommendation, ICRP states that "the control over regular radiation works could in some degree be mitigated without lowering the long-term level of protection in case of a severe accident"; however "the effective dose should not exceed about 0.5 Sv." - In addition, ICRP2007 advised to pay attention especially to prevention of serious deterministic effect, since the radiation exposure dose may reach a high level in a short period in the emergency exposure situation. - Based on these ICRP recommendations, the MHLW held an expert meeting, and on the premise that a dose limit for regular radiation work (100 mSv per five years) is observed and that the long-term control is proved for total effective dose from exposure during emergency and regular radiation work so that they may not exceed about 1 Sv during the whole working

			period for preventing probabilistic effects by ionizing radiation, discussed the acute disorder of the hematopoietic functions which affect the health condition of the whole body for deterministic effect. As a conclusion, from a viewpoint of preventing certain failing of the immune function by the lymphocyte reduction in an emergency work, it was judged to be conservative and appropriate to have adopted 250 mSv which is certainly lower than the threshold as an emergency dose limit in the case of the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. - It should be noted that we recognize that there is no clear basis that acute symptoms were seen at the radiation exposure dose of less than 250 mSv. - Based on this, in this revision, in cases where a nuclear emergency situation, etc. could occur, the Minister of Health, Labour and Welfare is going to revise the ordinance that allows the Minister of Health, Labour and Welfare to set an exceptional emergency dose limit within the exposure dose of 250 mSv with respect to the effective dose separately from the emergency dose limit considering the accident and other situations. - Together with this, the MHLW is going to obligate employers to provide a monthly ionizing radiation medical examination and measurement of an internal exposure dose, etc. of workers engaged in emergency works, as well as give special education to exceptional emergency workers and submit a status report on the implementation of emergency works during the emergency work period. In addition, the cancer screening according to the exposure dose during the emergency works, etc., and the

			lifetime dose control will be obligated by the Ministerial Guideline. In order to prevent the health hazards of the workers in case of a nuclear emergency situation, etc., the MHLW will instruct employers to surely take the above mentioned measures.
6	<Application period of an exceptional emergency dose limit> - In order to avoid confusion, it should be clearly mentioned whether the "exceptional emergency dose limit" is the value per year or an integrated value during a series of emergency works. - Although it is clearly shown that the dose limits for regular radiation works (50 mSv per year and 100 mSv per five years) are applied from 1 April; however, no period is shown to apply to the dose limit for emergency works. In order to avoid confusion, it should be clearly shown in the ordinance whether the dose limit is applied for a certain time period (e.g. one year) or through a whole period of the emergency works.	2	- In this revision, the Ministerial Ordinance will be revised so that it allows the Minister of Health, Labour and Welfare to set an exceptional emergency dose limit within the exposure dose of 250 mSv with respect to the effective dose separately from the emergency dose limit considering the accident and other situations. - With regard to the exposure dose calculation period, it is prescribed that the emergency dose limit shall be applied “when engaged in the emergency works” in Article 7, paragraph 1 of the Ionizing Radiation Ordinance. Therefore the radiation exposure dose to be calculated are those accumulated in the whole emergency work period including the exceptional emergency work period.
7	<Method of limiting the exposure during an emergency> - Several exposure dose limits for workers who are engaged in emergency works should be specified depending on the emergency level so that it allows the workers to take quick protection actions to respond to any emergency exposure situation. Such dose limits should be a target value for the efforts to decrease, rather than the limiting value that must not be exceeded.	1	- In this revision, the Ministerial Ordinance is going to be revised so that it allows the Minister of Health, Labour and Welfare to set an exceptional emergency dose limit within the exposure dose of 250 mSv with respect to the effective dose separately from the emergency dose limit considering the accident and other situations. - According to opinion in the report "Introduction of ICRP1990 Recommendation (Pub.60) to the domestic system, etc." (Radiation Council, June 1998), we consider it appropriate to position the radiation exposure dose limit during an emergency work as a limiting value.
8	<Nuclear disaster prevention managers>	1	- Based on your comment, the revision will

	- The revision prescribed that "Employers shall select workers from those specified as the nuclear disaster prevention workers in Article 8, paragraph 3 of the Act on Special Measures Concerning Nuclear Emergency Preparedness when they assign the workers to engage in emergency works in which an exceptional emergency dose limit is to be applied." Although it is desirable to enable them to assign nuclear disaster prevention managers and nuclear disaster prevention sub-managers who instruct disaster prevention actions in the plant at the time of a nuclear disaster as exceptional emergency workers; the nuclear disaster prevention workers in Article 8, paragraph (3) of the Act on Special Measures Concerning Nuclear Emergency Preparedness seems to indicate workers other than the nuclear disaster prevention managers or nuclear disaster prevention sub-managers when referring to the Article 2, paragraph 1, item (i) of the “Order Concerning Operator Disaster Prevention Plan to be Prepared by the Nuclear Facility operator pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness.” Since the nuclear disaster prevention manager and nuclear disaster prevention sub-manager are one of the staff members of the nuclear disaster prevention organization although they are not included in the nuclear disaster prevention workers, the revised ordinance should prescribe that “assign workers from staff of the nuclear disaster prevention organization established pursuant to Article 8, paragraph (1) of the Nuclear Emergency Act”, rather than “assign workers from the nuclear disaster prevention workers specified in Article 8, paragraph (3) of		prescribe that the workers who are allowed to engage in the exceptional emergency works shall be, among male and female radiation workers diagnosed as having no possibility of becoming pregnant, nuclear disaster prevention workers specified in Article 8, paragraph 3 of the Special Measures Concerning Nuclear Emergency Preparedness, nuclear disaster prevention managers specified in Article 9, paragraph 1 of the said act and nuclear disaster prevention sub-managers specified in paragraph 3 of the said article.

	the Nuclear Emergency Act.”		
9	<Workers included in exceptional emergency workers, and contents of special education to be provided to them> - As experienced in the accident at the Fukushima Daiichi Nuclear Power Plant, in an emergency situation, the event progress is different and is hard to predict beforehand. Depending on the progress, access to the high radiation rate area may be required for off-site engineers and engineers with special skills (design related personnel from the plant maker, foreign engineers, etc.). However, the provision limited the “exceptional emergency workers”; “select workers from those specified as the nuclear disaster prevention workers” in the Nuclear Emergency Act. Such a limitation may become a major barrier to actions to bring the event under control in case of an accident. In assigning the exceptional emergency workers, flexible actions will be required such as extending the workers to be assigned. - The revised Ministerial Ordinance prescribes that "Employers shall select workers from those specified as the nuclear disaster prevention works in Article 8, paragraph 3 of the Act on Special Measures Concerning Nuclear Emergency Preparedness when they assign the workers to engage in emergency works in which an exceptional emergency dose limit is to be applied." Although the report by the expert meeting states that "outsourced employer’s workers are included in the nuclear disaster prevention workers", and the above mentioned order describes that a part of the task of the nuclear disaster prevention organization could be	3	(Workers included in exceptional emergency workers) - Based on the principles of justification of ICRP, the workers who are engaged in exceptional emergency works need to be limited to workers with knowledge and experience required for the work which mainly aims at avoiding destructive situations in nuclear facilities. - Therefore, the revision will prescribe that the workers who are allowed to engage in the exceptional works shall be, among male and female radiation workers diagnosed as having no possibility of becoming pregnant, nuclear disaster prevention workers specified in Article 8, paragraph 3 of the Special Measures Concerning Nuclear Emergency Act, nuclear disaster prevention managers specified in Article 9, paragraph 1 of the said act and nuclear disaster prevention sub-managers specified in paragraph 3 of the said article. - It should be noted that, with regard to selection of workers of contractors other than a licensee of nuclear reactor operation as nuclear disaster prevention workers, we hear from the Nuclear Regulation Authority (NRA) that has jurisdiction over the Act on Special Measures Concerning Nuclear Emergency Preparedness that workers of the contractors could be selected as staff of the nuclear disaster organization because there is no provision that excludes them. In addition, the works to be outsourced should be limited to optimum ones, based on lessons learned from the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. - It should also be noted that any workers other than radiation workers must not be engaged in

	outsourced to the contractor, no description is seen in the order that contractor's workers could be selected as nuclear disaster prevention workers. For this reason, the revised Ministerial Ordinance should prescribe that "assign workers from staff of the nuclear disaster prevention organization established pursuant to Article 8, paragraph (1) of the Nuclear Emergency Act", rather than "assign workers from the nuclear disaster prevention workers specified in Article 8, paragraph (3) of the Nuclear Emergency Act." - The workers to whom the education and training are provided are too limited. A severe accident cannot be brought under control by the works of nuclear disaster prevention workers only, judging from the lessons learned from the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. Details on how to respond to accidents should be included in the special education to be provided to all the radiation workers. Moreover, it will be nothing more than words on paper ignoring the reality of the urgent accident to provide special education to engineers to whom the dose limit for regular radiation works is applied after an accident occurred. The workers who are in charge of work in a nuclear power plant, at least, will need training about radiological protection and actions in case of the occurrence of an accident in advance.		exceptional emergency works. (Special education) - Special education is to be obliged to the above mentioned workers who are going to engage in exceptional emergency works; including effects of ionizing radiation on organisms, method of exceptional emergency works, structure of facilities and equipment used for exceptional emergency works and their handling method. - Since it is difficult to provide the special education after an accident occurred, as you pointed out, we believe the special education should be provided in advance to workers to be engaged in the exceptional emergency works. - It should be noted that it is necessary to provide the special education concerning the handling of nuclear fuels, etc. at the nuclear reactor facility in advance to workers to whom dose limits for regular radiation works are applied, among workers other than nuclear disaster prevention workers, etc. in cases where nuclear emergency situation, etc. could occur.
10	<Selection of exceptional emergency workers> - Workers who engage in emergency works should be limited to radiation workers who volunteered for the emergency works in principle. The	2	- When a worker concludes or changes a contract, it shall be based on agreement in the equal relationship between the worker and an employer who are the party concerned of a labour contract.

	requirements for the workers should be that "workers who understand the potential health risk of the work concerned, and accept it." - No specific method nor content is clear to confirm the workers' will. It will be illegal to make a contract with workers that may seriously endanger the workers. Fuzzy provisions such as "consider" workers' intention "as much as possible" will not ensure free decision of the workers, nor satisfy the condition of "voluntary" as used in international standards.		- Therefore, in selecting nuclear disaster prevention workers, employers need to show working conditions concerning the exceptional emergency works, and then conclude a labour contract based on the agreement by both sides. In addition, in assigning to an actual emergency work, workers' intention needs to be taken into account as much as possible. - It should be noted that, we hear from the NRA that has jurisdiction over the Nuclear Reactor Regulation Law that the NRA is revising the regulations relevant to the law to include the provision that the workers shall offer in writing that they have the will to be engaged in the emergency works to nuclear facility employers before they are engaged in the emergency works.
11	<Limitation of workers to have an emergency ionizing radiation medical examination> - According to the interpretation of Article 7 of the Ordinance on Prevention of Ionizing Radiation Hazards, female radiation workers whose exposure dose is within the dose limit for regular radiation works are permitted to be engaged in emergency works, and thus it is interpreted that they are included in the emergency workers to whom a dose limit for regular radiation works (50 mSv per year or less) is applied. In the revision shown in Annex 1-2 "(3) Medical examinations to the workers engaged in emergency works", a special medical examination is obligated to be provided to the workers engaged in emergency works. However, workers to whom a dose limit for regular radiation works is applied and workers whose	2	- In revision, emergency ionizing radiation medical examinations are going to be obligated to workers engaged in emergency works including in exceptional emergency works, however, this is because of the need to provide health control during the works regardless of the exposure dose. Among items to be provided periodically, items other than existence of subjective and objective symptoms can be omitted in the cases where the radiation exposure dose is low, etc., and when a medical doctor determined it unnecessary. This is because the necessity for medical examinations needs to be based on a medical doctor's judgment. - The inspection of existence of subjective and objective symptoms are prescribed to be provided in terms of lack of sleep, appetite decline, accumulation of fatigue, a heat stroke, etc. which are assumed as a risk in the case of prolonged emergency works. For this reason,

	exposure dose were within the dose limit for regular radiation works when completing the emergency works should be excluded from the said medical examinations, even though they are workers who are engaged in the emergency works. - Although employers are prescribed to provide medical examinations to the workers engaged in the emergency works in the Draft Ministerial Ordinance to Revise Part of the Ordinance on Prevention of Ionizing Radiation Hazard, the emergency works concerned, according to the definition, will not necessarily have such a large radiation exposure as to require medical examinations by just being engaged in the works. Considering the objective to obligate employers to provide medical examinations to emergency workers, from the viewpoint of preventing radiation hazards by being engaged in the emergency works, obligating medical examinations only to workers whose exposure dose is higher than a certain level (e.g. 20 mSv which is a dose limit for regular radiation works), rather than obligating all of the said emergency workers equally will better fit the objective of this provision, and be considered reasonable.		this inspection cannot be omitted in the emergency ionizing radiation medical examinations provided periodically. - The medical examinations at the time of transfer to other works or terminating employment are provided in order to utilize the health care in the new works after the transfer, etc. They need to be provided in terms of all the items regardless of the exposure dose.
12	<Workers to be provided with an emergency ionizing radiation medical examination> - The description in this draft Ministerial Ordinance, it can be read that medical examinations are required to be provided (i) when emergency workers are transferred to other works as well as (ii) when the said workers terminate employment. Therefore, in order to ensure consistency with the description	1	- In this revision, the emergency ionizing radiation medical examinations obliged for employers to provide to the workers engaged in the emergency works including in exceptional emergency works are prescribed to provide, in addition to those provided periodically, when the emergency workers are transferred to other works or when the emergency workers terminate employment. In the ordinance after the revision, it shall be clearly described that there is no need

	in “2 Healthcare, etc. during emergency work period”, Section 2 Healthcare during emergency work period, in the report from the Expert Meeting on the Long-term Healthcare, etc. of Workers at the TEPCO Fukushima Daiichi Nuclear Power Plant, the conjunction should be changed from “and” to “or”.		to provide medical examinations when they terminate employment after they are transferred to other works.
13	<The emergency medical examinations at the time of unemployment> I would like to confirm that “(ii) when the said worker terminates employment” means “when the said worker left the emergency work as shown in the above report” (e.g. Are the medical examinations described in (ii) required even if the workers are engaged in the said emergency works after the employment was changed?)	1	- In this revision, the emergency ionizing radiation medical examinations obliged for employers to provide to the workers engaged in the emergency works including in exceptional emergency works are prescribed to provide, in addition to those provided periodically, when the emergency workers are transferred to other works or when the emergency workers terminate employment. The case “(ii) when the said worker terminates employment” in your question corresponds to the case where the workers engaged in the emergency works terminate employment. Thus for example when the worker terminates employment after being transferred to other works, the medical examinations will not be required. - Even in the cases where the worker remains engaged in emergency works after he/she changed the affiliated company, the change of the affiliated company (employer) corresponds to the “termination of employment”. The medical examinations at the time of terminating employment should be provided in order to utilize the health care in the new works after terminating the employment. They need to be provided in terms of all the items regardless of the exposure dose. - It is necessary to provide the ionizing radiation medical examinations at the time of the employment pursuant to Article 56 of the Ionizing Radiation Ordinance in order to

			conduct appropriate health care in a new employer's work place, when the workers concerned remain engaged in the exceptional emergency works in a new company. However, pursuant to Article 66 of the Industrial Safety and Health Act, in the cases where the worker concerned does not want to undergo the medical examination by a medical doctor assigned by the new employer, and the result of medical examinations are comparable to the ionizing radiation medical examinations at the time of employment which other medical doctors conducted (including the result of the emergency ionizing radiation medical examinations, and existence or not existence of the radiation exposure in the past and its evaluation) is submitted by the workers concerned, the ionizing radiation medical examination at the time of employment will not be required.
14	<Items of the emergency ionizing radiation medical examinations at the time of transfer> - According to the description of the present proviso, the medical examination items that are permitted to be omitted are limited to those provided periodically within a month shown in (iii) Omission of medical examination items, and omission is not allowed for those provided (ii) when the worker is transferred from emergency works to other works and (iii) when the said worker terminates employment. However, since radioactive iodine does not necessarily cause a problem in the accident depending on the facility concerned, the medical examination item aiming at the inspection of the thyroid gland, "d Thyroid stimulating hormone, ---(omitted hereafter)" should also be	1	- In the emergency ionizing radiation medical examinations to be provided periodically once a month after being transferred to the emergency works to be obliged in this revision, some of the items can be omitted in the cases where the radiation exposure dose is low, etc., and when a medical doctor determined it unnecessary. The emergency ionizing radiation medical examinations at the time of transfer to other works or terminating employment are the ones to be provided in order to utilize the health care when the said worker is engaged in other works after the emergency works. Therefore no examination item can be omitted.

	allowed to be omitted in the medical examination.		
15	<Special education to exceptional emergency workers> - May I understand that other matters described in the report from the Expert meeting (special education omitted) but not described in Attachment 1 and Attachment 2 (overview) will be incorporated into regulations such as an Ionizing Radiation Ordinance or relevant guidelines? - Although there is a provision that prescribes the "special education to the workers engaged in exceptional emergency works", will it be necessary to provide the education in a nuclear facility for every facility (will the workers who are provided the education in a certain facility need to be provided the special education again to engage in emergency works at another facility?) For practices in particular, there is no common matters considering the different nature of every nuclear facility (practical techniques required will vary depend on different facilities such as power reactors, manufacturing facilities and reprocessing facilities; even for the power reactor facilities, they have different reactor types.)	2	- In this revision, special education will be obligated to be provided to nuclear disaster prevention workers, etc. who are going to be engaged in exceptional emergency works. - With regard to omission of subjects in the special education, all or part of the education subjects may be omitted for workers who are accepted to have sufficient knowledge and skill as specified in Article 37 of the Ordinance on Industrial Safety and Health. For the education to provide to workers who are going to be engaged in exceptional works, all or some of the subjects may also be omitted pursuant to the said provision. However, details of subjects which are different for each nuclear facility may not be omitted. For this reason, for workers who intend to be engaged in exceptional emergency works at different nuclear facilities, special education needs to be provided about the different matters for every nuclear facility.

[Opinions on the revised contents of the Ministerial Guideline]

No.	Summary of opinions	Number of comments	Responses to the opinions
1	<A basis of a lifetime radiation exposure dose of 1 Sv>	4	- ICRP 1990 recommends, considering that the risk that could be accepted will be that of the total effective dose of about 1 Sv during the time

	- No basis is shown that a worker's health is protected by setting 1 Sv for occupational radiation exposure dose during a lifetime. The MHLW, based on that 100 mSv per five years corresponds to 1 Sv per 50 years, naturally set a lifetime exposure dose of 1 Sv. However, the lifetime radiation exposure dose of 1 Sv by ICRP is based on accumulating 20 mSv per year, and there is no basis for 1 Sv. Now many workers may be exposed up to the limit. We should realize that the situation is quite different from that in the time before the accident when the criteria of 20 mSv per year was determined. Also no discussion was made for the case where workers are exposed to a high radiation exposure dose for a short period of time. We should examine the specific risks that the 1 Sv of exposure dose will have and judge whether the health effect caused by the 1-Sv exposure will be accepted, without accepting the ICRP standard directly. - The exposure dose of 1 Sv should be set as "the value up to which workers may be exposed." The prescription that shows exposure doses for emergency works and regular radiation works separately and descriptions found in the long-term exposure dose control of workers who were exposed to 100 mSv or more by the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant seem to compel workers to actually be exposed to 1 Sv. As mentioned above, considering the different situation from that before the time when the accident occurred, no existing criteria should not be relaxed for reasons of 1 Sv. - The draft revised Ministerial Guideline is going		engaged in work based on the calculated health effect of radiation exposure using data of atomic bomb victims, a maximum 100 mSv per five years under the condition that it does not exceed 50 mSv per year, while dividing the whole working period into ten terms, so that a lifetime radiation exposure dose may not exceed 1 Sv. - In Japan, based on the opinion of the Radiation Council issued on June 2008 about the introduction of ICRP1990 recommendation into Japanese domestic regulations, the dose limit of 100 mSv per five years and 5 mSv per year have been adopted on the premise of a lifetime radiation exposure dose of 1 Sv in the revision of the radiation related regulations. - In line with this, in the revision here, the dose limit per five years is going to be set by employers for each worker within the range not exceeding the 100 mSv which is the exposure dose limit for regular radiation works, based on the value obtained by dividing the remaining dose (which is the lifetime dose of 1 Sv minus cumulative exposure dose (total of the emergency exposure dose and regular exposure dose)) by the remaining working period (final age of working period of 68 years old (assumed 50 years of working periods starting from 18 years old) minus current age. It should be noted that it does not mean that employers are not allowed to assign the workers aged 69 or over to radiation works.

	to permit the radiation exposure exceeding the dose limit of “100 mSv per five years or less, and 50 mSv per year or less,” provided that the exposure dose will not exceed 1 Sv by 50 years of radiation exposure during works with workers 18 to 68 years old. The current emergency dose limit of 100 mSv per seven days for workers under a designated high dose rate is also within the said limit. If the 100 mSv is changed to 250 mSv, the exposure dose will exceed the dose limit of 100 mSv per five years for workers engaged in regular radiation works. Although the dose limit is going to be mitigated little by little, the workers exposed to 250 mSv should not be made to engage in radiation works at least for 11 years, and should not be allowed to exceed 100 mSv per any five years up to becoming 68 years old. - Is there any reason that the example to calculate a lifetime radiation exposure dose sets the final age of the worker as 68 years old? (Does this mean that employers may not be allowed to assign the workers aged 69 or over to radiation works?)		
2	<Totaling of exposure doses from emergency works and regular radiation works> - The dose limit for regular radiation works is not the one aiming at the health hazards prevention. It will not be reasonable that the workers are subject to such a restriction as that the workers are not permitted to be engaged in the radiation works for five years, when the accident is brought under control and a dose limit for regular radiation works is suddenly applied, since their emergency exposure dose exceeded 100 mSv during the five years concerned. The	4	- The ICRP Pub.75 allows the change of works of the workers whose total exposure dose of emergency works and regular radiation works exceeded the dose limit for regular radiation works by being engaged in regular radiation works after being exposed in the emergency works, provided that statutory position of the dose limit was properly recognized and the change will be conducted flexibly. - Based on this in this revision, it was revised that, during the exposure dose control period which includes the time when an accident occurred, in applying dose limit for regular radiation works

	ICRP concept of controlling the emergency exposure dose and regular exposure dose separately will be important to be incorporated in the revision. - The radiation exposure dose during emergency works should not be added to the radiation exposure dose during regular radiation works. It is because that, for example, if a worker may not be engaged in radiation works for the reason of exceeding a dose limit of 50 mSv per year after the emergency works, it may deprive the worker of his/her freedom to choose their occupation, which might represent a violation of the Constitution. Rather, restriction based on the lifetime radiation exposure dose should be employed like an astronaut. - There is no rational reason in controlling exposure dose for emergency works and regular radiation works separately. It leads to compelling the works that cause exposure dose to workers who were exposed high radiation when they were engaged in emergency works. It will be inhuman treatment. It simply cannot be justified. There will be no difference in exposure doses for emergency works and regular radiation works. - In totaling the doses for emergency works and regular radiation works, the restriction of 50 mSv per year should not be removed. Annulment of the restriction of 50 mSv per year by notification at the time of the occurrence of accident must be a wrong judgment in terms of its content and procedures, although a shortage of workers was a concern in those days. Prescribing the fact by law as this revision will not certainly be		to the total exposure dose of emergency dose and regular dose, from the viewpoint of giving the minimum degree of redundancy, for workers whose exposure dose exceed the dose limit for regular radiation work (100 mSv per five years), employers may assign regular radiation works in the range not exceeding the lower dose limit of the radiation controlled area (5 mSv per year) provided that the workers are engaged in works required to secure safe operation of the nuclear facility.

	determined. Has the MHLW noticed the fact that it could not be able to protect workers according to this criteria?		
3	<Exposure dose control during the exposure dose control period including the time when an accident occurred> - The revised Ministerial Guideline allows the workers whose exposure dose exceeded the dose limit for regular radiation work (100 mSv per five years) to engage in regular radiation works in the range not exceeding the dose limit of 5 mSv per year. The 5 mSv exposure dose limit should be applied even for workers whose exposure dose is less than 100 mSv per five years. If the total exposure dose is 97 mSv, for example, only an additional 3 mSv of exposure is allowed, which is not consistent with the case where the exposure dose exceeded 100 mSv. - It should be made clear how to apply 5 mSv to the remaining period in the fiscal year when an accident occurred. When an accident occurred at the beginning of the fiscal year, the worker may not be allowed to engage in the radiation work if the dose limit of 5 mSv is not applied in the concerned fiscal year. Therefore it will be reasonable that the "5 mSv" dose limit can be applied also in the remaining periods in the concerned one fiscal year.	2	- There will be no inconsistency since the Ministerial Guideline will be revised so that, the workers whose exposure dose exceeded the dose limit for regular radiation works (100 mSv per five years) (for workers whose emergency exposure dose was 97 mSv, after the total with that of regular radiation works exceeded the 100 mSv), employers may assign regular radiation works in which additional exposure dose is in the range not exceeding the dose limit of 5 mSv per year, provided that the workers are engaged in works required to secure safe operation of the nuclear facility. - The above will also be applied to the fiscal year when an accident occurred. Therefore, in the cases where an accident occurred at the beginning of the fiscal year, and total exposure dose of emergency works and regular radiation works exceeded 100 mSv, as in the case of your question, even in the remaining period in the fiscal year when the accident occurred, employers may assign regular radiation works in which additional exposure dose is in the range not exceeding the dose limit of 5 mSv per year, provided that the workers are engaged in works required to secure safe operation of the nuclear facility.
4	<Reason to revise items for cancer screening, etc.> - No reason is shown for the revision of contents of the table, “Cancer screening, etc.” Are the reasons shown separately? Reasons may be difficult to show in detail, but they should be shown at least in a general manner.	1	- The revision of items for cancer screening, etc. is based on updated knowledge on cancer screening items, etc. provided by municipalities as a health improvement project pursuant to Article 19-2 of the Health Promotion Act. - See Section 3-III “Expert Meeting on the Long-term Healthcare, etc. of Workers at the TEPCO Fukushima Daiichi Nuclear Power

			Plant" (Expert Meeting, 1 May 2015) of the MHLW web site (http://www.mhlw.go.jp/english/topics/2011eq/workers/ri/pr/pr_150520.html) for details. - It should be noted that the same contents as the above-mentioned expert meeting report are due to be made open from now in the enforcement notification of the revised Ministerial Guideline.
5	<Reason to revise stomach cancer screening, etc.> - What is the reason that the "Helicobacter Pylori antibody inspection", and the "hepatitis screening" and the "test for renal function" were added in the stomach cancer screening and in other inspections, respectively? Another question is why the frequency of inspection of test for renal function is once a year while examination items for "the Helicobacter Pylori antibody inspection" and "hepatitis screening" are once for each person?	1	-The Helicobacter Pylori antibody inspection and hepatitis screening are those provided from the viewpoint that they are effective as preventive measures of stomach cancer and liver cancer, respectively. The expert meeting concluded that one time inspection will be enough for each person for both inspections. - For a chronic renal disease, a causal relationship is not necessarily established with the radiation exposure. However, since significant relationship with radiation exposure doses is seen in some articles, it was concluded in the expert meeting that a test for renal function should be provided at the same frequency as a general medical examination.
6	<Inspection frequency> - Unlike the Ministerial Guideline before the revision, various inspection frequencies are found and, moreover, ambiguous expression is also seen such as; "once in about three years" and "3 to 5 times". This will be very troublesome in managing personal medical examination history. (How does one manage the long interval inspections such as an interval of "once in about ten years" for a large intestine endoscope?)	1	- In the revision, inspection items were added. The inspection frequencies were determined based on members' opinion in the expert meeting. The inspection with a frequency shown in a range such as "once in three to five years" need to be conducted based on a medical doctor's judgement.
7	<Inspection frequency of chest CT, etc.> - For the "chest CT inspection", "large intestine	1	- As you pointed out, "a chest CT inspection" in a lung cancer screening, "large intestine endoscopy" in a colorectal cancer screening, and

	endoscopy", and "thyroid blood sampling inspection", since there are conditions like "the case where a medical doctor determined the necessity from the result of the inspection" (a), the inspection should be conducted when a medical doctor who looked at the inspection results determined the necessity, whatever the inspection frequency is. On the contrary, if a medical doctor determined it unnecessary, even if the interval of the inspection exceeds the inspection frequency, the inspection is not required. Is it right that, after all, a medical doctor's judgment seems to be the main factor and the inspection frequencies in the table are shown just as references?		"thyroid stimulating hormone (TSH), free triiodothyronine (free T3) and free thyroxine (free T4)5 by blood sampling" in a thyroid gland inspection are provided additionally when a medical doctor has determined the necessity based on the results of a certain inspection, respectively. - The inspection frequencies were determined based on the opinion in the expert meeting, as reference levels at the time when a medical doctor judges about the necessity for the above mentioned inspection, after taking the contents of an inspection into consideration. We believe that the inspection should be conducted based on a medical doctor's judgment.
8	<Reasons to revise a lung cancer screening, etc.> - What is the reason that "a chest C T inspection" for the lung cancer screening and the "large intestine endoscopy" for the colorectal cancer screening were added (although with a condition that "the case where a medical doctor has determined the necessity")?	1	- "A chest CT inspection" and "large intestine endoscopy" are not incorporated into the provision type screenings for the general public (cancer screening, etc. provided by municipalities as a health improvement project pursuant to Article 19-2 of Health Promotion Act) as items of a lung cancer screening and a colorectal cancer screening, respectively. - However, in the expert meeting, the profits by an additional inspection were judged to surpass the disadvantage for workers whose exposure dose exceeded 100 mSv. In line with this, the "chest CT inspection" and "large intestine endoscopy" were determined to be provided when a medical doctor has determined the necessity based on the result of "chest X-rays inspection" and "facilities occult blood inspection", respectively.
9	<Reason to revise the thyroid inspection> - What is the reason that the order of the inspections has reversed from the inspection conducted first to the one conducted later in the	1	- Since "inspection of thyroid stimulating hormone (TSH), free triiodothyronine (free T3) and free thyroxine (free T4)5 by blood sampling" are those conducted to investigate acute effects of radiation (reduction in the thyroid function),

	inspection of the thyroid gland? And what is the reason that the inspection frequency decreased to "once in three to five years" from "once a year"?		they should be provided for workers whose thyroid equivalent dose is higher than a certain level (approximately five or six Gy or higher). So in the expert meeting, it was concluded that it will be enough to provide such inspections when a medical doctor has determined the necessity. Based on this, it was determined to be provided when a medical doctor has determined the necessity based on the result of the "neck ultrasound test." - On the other hand, the "neck ultrasound test", was determined to be provided at the appropriate frequency, not based on a medical doctor's judgement, from a viewpoint of ensuring the monitoring of chronic influence of the radiation to the thyroid gland based on opinions in the expert meeting. The inspection frequency was determined based on the opinion in the expert meeting taking into consideration that development of the thyroid related illness is slow.
10	<Application date of the Ministerial Guideline> - Radiation control during an exposure dose control period (for five years) will be a practical and rational method. In line with this radiation control method, the day to apply the Ministerial Guideline should be the day when the revised Ministerial Guideline was announced, in order for workers whose exposure dose exceeded 100 mSv in the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant, to not have to wait until April 2016 when the Ministerial Guideline is going to be applied.	1	- The whole revision conducted this time consisted of a package together with the revision of the Ordinance on Prevention of Ionizing Radiation Hazards in which the special education and emergency ionizing radiation medical examination, etc. will be obligated, in addition to the revision of the Ministerial guideline. - The application date of 1 April 2016 was selected because the provisions that impose obligation to employers will require some preparation period. Application of only provisions related to the mitigation ahead of other provisions will cause confusion at the work places, and thus is not appropriate. - For this reason, the MHLW determined the application date of the revised Ministerial Guideline to be 1 April 2016.

11	<Workers to undergo the long-term health care> - The details of the worker's health care should not be made different in the time before and after December 2011 when the "under control declaration" of the TEPCO Fukushima Daiichi Nuclear Power Plant accident was issued. There is no basis for the declaration. The health effect of radiation is still unknown. It will be unreasonable to draw a line with the radiation exposure dose under the insufficient condition of knowledge about the exposure dose. A medical examination and radiation passbook are equally required for workers who are engaged in the works toward getting the accident under control under the special environment at the TEPCO Fukushima Daiichi Nuclear Power Plant in the past, present and future.	1	- The MHLW had temporarily raised the dose limit at the time of emergency works at the TEPCO Fukushima Daiichi Nuclear Power Plant to 250 mSv up to the time when step 2 was completed (16 December 2011). The works were those that give the workers with extreme strain under the condition where the nuclear reactor is not stabilized. For this reason, long-term health care has been provided to the emergency workers by defining a Ministerial Guideline in October 2011 based on the report by the expert meeting. For workers who are additionally engaged in the work after completing step 2, the same health care will be provided as workers in other nuclear power plants; special ionizing radiation medical examinations, general medical examinations, etc. which are provided twice a year by employers pursuant to regulations.
12	<Scope of the Ministerial Guideline> - The title of the Ministerial Guideline was changed into "- - at Nuclear Power Plants" from "- - at the TEPCO Fukushima Daiichi Nuclear Power Plant". Does this assume that this Ministerial Guideline may be applied when an accident like that at Fukushima Daiichi should occur at nuclear facilities in the future?	1	- The revised Ministerial Guideline will be applied, as you pointed out, when emergency works should be required at nuclear facilities other than the TEPCO Fukushima Daiichi Nuclear Power Plant in the future.

[General opinions]

No.	Summary of opinions	Number of comments	Responses to the opinions
1	<Investigation by IARC> ・According to a large scale investigation for approximately four hundred thousand or more workers who have been engaged in works at nuclear facilities in 15 countries (*), no less than 90% of workers were exposed to radiation at an	1	- The result of the investigation at 15 countries conducted by IARC which you pointed out showed an extremely high cancer death rate among workers at a nuclear power plant in Canada compared to those in other countries and a project to analyze Canadian data again was implemented. According to the investigation,

	exposure dose of 50 mSv or less. However, their excess relative risk (ERR) of cancer death excluding leukemia is higher than that of Atomic bomb victims at Hiroshima and Nagasaki by a factor of two or more. (*) E. Cardis et al.: “The 15-country collaborative study of cancer risk among radiation workers in the nuclear industry. Estimates of radiation-related cancer risks” Radiation Research 167 (2007) 396-416		including the re-analysis of Canadian data, no statistically significant difference was observed; ERR of cancer death excluding leukemia in Canada was 1.20/sievert (confidential interval: -0.73, 4.33) (*). (*) Zablotska et al.: A reanalysis of cancer mortality in Canadian nuclear workers (1956-1994) based on revised exposure and cohort data. British Journal of Cancer 110. Pp.214-223 (2014)
2	< Dose and dose-rate effectiveness factor > - The risks of the radiation exposure shown by the MHLW are based on ICRP data. Since ICRP used a different dose and dose-rate effectiveness factor (DDREF) for regular distributed exposures at the low dose rate and emergency intensive exposure at the high dose rate, risk evaluation that simply totals the exposure dose from emergency works and that from regular radiation works seems to represent a problem even if both are based on ICRP data. If DDREF of the exposure dose from emergency works should be set to 2 as in ICRP, the exposure dose of 250 mSv must be considered to be 500 mSv in a normal sense. In that case, workers who had exposure dose of 250 mSv by being engaged in the emergency works should avoid radiation works for 25 years from a viewpoint of a dose limit for regular radiation works.	1	- The dose and dose-rate effectiveness factor （DDREF） is used for comparing the health effect between simultaneous large exposure (an order of exposure dose rate is sievert per hour at least) such as exposure from explosion of an atomic bomb or critical accident, etc. and the other exposure situations. On the other hand, considering the dose limit at the time of exceptional emergency works (250 mSv), since it is not realistic to work under such a high dose rate, your indication will not be applied for the cases of emergency works in nuclear facilities. It should be noted that, in the ICRP1990 recommendation, ICRP states that "the control over regular radiation works could in some degree be mitigated without lowering the long-term level of protection in case of a severe accident"; however "the effective dose should not exceed about 0.5 Sv."
3	<Risk evaluation model> - According to the risk evaluation (*) based on the long-term follow up data of the Atomic bomb victims of Hiroshima and Nagasaki by Mr. Kiyohiko Mabuchi, Radiation Effects Research	2	- ICRP assumes a linear model without a threshold as a risk evaluation model to estimate the health effect by radiation exposure. - ICRP 1990 recommends, considering that the risk that could be accepted will be that of the total effective dose of about 1 Sv during the time

	Foundation, it is shown that, based on the linear model without a threshold, the solid cancer is observed even for persons whose ERR is 50 mSv or less. (*) Kiyohiko Mabuchi "From position of risk assessment based on epidemiology" - There is no threshold value of exposure dose in radiation effect on cancer and leukemia. The concentrated exposure of radiation up to 250 mSv corresponding to 250 times larger than the dose limit for the public in a short period of time causes significantly higher risk than that of the industrial accident in other work places. Such an emergency dose limit is against the Industrial Safety and Health Act, and should not be introduced.		engaged in work based on the calculated health effect of radiation exposure using data of atomic bomb victims, a maximum 100 mSv per five years under the condition that it does not exceed 50 mSv per year, while dividing the whole working period into ten terms, so that a lifetime radiation exposure dose may not exceed 1 Sv. - In the ICRP1990 recommendation, ICRP states that "the control over regular radiation works could in some degree be mitigated without lowering the long-term level of protection in case of a severe accident"; however "the effective dose should not exceed about 0.5 Sv." - It should be noted that, we cannot evaluate the validity of the paper you pointed out, because the details of the analysis that shows minimum significant dose of 0.05 Sv are not stated clearly.
4	<Difference from a workers compensation standard> - The workers compensation standard for leukemia is set 5 mSv (0.5 rem) per year. There is an example where a worker whose exposure dose is 5.2 mSv was authorized for the application of the workers compensation as leukemia. - No consistent information is found with the worker's compensation. There is no reasonable explanation about dealing with the workers compensation standard differently than from the dose limit. A dose limit of 250 mSv is too large compared to the leukemia authorization standard of 5 mSv per year. The criteria should be established based on a precautionary principle.	2	- The workers compensation standard for leukemia has been set from the viewpoint of compensating workers while the radiation effect of the low exposure dose lower than 100 mSv has not been made scientifically clear. If the workers compensation standard is met, the worker will be authorized for the application of workers compensation after discussion by medicine experts, unless any factor other than the works are clear. - Thus, a workers compensation standard is the one to judge whether to authorize application of workers compensation, and is different from the dose limit in terms of the objective. It is not appropriate to simply compare both values.
5	<Objectives of the Industrial Safety and Health Act> - It will be against the Act to make employers	3	- The criteria for the radiation protection in the Ionizing Radiation Ordinance under the Industrial Safety and Health Act have been set based on the concept of ICRP Recommendation.

	make such judgement as to expose workers to danger. The act prescribes that employers' are responsible for workers' safety, and this is violation of the Act. A judgment to assign workers to engage in works at the work places where health hazards will certainly be generated should not be made based on a labour contract. - The objectives of the Industrial Safety and Health Act are to "prevent industrial accidents" and "to ensure the safety and health of workers in workplaces, as well as to facilitate the establishment of a comfortable working environment" as defined in Article 1, and the "industrial accident" is defined as "a case in which a worker is injured, suffered from illness or is killed" as defined in Article 2 of the Act. That is, the Act aims at protecting the generation of not only "injuries or illness" which are "serious" or "continue eternally" and may result in death, but also injuries and illness which functions could be recovered to a certain level by medical treatment. In the draft revised Ionizing Radiation Ordinance, it is said that the basis of 250 mSv is not to prevent an "acute radiation damage" (or "deterministic radiological hazard") but to prevent "a serious acute radiation damage", or "the acute radiation damage which continues eternally". The dose limit will be against the objective of protecting industrial hazards, because, even if these acute radiation damages were recovered after a certain period of time, the generating of the healthy destruction resulting from the exposure cannot be denied at all after the recovery. - The objective to raise the emergency dose limit to 250 mSv will be to prepare for the occurrence of a severe accident associated with the re-operation of a nuclear power plant. A nuclear		This revision is also consistent with the concept of the ICRP Recommendation as follows; - ICRP 1990 recommends, considering that the risk that could be accepted will be that of the total effective dose of about 1 Sv during the time engaged in work based on the calculated health effect of radiation exposure using data of atomic bomb victims, a maximum 100 mSv per five years under the condition that it does not exceed 50 mSv per year, while dividing the whole working period into ten terms, so that a lifetime radiation exposure dose may not exceed 1 Sv. - In the ICRP1990 recommendation, ICRP also states that "the control over regular radiation works could in some degree be increased without lowering the long-term level of protection in case of a severe accident"; however "the effective dose should not exceed about 0.5 Sv." - In addition, ICRP2007 recommendation advised to pay attention especially to prevention of serious deterministic effect, since the radiation exposure dose may reach a high level in a short period in the emergency exposure situation. - Based on these ICRP recommendations, the MHLW held the expert meeting, and, on the premise that a dose limit for regular radiation work (100 mSv per five years) is observed and that the long-term control is proved for total effective dose from exposure during emergency and regular radiation work so that they may not exceed about 1 Sv during the whole working period for preventing probabilistic effects by ionizing radiation, discussed the acute disorder of the hematopoietic functions which affect the health condition of the whole body for deterministic effect. And as a conclusion, from a viewpoint of preventing certain failing of the

	reactor under the condition of a severe accident is not the work place to apply the Industrial Safety and Health Act, where a nuclear reactor and the radiological environment are not under control.		immune function by the lymphocyte reduction in an emergency work, it was judged to be conservative and appropriate to have adopted 250 mSv which is certainly lower than the threshold as an emergency dose limit in the case of the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. - In addition, in this revision, based on the principles of justification of ICRP, the workers who are engaged in exceptional emergency works need to be limited to workers with knowledge and experience required for the work which mainly aims at avoiding destructive situations in nuclear facilities.
6	<Legislation> - The basis of the law which introduced the dose limit for regular radiation works:"100 mSv per five years or less, and 50 mSv per year or less" will be destroyed by the low ranking guideline in the law system. It is not allowed in the law system. - Setting an emergency dose limit that significantly exceeds the dose limit for regular radiation works in the Ionizing Radiation Ordinance which is under the Industrial Safety and Health Act is against the Industrial Safety and Health Act. Therefore, this revision will not be permitted. - It is a problem that such a large mitigation of the existing dose limit (increasing to 2.5 times larger than the present one) can be made by the Ministerial Ordinance. The dose limit should be prescribed after the discussions in the Diet.	3	- The Article 22, paragraph (1), item (b) of the Industrial Safety and Health Act prescribed that employers shall take actions required for protecting health hazards by radiation, and Article 27, paragraph (1) of the said Act prescribed that matters that employers and workers need to observe shall be specified in the MHLW Ordinance. - The specific ordinance specified by the Minister of Health, Labour and Welfare pursuant to the above-mentioned Industrial Safety and Health Act is an Ordinance on Prevention of Ionizing Radiation Hazards. The actions required for protecting health hazards by radiation prescribed in Article 22, paragraph (1), item (b) of the said ordinance include the dose limit. For this reason, the revision of the Ministerial Ordinance is within the jurisdiction of the Minister of Health, Labour and Welfare, and not against the Industrial Safety and Health Act. - It should be noted that, the draft revised Ministerial Ordinance was formulated based on the recommendation from the Labour Policy

			Council consisted of representative of public, employers and workers on the request for consultation. - The Article 70-2 of the said Act prescribed that the Minister of Health, Labour and Welfare shall issue a Ministerial Guideline required for appropriate and effective implementation of measures to maintain and improve health. The revision here defines specific measures for maintaining and improving health of emergency workers pursuant to the said article, on the premise of revision of the Ordinance on Prevention of Ionizing Radiation Hazards. Thus, this revision is not against the Industrial Safety and Health Act.
7	<Comparison with the TEPCO Fukushima Daiichi Nuclear Power Plant accident> - The accident at the TEPCO Fukushima Daiichi Nuclear Power Plant occurred in March 2011 could not be brought under control by emergency works assumed and prescribed in the Ionizing Radiation Ordinance. In the revision, measures to protect workers should be taken assuming the same or higher level of accident. However, the "exceptional emergency dose limit" proposed in the draft revision is based on clearly the wrong overview that seems to have forgotten the severe conditions at that time and overly reluctant recognition like that; "It was possible to deal with the emergency situation under the emergency dose limit of 250 mSv even in the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant, which was a severe accident involving core meltdown of multiple reactor units. Taking this background into account, it is hard to foresee at this point any necessity of working beyond this dose limit in	2	- At the TEPCO Fukushima Daiichi Nuclear Power Plant, after declaration of nuclear emergency situation, a special emergency dose limit of 250 mSv was prescribed by the exceptional ordinance based on comparison between health risk of workers and benefit of protecting lives and properties of residents. Based on this experience, in this revision, response procedures were prescribed in a general manner in cases where a nuclear emergency situation should be declared and then emergency works become required, as discussed in the expert meeting. For this reason, there is no direct relationship between the details of the revision and individual specific matters in the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant.

	any future emergency works." (Report from the Expert Meeting on the Long-term Healthcare, etc. of Workers at the TEPCO Fukushima Daiichi Nuclear Power Plant). It left things unfinished and unreasonable. - The verification of a worker's exposure situation has not been fully conducted for the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. At the beginning of the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant, problems occurred in the midst of chaos such as; shortage of dosimeters, insufficient exposure dose control, and late knowledge on internal exposure dose after several months. There are also many workers who were engaged in responding to the severe accident with no registration as a radiation worker or provided with no education/training. The first thing to do is the thorough investigation of the facts of the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant, and re-evaluate the exposure doses. On the premise that many unknown matters remain even making those efforts, the compensation, reparation or guaranty should be provided to all workers. At the same time, the stopgap measures taken by administration will also need to be verified. Without these actions, new criteria could not be established.		
8	<Re- operation of nuclear power plants> - Requirement of such a high exposure dose is caused by the re-operation of nuclear power plants. Without the re-operation of nuclear power plants, there will be no chance to expose the workers to danger. The MHLW should forbid in principle works at the workplaces that cannot	3	- The Expert meeting concluded in the report that, from a viewpoint of preventing certain failing of the immune function by the lymphocyte reduction in an emergency work, it was judged to be conservative and appropriate to have adopted 250 mSv which is certainly lower than the threshold as an emergency dose limit in the case of the accident at the TEPCO Fukushima

	prevent the occurrence of a severe accident of a nuclear power plant and it has to raise an emergency dose limit in preparation for a severe accident. At least, from a viewpoint of achieving the objective of the Industrial Safety and Health Act, the Ministerial Ordinance to raise such an emergency dose limit should be withdrawn. - A criteria on the condition of the re- operation of nuclear power plant should not be formulated. The highest priority for the MHLW should be assigned to the workers' health and safety. The criteria should not be mitigated assuming the re-operation with unreasonable reasons. In addition, as described below, this revision is proposed while recognizing that the criteria will not function as criteria once a severe accident has occurred, which will certainly be delusive. The MHLW pointed to “prevention of a destructive situation" as the reason that the principles of justification of ICRP permit; however, when the "destructive situation" is not caused by the justifiable reason, can the exposure required to prevent it be justified? The natural judgement about the first thing to do is not to raise the possibility that may cause a "destructive situation". - There is no reasonable reason to operate a nuclear power plant which is not realized without compelling workers into such a large exposure. The nuclear power generation must not be conducted.		Daiichi Nuclear Power Plant. - Based on this, in this revision, in cases where a nuclear emergency situation, etc. could occur, the Minister of Health, Labour and Welfare is going to revise the ordinance that allows the Minister of Health, Labour and Welfare to set an exceptional emergency dose limit within the exposure dose of 250 mSv with respect to the effective dose separately from the emergency dose limit considering the accident and other situations. - Together with this, the MHLW is going to obligate employers to provide a monthly ionizing radiation medical examination and measurement of an internal exposure dose, etc. of workers engaged in emergency works, as well as special education to exceptional emergency workers and submit a status report on the implementation of emergency works during the emergency work period. In addition, the cancer screening according to the exposure dose during the emergency works, etc., and the lifetime dose control will be obligated by the Ministerial Guideline. In order to prevent the health hazards of the workers in case of a nuclear emergency situation, etc., the MHLW will instruct employers to surely take the above mentioned measures. - It should be noted that the re-operation of nuclear power plants is not under the jurisdiction of the MHLW. It is out of the scope of this opinion collection.
9	<Future accident at nuclear facilities> - No definite commitment is seen that they will not raise the limit after an accident occurs again. In fact, raising the dose limit to a further 500 mSv was considered at the time of the occurrence of	2	- It was possible to deal with the emergency situation under the emergency dose limit of 250 mSv even in the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant, which was a severe accident involving core meltdown of multiple reactor units. Taking this background

	the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. It is not a limit if it can raise the limit set assuming the emergency situation if an emergency situation should occur. - On the contrary, no basis that accidents can be brought under control by setting the exposure dose limit of 250 mSv is shown, either. The MHLW urges that there is a reason to raise an exposure dose limit based on the statement of the NRA that assumes the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant. However, no consistency is seen in the assumption by the NRA; the same level of accident as that at the TEPCO Fukushima Daiichi Nuclear Power Plant is not set in the evacuation plan for residents. Naturally, there is no guarantee that the accident that may occur will be the same or lower level as that occurred at the TEPCO Fukushima Daiichi Nuclear Power Plant.		into account, it is hard to foresee at this point any necessity of working beyond this dose limit in any future emergency works." - It should be noted that in the report by the expert meeting, from a viewpoint of preventing certain failing of the immune function by the lymphocyte reduction in an emergency work, it was judged to be conservative and appropriate to have adopted 250 mSv which is certainly lower than the threshold as an emergency dose limit in the case of the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant.
10	<ICRP2007 recommendation> - In the situation that the ICRP assumed in the 2007 recommendation, many factors that cannot be applied directly to the present Japanese system such as of the Industrial Safety and Health Act including that; it established principles of education, volunteer, and training however, the implication of the numerical value itself are not the exposure dose limits. Therefore, the Primary Committee of the Radiation Council raised issues in the interim report in January 2011. I decisively oppose the irresponsible fellows who call themselves experts or bureaucrats to change numerical values or statements in the Ionizing Radiation Ordinance without facing the issues head on.	1	- Based on the principles of justification of ICRP, the workers who are engaged in exceptional emergency works need to be limited to workers with knowledge and experience required for the work which mainly aims at avoiding destructive situations in nuclear facilities. - For this reason, in this revision, while limiting workers who are engaged in exceptional emergency works to nuclear disaster prevention workers, etc., employers are obliged to provide these personnel with special education including effects of ionizing radiation on organisms, method of exceptional emergency works, structure of facilities and equipment used for exceptional emergency works and their handling method. - In selecting nuclear disaster prevention workers, employers need to show the working conditions

			concerning exceptional emergency works, and then conclude a labour contract based on agreement by both sides. In addition, in the arrangement to an actual emergency work, workers' intention needs to be taken into account as much as possible. - It should be noted that, we hear from the NRA that has jurisdiction over the Nuclear Reactor Regulation Law that they are revising the regulations relevant to the law to include the provision that the workers shall offer in writing that they have the will to be engaged in the emergency works to nuclear facility employers before they are engaged in the emergency works. - The implication of the dose limit during the emergency work to be the limiting value is that according to the opinion in the report "Introduction of ICRP1990 Recommendation (Pub.60) to the domestic system, etc." (Radiation Council, June 1998) will be appropriate.
11	<Cooperation with the Nuclear Regulation Authority (NRA), etc.> - Following the public comments about revision of the Ionizing Radiation Ordinance, revisions of the "Ordinance on Transportation Outside the Place of Activity" in the Nuclear Reactor Regulation Law system, and the recommendation by the National Personnel Authority (the Ionizing Radiation Ordinance for Public Employee), etc. are subjected to the public comments. Are the systems of the Laws Concerning the Prevention from Radiation Hazards due to Radioisotopes and Others and/or the Ionizing Radiation Ordinance for Mariners also going to be revised?	2	- There is no provision concerning the actions on workers whose total of the emergency exposure dose and regular exposure dose exceeds the dose limit for regular radiation work (100 mSv per five years) in the relevant regulations of the Nuclear Reactor Regulation Law. However, we hear from the NRA that has jurisdiction over the Law that the regulations shall be put into practice so that; (1) exposure doses during emergency works and regular radiation works would be distinguished in order to allow to engage in a certain radiation work without affecting post-treatment of the emergency works or works at other nuclear facilities, and (2) total effective dose (total of the emergency exposure dose and regular exposure dose) exposed during

	They also should be revised to ensure consistency among them, though it may be difficult because of the different jurisdictions for different regulations. Is there any communication with other ministries such as the Construction and Transportation Ministry? - From the time before the earthquake disaster, vertically divided regulations among ministries have been developed, but some differences are seen among them in terms of the limit control method. For the work places where both the Nuclear Reactor Regulation Law and Ionizing Radiation Ordinance are applied mutatis mutandis, it is confusing to work using different criteria such as; exposure doses limit per five years are to set by employers for each worker based on the value obtained by dividing the remaining dose (which is the lifetime dose of 1 Sv minus cumulative exposure dose (total of the emergency exposure dose and regular exposure dose)) by the remaining working period, and; for workers whose exposure dose exceeds the dose limit for regular radiation works (100 mSv per five years), employers may assign regular radiation works in the range not exceeding the lower dose limit of the radiation controlled area (5 mSv per year) provided that the workers are engaged in works required to secure safe operation of the nuclear facility. They should be consistent with each other.		the whole working period (assumed 50 years starting from 18 years old), the so called lifetime exposure dose, will not exceed 1 Sv. Thus there is no inconsistency in the radiation control method with that specified by the MHLW defines. - In addition, we have already explained about the details of the revision and will gain the cooperation of ministries which have jurisdiction over the National Personnel Authority rule and the Ordinance on Prevention of Ionizing Radiation Hazards for Mariners.

【Other opinions】

No.	Summary of opinions	Number of comments	Responses to the opinions

1	<Public exposure and occupation exposure> - No discussion is made on total exposure of a worker such as exposure as a general public and medical exposure. In the 42nd Primary Committee of the Radiation Council on 4 November 2011, the MHLW asked whether the increased exposure as a general public will justify the higher occupational exposure dose according to the principles of justification of ICRP. The question will be natural and the exposure doses that the general public had after the accident were those that are absolutely impossible to ignore. On the other hand, the medical exposure was evaluated in the epidemiological research of workers who were engaged in the emergency works. It was completely contradictory. Though they may be handled separately, the effect of totaling the exposure doses on health should be investigated sufficiently. They are managed by dividing vertically now and therefore there is no room to justify.	1	-The ICRP classifies the exposure into three categories; occupation, public, and medical exposures and it stands on the principle which accepts only the justified exposure (principles of justification) for each categories of exposure. Based on the principle, the exposure needs to be kept as low as reasonably attainable (optimization principle). Since the exposure mode is different for workers, the general public and patients, the reduction of exposure dose will be achieved by different measures. - For this reason, ICRP handles occupation, public, and medical exposure separately. - In line with this, the exposure of emergency worker is reasonably deemed to be within the scope of employers' responsibility; i.e. occupational radiation exposure in the Industrial Safety and Health Act. - It should be noted that, in the 42nd Primary Committee of Radiation Council, the MHLW introduced that there are different opinions on the occupational exposure dose limit including that you pointed out and requested opinions to the Radiation Council.
2	<Systematic control of exposure doses> - There is neither a regulation nor system which controls lifetime occupational exposure dose of 1 Sv. As mentioned above, the radiation control will be conducted while emphasizing the lifetime occupational exposure dose of 1 Sv. However, there is no mechanism to control the occupational exposure dose through a lifetime. The lifetime exposure dose 1 Sv should not be established pretending that control is possible. The law to systematic control of exposure doses should be enacted immediately.	1	- The number of workers whose emergency radiation exposure dose exceeded 100 mSv during the accident at the TEPCO Fukushima Daiichi Nuclear Power Plant was 174, and their employers are also clear. Thus cumulative exposure dose can be strictly managed for individual workers. In case where emergency works should be conducted hereafter, the same system will be applied. In case where workers' employment should be quite different from that in the TEPCO Fukushima Daiichi Nuclear Power Plant, the system shall be re-examined again.

3	<Local civil servant> - Although there is a provision to select workers to whom the "exceptional emergency dose limit" is applied from the nuclear disaster prevention workers specified in Article 8, paragraph 3 of the Nuclear Emergency Act, measures should be taken to apply the exceptional emergency dose limit to other personnel involved in disaster prevention works (especially local civil servants, etc.). The revision of the Ionizing Radiation Ordinance sets an exceptional case in the dose limit to apply to emergency workers of the employers who caused the disaster; however when the disaster occurred, different employers in addition to workers concerned will be engaged in works to bring the reactor under control or to secure safety of the residents. At the time when a disaster occurs, a certain exceptional case should also be set for personnel involved in disaster prevention works other than employers' emergency workers and if not, it will post an obstacle in the response to the disaster. However, extensive exposure without any criteria will not be allowed. Unified criteria should be set by the law and it should be clearly prescribed to apply the criteria to the exceptional case in the law.	1	- The exposure dose control of the local civil servants engaged in desk work is not under the jurisdiction of the MHLW. However, we have already explained about the details of the revision and will gain the cooperation of relevant ministries.
4	<Hearing from worker side> - There is no opportunity to hear the opinion of the workers who are the party concerned reflected in the process of the revision. The worker side (especially radiation workers) should participate in the revision process, not only through the recommendations from the Labor Policy Council. In revising the laws to raise the dose	1	- We understand that the worker side members collected opinions of related labor unions and presented them at the Labor Policy Council. We also held a hearing at the Safety and Health Committee of the Radiation Council on 20 May from the Federation of Electric Power Related Industry Worker's Union Japan to which most of workers to whom the exceptional emergency dose limit is applied belong to.

	limit by a factor of 2.5 to the level that may cause health hazards, discussions among experts in radiation will not be sufficient. Not only the party concerned, but also experts in ethical and other aspects need to participate in different discussions. Although the MHLW seems to have hearings from the employer side on the occasion of the committee, the same opportunities should also be held to hear opinions from the worker side.		- We also hold hearings for each of the labour unions that the workers of the plant makers belong to (Japan Electrical Electronic & Information Union, Japan Federation of Basic Industry Worker's Unions, and Tokyo Electric Power Worker's Union).
5	<Others> - The first thing to do will be to take measures such as reduction of exposure dose, improvement of work environment and improvement of work conditions. It will not be justified not to take measures which should be taken such as those for systematic control of occupational exposure dose and dissolution of multilayered subcontracting system and against compelling workers with exposure to radiation. - Compensation or remedy should be provided in the cases where a worker's exposure dose has exceeded or is approaching the dose limit. Measures should be taken immediately for the cases where workers lose their job not only when their exposure dose exceeds the dose limit in an emergency situation but also when their exposure dose is approaching the dose limit during the time when they are engaged in regular radiation works. However, it will be a sophistry or shameful behavior to mitigate the dose limit so that the workers do not lose opportunity of employment. A work's life or works other than radiation work should be guaranteed for them. - Compelling radiation workers to be exposed to radiation that causes 1 Sv of exposure dose	3	- Such subjects as work conditions, multilayered subcontracting system, compensation and securing of employment opportunity are out of the scope of this hearing. Your comment will be used for future reference.

	during their lifetime is also a violation of human rights. It will definitely not be accepted. At the NRA meeting on 10 December last year, it was introduced that the concept of considering the emergency exposure and exposure dose from regular radiation works separately is internationally accepted and the concept seems to have been supported by the NRA members. However, I was shocked to hear that. The matter to respect will be the human rights, not the radiation works that causes radiation exposure. For workers whose exposure dose is high, works without exposure should be ensured and health care measures should be taken and generous medical support should be provided.		