Procedures for Extending the Operation Period of Nuclear Power Plants in Japan and Related Topics

- Analysis of Related Laws and Implementation, and International Comparison-

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Summary

The operation period of nuclear power plants in Japan is prescribed in the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors" (hereinafter referred to as the "Reactor Regulation Act"). Under the law, the period during which a nuclear power reactor can be operated (hereinafter referred to as the "operation period") shall be 40 years from the date the pre-use inspection is successfully passed. Upon expiration, once approval has been received from the Nuclear Regulation Authority, it is stipulated that this period can be extended, once only, for a period not exceeding 20 years.

Regarding the extension of the operation period under this law, The Kansai Electric Power Company, Incorporated filed applications for the Takahama Nuclear Power Station (Units 1 and 2) in April 2015 and for the Mihama Nuclear Power Station Unit 3 in November 2015, and The Japan Atomic Power Company filed an application for the company's Tokai No. 2 Power Station in November 2017. However, the Act does not specify implementation details concerning extension of the operation period. Additionally, the Act also does not have a clear and definite provision regarding the handling of situations where the initial operation period for a facility expires while that facility is under review by the Nuclear Regulation Authority.

For this reason, concerning the handling of this situation, while the Nuclear Regulation Authority suggests termination of the inspection on the grounds that it is difficult to complete the inspection within the deadline, the Authority's international advisors and the Japan Society of Maintenology have expressed opposition to termination of the inspection, resulting in a situation where there is a large difference in opinion between the relevant parties. Discussions by both parties, insisting on termination or continuation of inspections, began from around 2015 at the latest, but with neither party presenting their legal interpretation of the Reactor Regulation Act, the situation where the views of both parties have been expressed without any supporting evidence is continuing. Such has been the background of this rigid debate over the long term.

In this paper, in recognition of the above problem, we have examined the legal interpretation regarding application for extension of the operation period, as laid out in the Reactor Regulation Act, and revealed that either interpretation, for either termination or continuation of inspections, superficially appears to be possible. In addition, as a countermeasure for the short-term situation, based on the point that consideration of the necessary period would prevent us from resolving the matter via revision of the law, etc., we point out that it is important to discuss the reasonable legal interpretation of the current law while referring to the wording of other laws and regulations, instead of expanding upon a polarizing argument by both parties for or against the termination of inspections.

Additionally, in order to examine medium to long-term measures that can take into account revision of the law, etc. as an option, we compare Japan's procedures for extension of the operation period with those of the United States, France, the United Kingdom, Canada and South Korea, finding that (1) Japan's period in which an application can be made is the shortest among the six countries that are compared, and that (2) excluding Japan, there is no country among the five countries that opts to terminate inspections in the case where the initial operation period expires while an inspection is in progress.

The point that Japan's handling of the operation period extension inspections is unique from an international viewpoint is merely a fact, and it is impossible, with only that point, to immediately decide that it is necessary to revise the law, etc.

However, taking into account the magnitude of the impact that termination of the inspection for extension of a nuclear power plant's operation period would have on the operations of the plant operator and eventually the national economy, it becomes necessary to show a reasonable basis for Japan's unique handling of this issue.

In this paper, in relation to the extension of a nuclear power plant's operation period, we analyzed the legal interpretation of the current law and compared implementation from an international viewpoint. However, in order to make a more accurate understanding regarding how to apply for extension of the operating period, in addition to deepening further discussion by law experts, interdisciplinary discussions, such as on the scientific safety of extending the operation period of nuclear reactors, are required. With regards to this matter, it is desirable that experts in various fields, such as law and engineering, be included to facilitate further understanding.

1. Introduction

The operation period of nuclear power plants in Japan is prescribed in the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors" (hereinafter referred to as the "Reactor Regulation Act"). Under the law, the period during which a nuclear power reactor can be operated (hereinafter referred to as the "operation period") shall be 40 years from the date the pre-use inspection is successfully passed, and it is stipulated that this period can be extended, once only, for a period not exceeding 20 years.[1] The Kansai Electric Power Company, Incorporated, in accordance with this stipulation, submitted applications for extension of the operating period of the Takahama Nuclear Power Station (Units 1 and 2) in April 2015 and for the Mihama Nuclear Power Station Unit 3 in November 2015, while The Japan Atomic Power Company filed an application for the company's Tokai No. 2 Power Station (hereinafter Tokai No. 2) in November 2017.[2]

The stipulation of the Reactor Regulation Act, with regards to the installer of a nuclear power reactor who wishes to extend the operation period of the reactor, imposes an obligation to implement special inspections in accordance with the aging of the facility and to obtain approval for necessary construction plans to be in compliance with new safety standards, the appropriateness of which will be judged by the Nuclear Regulation Authority. While this can be evaluated as an effort conducive to improving the safety of nuclear power plants, the situation surrounding its operation is that consensus among the relevant parties regarding implementation has not been obtained partly due to lack of clarification on the handling of cases where the initial operation period of a nuclear power reactor expires while under inspection.

In this paper, together with analyzing the laws and implementation concerning Japan's procedures for extension of the operation period, we consider issues faced by Japan’s procedures and a path towards resolving those issues via a comparison of similar regulations and implementation from overseas.

2. Discussion of Japan's Laws and Implementation

2-1. Law Concerning the Extension of the Operation Period of Nuclear Power Plants in Japan

The main matters pertaining to extension of the operation period of nuclear power plants in Japan are stipulated in the aforementioned Reactor Regulation Act and the "Ordinance Concerning the Installation and Operation of Commercial Power Reactors" (hereinafter referred to as Commercial Reactor Ordinance), as established by the Nuclear Regulation Authority for the purpose of enacting the Reactor Regulation Act. The Reactor Regulation Act establishes that the operation period of a nuclear power reactor shall be 40 years from the date the pre-use inspection is successfully passed, and that upon expiration, once approval has been received from the Nuclear Regulation Authority, this period can be extended, once only, for a period not exceeding 20 years (Article 43-3-32 of the Act). However, the Reactor Regulation Act does not have a clear and definite provision concerning the handling of situations where the initial operation period of a facility expires while that facility is under inspection, and, as described later, there have been various discussions regarding its implementation.

In addition, the Commercial Reactor Ordinance, with regards to the submission period for applications to extend the operation

[1] Article 43-3-32, Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors

[2] Nuclear Regulation Authority website, "Inspections Relating to the Extension of the Operating Period of Power Reactors” <http://www.nsr.go.jp/disclosure/committee/yuushikisya/tekigousei/power_plants/untenkikanencho/index.html> (Accessed August 31, 2018)

period, requires that they must be submitted to the Nuclear Regulation Authority within the one year preceding the date when the operation period expires (Article 113 of the Ordinance). The provision concerning the submission period for applications to extend the operation period, at the time of enactment, called for submission within the three months preceding the date one year prior to the expiration of the initial operation period, but on September 28, 2017, the Commercial Reactor Ordinance was revised and changed to the current provision, in which the three-month submission period restriction was removed.

Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors

(Operation Period, etc.)
Article 43-3-32 The period during which the installer of a nuclear reactor for power generation can operate the nuclear reactor for power generation shall be forty years starting from the day when the inspection under paragraph (1) of Article 43-3-11 for the installation of the nuclear reactor for power generation in question is successfully completed.
2 The period set forth in the preceding paragraph may, upon expiration and with the approval of the Nuclear Regulation Authority, be extended only once
3 The period of extension pursuant to the provisions of the preceding paragraph may not exceed the period specified by Cabinet Order within a period not exceeding twenty years.
4 The installer of a nuclear reactor for power generation who intends to obtain the approval set forth in paragraph (2) shall apply for approval to the Nuclear Regulation Authority pursuant to the provisions of the rules of the Nuclear Regulation Authority
5 For applications for approval of nuclear reactors for power generation as set forth in the preceding paragraph, the Nuclear Regulation Authority can, based on the status of deterioration of the nuclear reactor and other equipment caused by long term operation, approve the extension pursuant to the provisions of paragraph (2) only when it is deemed that it conforms to the standards stipulated by the Nuclear Regulation Agency as a standard for ensuring safety.

Ordinance Concerning the Installation and Operation of Commercial Power Reactors

Before revision (before September 27, 2017)
Article 113 Pursuant to the provisions of paragraph (4), Article 43-3-32 of the Act, an individual who intends to obtain approval for extension of the period during which it is possible to operate a nuclear reactor for power generation as set forth in paragraph (1) of the same Article shall submit to the Nuclear Regulation Authority an application stating the matter listed below within one year to one year and three months before the expiration of said period. (Following text omitted)

After revision (from September 28, 2017)
Article 113 Pursuant to the provisions of paragraph (4), Article 43-3-32 of the Act, an individual who intends to obtain approval for extension of the period during which it is possible to operate a nuclear reactor for power generation as set forth in paragraph (1) of the same Article shall submit to the Nuclear Regulation Authority an application stating the matter listed below from the day one year before the end of said period to the end of said period. (Following text omitted)

2-2. Discussion on Interpretation and Implementation of Laws Concerning Extension of the Operation Period

Regarding the interpretation and implementation method of the law concerning the extension of the operation period of nuclear power plants, the Nuclear Regulation Authority has made remarks suggesting their view during press conferences and the review process, and there are also various opinions made by the Nuclear Regulation Authority's international advisors and academic experts. Below, we will outline discussions by relevant parties concerning extension regulations for nuclear power plants.

(1) International Advisors to the Nuclear Regulation Authority

The Nuclear Regulation Authority has appointed international advisors[3] consisting of intellectuals with experience at the top of the nuclear regulatory agencies of the United States, the United Kingdom, and France, and holds opinion exchange opportunities as necessary. In November 2015, the members of the Nuclear Regulation Authority exchanged opinions with Mr. Lacoste, Mr. Meserve, and Mr. Weightman, who are international advisors, and after exchanging opinions, the Nuclear Regulation Authority received in writing from the international advisors an opinion consisting of five items concerning the Nuclear Regulation Authority.[4]

One of the five items from the international advisors concerns the provisions and implementation of the approval renewal procedure for reactor operation, and it urges the Nuclear Regulation Authority to improve its current handling. Specifically, the international advisors raised two points: (1) applications for license renewal cannot be made unless the licensee waits until 15 months before the expiration of a current license and (2) the result of an uncompleted inspection inevitably leads to a suspension of operations.[5] The international advisors, based on a comparison to the regulations concerning applications for extension of the operating period of nuclear reactors as stipulated by the United States Nuclear Regulatory Commission (hereinafter referred to as "NRC") (10C.F.R 2.109(b)), concluded that Japan's related laws and regulations need to be adjusted.

[Opinion from the International Advisors: License Renewal (partial excerpt)[6]]

But we understand that under the pertinent Japanese statute a licensee is allowed to apply for license renewal no earlier than 15 months before the expiration of an existing license. And then, if the renewal is not granted before the license expiration, the processing of the renewal application is terminated and the NPP must be decommissioned. In our view, the terms governing license renewal are very problematical. The prohibition on filing for license renewal until 15 months before the expiration of the initial term allows only a small window for review. This puts pressure on the NRA to turn to license renewal at a time when other work may have higher priority. Moreover, licensees need to plan ahead to assure the capacity to provide power to customers and thus there is a legitimate need to know far in advance of license expiration whether a licensee can rely on the continuing operation of a nuclear unit. By way of comparison, the USNRC allows a renewal application to be filed up to 20 years before the end of a license term. The consequence of a failure to complete the review – necessary shutdown – also seems inappropriate. The NRA is now overwhelmed with the work associated with restart applications and the rigid deadline for completing license renewal adds an additional burden. In any event, it seems unfair to penalize licensees if the NRA is unable to complete its work in the narrow window that is provided. The USNRC regulations state that, if a licensee files an adequate renewal application at least five years before the expiration of its current license, it may continue to operate the plant after the expiration of its current license until the NRC completes its review. 10 C.F.R. 2.109(b). This allowance for continued operation if a timely application has been filed serves to alleviate any adverse consequences if the review of license renewal is delayed. Of course there always has to be a valid safety case to allow the plant to continue to operate. Adjustment of statute governing license renewal seems appropriate to us.

In response to the above opinion from the international advisors, the Nuclear Regulation Authority expressed its view in the

[3] The name and work experience of the international advisors are as follows.
Andre-Claude Lacoste (Former Chairman of ASN)
Richard A. Meserve (Former Chairman of the NRC)
Michael Weightman (Former Chief Inspector of Nuclear Installations and head of the ONR)

[4] Nuclear Regulation Authority, "Concerning Opinions from International Advisors," April 13, 2016 <http://www.nsr.go.jp/data/000146894.pdf> (Accessed August 31, 2018)

[5] In Japan, there are no expressly laid out laws, government ordinances, or documents prepared by the Nuclear Regulation Authority, etc. stipulating the handing in cases where the license cannot be renewed by the expiration date, and, in all actuality, it is considered that there is room for discussion to a considerable extent concerning the legal validity of terminating the review.

[6] Nuclear Regulation Authority, "Concerning Opinions from International Advisors," pp. 5-6, April 13, 2016 <http://www.nsr.go.jp/data/000146894.pdf> (Accessed August 31, 2018), *emphasis added by the author

"Concerning Opinions from International Advisors" issued on April 13, 2018, that the they do not see the current situation as a problem due to the following two reasons.[7]

(1) When approving an extension of the operation period, the first condition is that the nuclear power facility under consideration conforms to the latest regulatory standards. Currently, although this conformity inspection takes time, there are no restrictions on the application period for it.

(2) The international advisors view that "a licensee is allowed to apply for license renewal no earlier than 15 months before the expiration of an existing license" as a problem, but as the inspection for extension approval demands clarity that soundness can be maintained for the extension period (a maximum of 20 years), on the premise that an application for conformity assessment has been made, time is not assumed to be a problem with regards to conducting inspections for extension approval.

The Nuclear Regulation Authority states in (1) that "Currently, although this conformity inspection takes time, there are no restrictions on the application period for it." However, at the time of this paper's writing, with regards to the approval for extension of the operation period for Tokai No. 2, time is required not just for the conformity inspection but also for the inspection for extension approval, putting the inspection in the situation where its completion might not be feasible within the current approval period. For this reason, among the Authority's responses to the international advisors, (1) does not match the actual state of the application for approval of an extension of the operation period.

Furthermore, the Nuclear Regulation Authority, regarding the provision in (2) that "a licensee is allowed to apply for license renewal no earlier than 15 months before the expiration of an existing license," amended said provision (Article 113 of the Commercial Reactor Ordinance) on September 28, 2017, to make it possible to apply for approval extension after obtaining the results of a special inspection performed by the operator after 35 years have elapsed since the start of operations.[8]

(2) Japan Society of Maintenology

In September 2014, the Japan Society of Maintenology established the "Subcommittee for Study of the 40 Year Limit to the Operation Period of Nuclear Power Plants," and after seven rounds of discussions by experts, published the "Investigative Report Regarding the 40 Year Limit to the Operation Period of Nuclear Power Plants in Japan"[9] (hereinafter referred to as "the report") in March 2015. Regarding the process for application to extend the operation period, the report presents views similar to those of the Nuclear Regulation Authority's international advisors and proposes remedial measures.

a. Application Period for Approval to Extend the Operation Period

The Japan Society of Maintenology, in the report, states that "In the current system, when applying for approval to extend the operation period, based on Article 113 of the Commercial Reactor Ordinance, the application must be made from one year and three months to one year prior to the end of the operation period, after which the inspection will end within a period of one year and permission to extend the operating period must be received." Based on this, it is pointed out that "For the operators of electric utilities that operate nuclear power plants, the questions of whether operation beyond 40 years is approved, or whether it is possible to continuously operate the plant beyond the 40 year mark by systematically dealing with the case where additional equipment and facilities are required, are important matters in terms of mid- to long-term supply plans for business management

[7] Same as the above, p. 2

[8] Nuclear Regulation Authority, "Partial Revision of Ordinance Concerning the Installation and Operation of Commercial Power Reactors, Regarding the Application Procedure for Extension of the Operating Period," September 20, 2017, <http://www.nsr.go.jp/data/000203704.pdf> (Accessed August 31, 2018)
As the Nuclear Regulation Authority did not state the reason for this regulation change in their published materials, the purpose for this regulation change cannot be confirmed from the Authority's official records.

[9] Japan Society of Maintenology, "Investigative Report Regarding the 40 Year Limit to the Operation Period of Nuclear Power Plants in Japan," pp. 38-43, March 2015, <http://www.jsm.or.jp/jsm/images/at/sll/sll-1.pdf> (Accessed August 31, 2018)

and making decisions for capital investment. Therefore, it is considered that the current system does not provide foresight for those points and requires a review."

In addition, after exemplifying the regulations established by the United States Nuclear Regulatory Commission (hereinafter referred to as "NRC") as a good case, which states, "Applications for renewal are set to be from 20 to 5 years before the renewal deadline so that electric utility operators can operate their business with foresight," the report proposes, regarding the application period for permission to extend the operation period in Japan, that, "It is desired that revisions be made similar to the license renewal application in the United States so that applying will be possible from an early stage, several years or more before the expiration of the operation period."[10]

b. Authorization Deadline for Approval of Applications for Extension of a Plant's Operation Period

The Japan Society of Maintenology, regarding the authorization deadline for approval of applications for extension of a plant's operation period, points out the problem that "Approval must be obtained in the approximately one year inspection period, but if the examination extends over a long period of time and approval cannot be obtained by 40 years after the start of operation, it is predicted that the inspection will be terminated at that point and the plant will not be able to continue operations."

Additionally, looking at the application from a practical viewpoint, it is noted that "In particular, together with the application for permission to extend the operation period, for plants that apply for approval to install/change facilities or for authorization to plan new construction in order to be in compliance with new regulatory standards, they must receive approval to install/change facilities or authorization to plan new construction before applying for permission to extend the operation period. Considering the period required up until now for conformity inspections for new regulatory standards, an inspection period of approximately one year is considered to be too short. It seems that this situation was not anticipated in July 2013 when the law was enacted."

Furthermore, using as a good example the case of the United States, where "There is a provision that allows continued operation until the NRC issues a judgment, if an application for renewal is properly made five years in advance of when an operation license is set to expire," the Japan Society of Maintenology makes a recommendation that "For plants that have already submitted an application for extension of the operation period and whose inspection is ongoing, even if the expiration of the 40 year period is passed, the inspection should be continued and the plant should receive approval to extend the operation period."[11]

c. Improvement Plan Concerning Procedures for the Operation Period Extension Approval System

In the various discussion points of the above a. and b., and in Article 22 of the "Supplemental Resolution to the House of Councillors Act for Establishment of the Nuclear Regulation Authority," regarding the system of restricting the operation period to 40 years, it is clearly stated that it should be consistent with existing measures for aging nuclear power plants. Additionally, Article 23 of the same resolution states that, "In the process of reviewing the revised Reactor Regulation Act, it should be created as a regulatory system consistent with international standards and trends based on the latest scientific and technical knowledge, in order to promptly examine and improve the effectiveness of nuclear safety regulations." In light of this point, the Japan Society of Maintenology makes the following recommendations[12] as points of improvement for the procedures, etc. of the approval system for extension of the operation period (author's excerpts of main points only).[13]

- The time period when it is possible to apply for permission to extend the operation period should be made to start several years before the 40-year operation mark. (Revision to the Commercial Reactor Ordinance)
- In conformity to this, the timing of the approval by the Nuclear Regulation Authority to be issued should also be modified to enable it to be issued as soon as the inspection has been completed.
- For plants that are applying for permission to extend the operation period, it should be clearly stated that in the case where the inspection period stretches past the 40-year expiration date without being completed, the inspection can still be

[10] Same as the above, pp. 40-41
[11] Same as the above, pp. 41-42
[12] Same as the above, p. 42
[13] Same as the above, p. 43

continued beyond the 40-year mark and approval procedures can be handled. (Revision to the Reactor Regulation Act)

(3) Nuclear Regulation Authority

At the time of this paper's writing, there are no documents under review that have been issued by the Nuclear Regulation Authority concerning the handing of cases in which the operation period expires for a nuclear power plant that is under inspection. On the other hand, at meetings of the Nuclear Regulation Authority and at press conferences, etc., Nuclear Regulation Authority members have made several remarks that they are mindful of the handling of cases where the operation period expires while an inspection is in progress.

For example, regarding the application for extension of the operation period of Tokai No. 2,[14] submitted on November 24, 2017, Commissioner Shinsuke Yamanaka (in charge of the application for extension of Tokai No. 2's operation period) said, at a meeting held on April 11, 2018 about the application for extension of Tokai No. 2's operation period, that "As we continue the inspection going forward, April and May will be an extremely important time, and if there are no further answers or no answer seems possible, we should consider the necessity of continuing the inspection. If an application is submitted at the last minute, the inspectors will not be able to see it. I will report on this point again at the Nuclear Regulation Authority meeting but I request that you also consider it."[15]

At the Nuclear Regulatory Authority Chairman's regular press conference held on April 11, 2018, Chairman Toyoshi Fuketa opened his remarks with regards to the application for extension at Tokai No. 2, "I would like to refrain from referring to the individual points on which we have not yet reached a final decision concerning the approval," followed by saying, "I think that April and May will be a very significant period, and the situation will be extremely serious if we do not have a proper outlook by around the end of May or the beginning of June." In addition, in response to questions from reporters seeking supplementary remarks regarding Commissioner Yamanaka's previous comments, Chairman Fuketa responded by saying "I think that it is fine to accept Commissioner Yamanaka's words the way they are at face value, but of course we do not want to do things that will end because of a time limit or deadline, if possible. Whether it is permitted or not, or approved or not, this is a technical issue, and, just like all of us, as many people have exerted a great deal of effort, we will do our best to reach a solid conclusion. Having said that, as the system has a deadline, and I believe that Commissioner Yamanaka meant that it would be extremely regrettable if we were unable to reach a result or a conclusion as a result forcing an exceedingly heavy burden on the staff here at the Authority. Therefore, as Commissioner Yamanaka said, I think that April and May will be the turning point." Regarding the remaining work, he said "As regards time and the authorization of planning and construction, if essential discussions remain beyond the summer, being realistic, I think it won't be possible in terms of time. For example, if we are discussing an item about which we do not have a common understanding regarding the method of evaluation, and if we are doing it in the coming summer, then it will not be physically possible."[16]

Additionally, at the Nuclear Regulatory Authority Chairman's regular press conference held on May 9th, the month after the above statements were made, Chairman Fuketa regarding the inspection for extension of the operation period at Tokai No. 2 said that, "We have nearly come to the time when, depending on the circumstances, we must make a big decision."[17]

(4) Various Points of Discussion and Issues

As stated above, the revised Reactor Regulation Act was enacted in 2013, and from the introduction of the system for extending the operation period of nuclear power plants to the present day, various stakeholders, including the Nuclear Regulation Authority,

[14] The Japan Atomic Power Company, "Tokai No. 2 started operations on November 28, 1978 (Power Generation Results since the Start of Operations for the Tokai No. 2 Power Station," <http://www.japc.co.jp/plant/data/results/tokai2.html> (Accessed August 31, 2018)) The end of November 2018 will mark 40 years since the start of operations at Tokai No. 2.

[15] Nuclear Regulation Authority, Minutes of the 2nd Meeting of the 2018 Nuclear Regulation Authority, pp. 23, April 11, 2018 <http://www.nsr.go.jp/data/000227129.pdf> (Accessed August 31, 2018)

[16] Nuclear Regulatory Authority, Minutes of the Nuclear Regulatory Authority Press Conference, pp. 2-4, April 11, 2018 <http://www.nsr.go.jp/data/000226921.pdf> (Accessed August 31, 2018)

[17] Nuclear Regulatory Authority, Minutes of the Nuclear Regulatory Authority Press Conference, p. 5, Wednesday, May 9, 2018 <http://www.nsr.go.jp/data/000229796.pdf> (Accessed August 31, 2018)

have made many comments concerning the application for extension of the operating period. The main points of the various comments are summarized as the following two points, namely, (1) the pros and cons of the limited to three month application period for application to extend the operation period and (2) the handling of the case where a nuclear power plant being inspected for extension of the operation period reaches the 40th year since its pre-use inspection while still being under inspection.

Regarding (1) among the above points, the Nuclear Regulation Authority amended the Commercial Reactor Ordinance on September 28, 2017, and the scope of the submission period was relaxed.[18] Therefore, it is considered that, going forward, for nuclear power plants that are aiming to apply for extension, the problems caused by the time restraint have been relieved to a certain extent. On the other hand, as far as (2) is concerned, consensus among stakeholders has yet to be established.

It is a factor causing the stagnation on the discussion of (2) that the assertions from both sides, the Nuclear Regulation Authority, which suggests the termination of inspections, and those who received the Authority's suggestion and are opposed to its handling, have been developed without quoting the basic provisions of the Reactor Regulation Act (Article 43-3-32), which should be the discussion's starting point otherwise. Due to such a condition, they have been discussing at cross purposes, which is considered to have affected the progress of the discussion of (2) to a considerable extent.

As for the Nuclear Regulation Authority, if there is a case where Tokai No. 2 reaches its 40th year since the pre-use inspection while still being under inspection, the Authority will handle the case only by “suggesting” the termination of the inspection on a verbal basis through a member of the Authority. The Nuclear Regulation Authority has not clearly stated the point that the termination of inspections in the case where they do not meet the deadline is the official view of the Authority, and regarding the grounds for that case, has not explicitly shown the legal interpretation of the Reactor Regulation Act. Meanwhile, those who oppose the termination of inspections do not quote the Reactor Regulation Act as a basis for their assertions, and neither side, both those who support and those who oppose termination, has reached a state where they make points based on the legal interpretations of the Act.

Similarly, with respect to the adequacy of the implementation of the system for extending the operation period, none of the stakeholders has shown their legal interpretations and considerations regarding the Article 43-3-32 of the Reactor Regulation Act, which should be the prerequisite for any debate. Mutual understanding between the two, therefore, does not advance, and in fact, the current situation is such that both sides are merely presenting their respective desired implementation forms. Going forward, in order for both parties to have a constructive debate, they first need to show their legal interpretations that should serve as the starting point for their argument, and a change in the approach of both sides will be required.

2-3. Legal Interpretation of the Reactor Regulation Act

As described in the previous section, in order to make the discussion more constructive in the case where the initial period of authorized operation of a nuclear reactor has expired while applying for extension of the operation period, it is considered useful as a ground of discussion identify the legal basis and then consider its interpretation. Therefore, we will identify provisions in the law concerning application for extension of the operation period and consider possible legal interpretations.

(1) Legal Provision Concerning the Application for Extension of the Operation Period of Nuclear Power Plants

The legal provisions concerning the application for extension of the operation period of nuclear power plants are stated in

[18] The pre-revision "one year and three months before" was relaxed to "from the day that results are obtained from a special inspection performed by the operator after 35 years have elapsed since the start of operations, until the day one year before the day the current license expires." The Nuclear Regulation Authority, in the No. 2 entry of the "Opinions and their Rationale Concerning (1) Partial Revision of the Ordinance Concerning the Installation and Operation of Commercial Power Reactors, Regarding the Application Procedure for Extension of the Operating Period (Draft)" table of Appendix 1 to "Concerning the Partial Revision of Ordinance Concerning the Installation and Operation of Commercial Power Reactors, Regarding the Application Procedure for Extension of the Operating Period," dated September 20, 2017, said that "Regarding applications for approval to extend the operation period, as we have been requesting that special inspections be carried out after 35 years have elapsed since the start of operations. As it is stipulated that applications cannot be made until, at a minimum, the result of the special inspection has been obtained, there is naturally a limit to the period when an application can be submitted. As was pointed out, this does not mean that applicants can apply any number of years in advance without limitation."
<http://www.nsr.go.jp/data/000203704.pdf> (Accessed August 31, 2018)

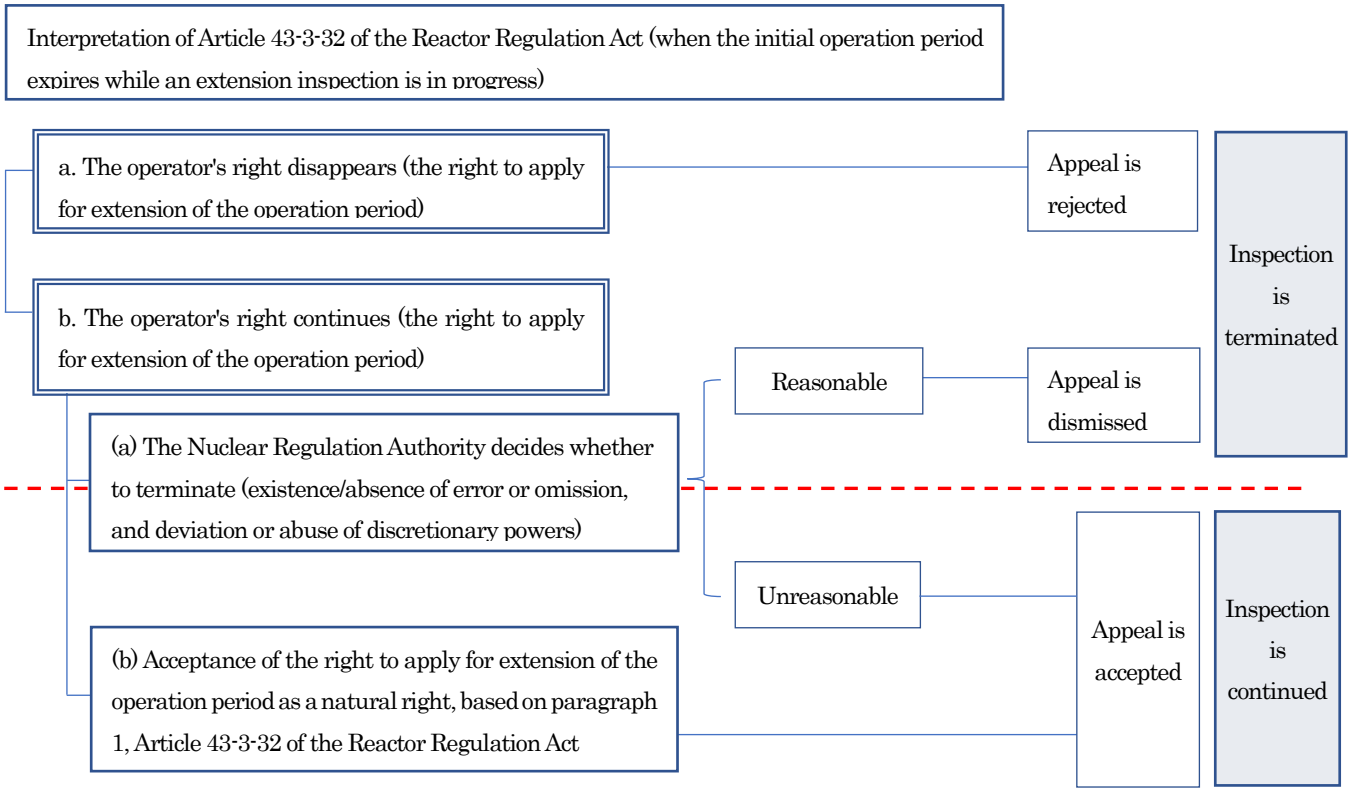
Article 43-3-32 of the Reactor Regulation Act. Paragraph 1 of the same Article states that, "The period during which the installer of a nuclear reactor for power generation can operate the nuclear reactor for power generation shall be forty years starting from the day when the inspection under paragraph (1) of Article 43-3-11 for the installation of the nuclear reactor for power generation in question is successfully completed." (hereinafter referred to as the "initial operation period"), and in the second paragraph stating, "The period set forth in the preceding paragraph may, upon expiration and with the approval of the Nuclear Regulation Authority, be extended only once."[19]

The above paragraph 2 does not specify the details on how to handle the case in which the initial operation period expires while an inspection is in progress, and this paragraph is the only provision in the law concerning the extension of the operation period of nuclear reactors.

(2) Possible Interpretation with Regards to Article 43-3-32 of the Reactor Regulation Act

Possible interpretations with regards to Article 43-3-32 of the Reactor Regulation Act can be broadly divided into two categories, which are: a., the operator's right disappears (the right to apply for extension of the operation period), and b., the operator's right continues (the right to apply for extension of the operation period).

In interpretation a., even if the operator filed an appeal in court seeking the continuation of the inspection for extension of the operation period, the court would decide that the appeal had no merit and would reject it. Interpretation b. can be further split into two broad categories: (a) the case where the right or wrong of the Nuclear Regulation Authority's judgment on the termination of inspections is considered a matter of dispute, and (b) the case where it is confirmed that applying for extension of the operation period is the operator's natural right under the provisions in paragraph 1, Article 43-3-32 of the Reactor Regulation Act. (See the below figure). In the below section, we will explain each case regarding the application right for extension of the operation period.



a. Interpretation that the Operator's Right Disappears (the right to apply for extension of the operation period): Inferences Based on Past Precedent from the Mining Act

By way of inference from precedent for the Mining Act, it can be interpreted that, for the case in which the initial operation period expires while an inspection is in progress, the operator's right to extend the operation period disappears. According to the

[19]Article 43-3-32, Reactor Regulation Act

decision with respect to the Mining Act by the Sapporo District Court on February 26, 1973, once the period has expired, there is not a right (interest) that is protected by law without an application for extension having already been made, and the appeal was rejected due to no interest being present (the appeal was also rejected by a higher court). The court decision that the mining rights disappear when the period for the mining rights expires (24:00 of the day in question) then became final and binding. As such, for the operation of nuclear power reactors, it can be interpreted that the "right" to operation will disappear in the same way when the period expires.[20]

Meanwhile, comparing the Reactor Regulation Act with the Mining Act, Article 20 of the Mining Act stipulates that "If the application prescribed (in paragraph (2) of Article 18) is filed, the prospecting right shall be deemed to remain effective until the application is refused or the extension is registered, even after the expiration of duration thereof," while the Reactor Regulation Act stipulates inspections for the extension of operation without setting such a provision. Thus, it can be interpreted that, for extension of the operation period for nuclear power plants, even if an inspection is in progress, the right disappears in conjunction with the termination of the period, and that extension inspections will be terminated.

Mining Act

(Duration of Prospecting Right and Extension Thereof)

Article 18 (1) The duration of prospecting right shall be two years from the date of registration (or four years in the case of prospecting for oil or combustible natural gas)

(2) The period prescribed in the preceding paragraph may be extended twice by the application filed by the holder of prospecting right at the expiration of the period.

(3) The period extended each time pursuant to the provision of the preceding paragraph shall be two years.

(4) The application prescribed in paragraph (2) above shall be filed pursuant to the procedures prescribed by the Ordinance of the Ministry of Economy, Trade and Industry within a period from the day six months before the expiration of duration to the day three months before the expiration of duration.

Article 20 If the application prescribed in paragraph (2) of Article 18 is filed, the prospecting right shall be deemed to remain effective until the application is refused or the extension is registered, even after the expiration of duration thereof.

As stated above, if it is assumed that the right to apply for extension of the operating period of a nuclear power plant will disappear while an inspection is in progress, then a decision by the court given to an appeal by the operator for an injunction against the termination of an inspection is assumed that an appeal from the operator would be rejected.

This is because, according to inference from the provisions of the Mining Act above, the right is deemed to disappear immediately,[21] even if an inspection is in progress. In the case that the extension inspection is to be terminated, if the operator were to seek revocation, invalidation or injunction, it then becomes a question of whether the operator has the interest for an appeal. However, if the expiration of the operation period has been reached at that point, the right, which is the appeal's premise, would be understood to have already disappeared as stipulated by the law and judged as such.

b. Interpretation that the Operator's Right Continues (the right to apply for extension of the operation period)

[20] Although the nature of rights under the Mining Law and the "period during which it is possible to operate a nuclear reactor for power generation" under the Reactor Regulation Act are considered to be different in nature, because it seems likely that the court will affirm the right of operation as a business operator's right (a part of the right to operate a business), we considered that the concept of the period in the judicial precedent on the Mining Act could be applied to a way of thinking about the "period during which it is possible to operate a nuclear reactor for power generation" under the Reactor Regulation Act.

[21] The term "disappearance of a right," as used herein, may refer to the disappearance of the right of operation or the disappearance of the right to apply for inspection, but as the right to apply for inspection itself is interpreted as being attendant upon the right of operation, there is no need to discuss this point separately.

Under the premise that inferring the application of provisions regarding the disappearance of rights of the Mining Act does not apply to the regulation of nuclear reactors, and based on the interpretation that the operator's right (the right to apply for extension of the operation period) continues,[22] the interpretation can be split into two broad categories, as stated before, namely: (a) the case where the Nuclear Regulation Authority's judgment on whether to termination inspections becomes a matter of dispute, and (b) the case where inspections are continued as the natural right of the operator under the provisions in paragraph 1, Article 43-3-32 of the Reactor Regulation Act.

(a) Issue of Whether the Nuclear Regulation Authority Decides to Terminate Inspections

As long as the operator's right to the extension of operation and the right associated with the application do not disappear with the expiration of the period, it can be considered that the operator has an interest for appeal in regards to the termination of inspections. In this case, the court takes a position understanding that the law does not schedule the aforementioned rights to disappear with the expiration of the period, and after acknowledging the interest for an appeal, it will judge whether to accept or dismiss the operator's appeal regarding the question of the termination of inspections for operation extension. The criteria for the judgment will be discussed below.

As regulatory activities are part of the executive, this question should be reviewed with a focus on the Nuclear Regulation Authority's decision on termination of inspections for extension, and the point as to whether there were any errors/omissions or deviation/abuse of discretionary powers in the process of the said decision. If it is deemed that there were no errors/omissions or deviation/abuse of discretionary powers in the Nuclear Regulation Authority's inspection process, then the termination of inspections will be deemed reasonable and the operator's appeal would be dismissed.

On the contrary, suppose it is deemed that there are errors/omissions or absence/abuse of discretionary powers in the Nuclear Regulation Authority's inspections. For example, in the cases where the delay in inspections for operation extension is attributed to the responsibility of the Nuclear Regulation Authority, or where there are flaws in the inspection process (procedural flaws including flaws that result in delays), then the inspection would not be immediately terminated due to the expiration of the initial operation period, and there would be a possibility that the extension of inspections will be approved.

Furthermore, in cases where inspection has required a long time despite operators' early application, the operators will suffer a significant disadvantage if they are deprived of their rights in conjunction with the termination of inspections at the expiration of the initial operation period. Alternatively, if special circumstances, such as the termination of inspections being contrary to public welfare, are acknowledged, the Nuclear Regulation Authority will continue inspections for the application to extend the service period, despite the expiration of the initial operation period, and when the inspections end and approval is received, there is a possibility that the operation period can be extended.

However, considering the fact that the inspection period requires a significant amount of time, the above handling shall be approved only if the operator applies to the Nuclear Regulation Authority for extension of the operation period while there is still a reasonable margin period (sufficient period).[23] [24]

[22] The legal system related to the Reactor Regulation Act and the legal system related to the Mining Act are essentially different, and taking into account that the Mining Act and judicial cases concerning the Mining Act do not refer to general industrial regulation, it can be interpreted that the operator's right continues (the right to apply for extension of the operation period).

[23] However, as with Tokai No. 2, before the revision of the Commercial Reactor Ordinance on September 20, 2017, for nuclear power reactors that needed to apply, it was unfeasible under the provisions at the time to leave a sufficient period until applying, so there is a possibility that it may be interpreted as having different circumstances to nuclear power plants that will enter the application period after the revision.

[24] In judging whether there is absence or abuse of the Nuclear Regulation Authority's discretionary powers, it is important to bear in mind that the Nuclear Regulation Authority's discretionary rights and their degree must be discussed. Regarding specialized technical fields such as the establishment of regulatory standards to ensure the safety of nuclear reactors, a wide range of knowledge in the natural sciences if required, from nuclear physics to seismology, meteorology, and even radiology. As it is considered extremely difficult for the court to take into account all the scientific knowledge and draw a conclusion within a certain time if an appeal is brought regarding the fitness of regulatory standards for nuclear power reactors, it seems that there is a certain rationality then when understanding the broad discretion given to the Nuclear Regulation Authority with its high degree of expertise in this field (the court should respect the judgment of the Nuclear Regulation Authority unless there are obvious flaws in the regulatory standards created by the Nuclear Regulatory Authority). On the other hand, as to whether the review process was appropriate, that is, whether the entire executive process was implemented in accordance with fair procedures, or the decision of whether or not the executive judgment process was dominated by a "democratic atmosphere," rather than requiring a high degree of expertise in the natural sciences, it

(b). Acceptance of the Right to Apply for Extension of the Operation Period as a Natural Right, Based in paragraph 1, Article 43-3-32 of the Reactor Regulation Act

As stated in 2-3(1), paragraph 1, Article 43-3-32 of the Reactor Regulation Act stipulates that "The period during which the installer of a nuclear reactor for power generation can operate the nuclear reactor for power generation shall be forty years starting from the day when the inspection under paragraph 1, Article 43-3-11 for the installation of the nuclear reactor for power generation in question is successfully completed for the first time." Upon this stipulation, the second paragraph states that, "The period set forth in the preceding paragraph may, upon expiration and with the approval of the Nuclear Regulation Authority, be extended only once."[25]

There is no provision, even going through the entire Reactor Regulation Act, that stipulates that the inspection for extension of the operation period must be completed by the time the initial operation period expires. Also, paragraph 2 of Article 43-3-11 stipulates the time when extension of operation is approved as "upon expiration." Thus, in the case where the operator has, "upon" expiration of the initial operation period, already "applied for approval to the Nuclear Regulation Authority" in accordance with paragraph 4 of the same Article, the time when extension of operation is approved can also be interpreted as the time when the Nuclear Regulation Authority completes their inspection (including the period beyond the initial operation period).

Although not premised on the administrative handling of the application, the stipulation "until the expiration of the period" exists in the Civil Execution Law. Such a wording is not used in the Reactor Regulation Act, and as "upon" expiration is generally interpreted to be when expiration is "reached," it can also be understood as referring to a certain period before and after the expiration. In that sense, the operator is naturally considered to have the right to continue receiving the inspection for extension of the operation period even after the initial operation period has expired, so the inspection for extension of operation will be allowed to continue.

Civil Execution Law
Article 107 (1) An administrator shall pay expenses under the provisions of paragraph 1 of the preceding Article, calculate the amount of money to be allotted to liquidating distribution, etc. for each period specified by the execution court, and implement the liquidating distribution, etc.
(2) In cases where there is only one obligee or in cases where there are two or more obligees and it is possible to fully perform

seems likely that these processes will be judged in light of their lawful implementation of the Reactor Regulation Act, so the discretion of the Nuclear Regulation Authority can be regarded as limited.*

The above discussion and thinking have mainly been considered through discussions on the "restart" of nuclear power plants before they have reached 40 years of operation, and the question of how much discretion the Nuclear Regulation Authority is afforded with regards to the inspections for "extension of operation" of nuclear power plants must be considered separately. Nevertheless, in the inspections for extension of operation, if it is considered that the inspections will be conducted similarly to the safety inspections for the restart of a nuclear power reactor, it can be said that the Nuclear Regulation Authority is granted a certain amount of discretion, even if it is of a different degree.

However, it can be said that the way this judgment is made is similar to when a nuclear power reactor is restarted (that is, in the narrow sense of discretion), or, alternatively, that since the inspection for extension of operation is for the purpose of continuing to operating a facility in which a certain amount of time has passed since it was newly established, in terms of safety, unlike facilities that have not yet reached the 40 year mark, a careful examination is required, and regarding the discretion for judgment concerning the required safety inspections, more so than for applications to restart a nuclear power reactor, it will be left for future consideration whether judgment factors such as "socially accepted ideas" are taken into account.**

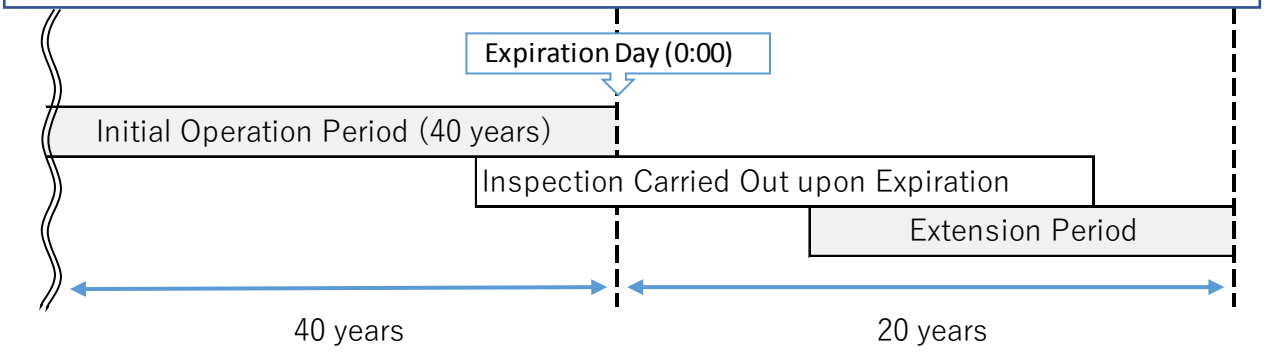
* However, if we suppose that the Nuclear Regulation Authority does not have any discretion when it comes to the interpretation of the law in regards to inspections, then the right itself for the Nuclear Regulation Authority to conduct inspections based on the law does not exist in the first place. For this reason, it is considered that while the discretionary power with regards to the legal interpretation for the Nuclear Regulation Authority exists, it is passive and is considered to be the minimum necessary for practical use. (Yoshinaga Kosaki (1987), “Safety Assessment at the Stage of Authorizing Installation of a Nuclear Reactor,” Hanrei Times, No. 362, pp. 4-7, author's reference based on precedent)

**Originally, the premise of operation extension was based on nuclear reactor technology that, through the replacement of parts and periodic inspections, was to allow operations to resume with safety equivalent to that of newly installed reactors, and in that respect, there is no essential difference of technical significance between 40, 60, 80, or 100 years of operation. However, acknowledging the existence of socially accepted ideas, there should be a considerable difference in the inspection method, safety, and so forth for a newly installed nuclear reactor and a nuclear reactor that has been in operation for 40 years, and in the case where the court presupposes such "socially accepted ideas" for the latter, the court's judgment may respect the judgment of the Nuclear Regulation Authority.

[25] Reactor Regulation Act, Article 43-3-32 *emphasis added by the author

the claims and execution costs of the respective obligees with the money to be allotted to liquidating distribution, etc., the administrator shall deliver payment money to the obligee(s) and deliver any surplus to the obligor.
(3) Except in the cases prescribed in the preceding paragraph, if an agreement was reached among the obligees with regard to liquidating distribution of the money to be allotted to liquidating distribution, etc., the administrator shall implement liquidating distribution in accordance with such agreement.
(4) The obligees who are to receive liquidating distribution, etc. shall be the following:
(i) The obligee(s) effecting a seizure who falls under any of (a) to (c) below:
(a) An obligee who has filed a petition for compulsory administration by the time of expiration of the period set forth in paragraph 1.
(b) An obligee who has filed a petition for the execution against earnings from secured real property prescribed in Article 180 (ii) for exercise of a general statutory lien by the time of expiration of the period set forth in paragraph 1.
(c) An obligee who has filed a petition for the execution against earnings from secured real property prescribed in Article 180 (ii) by the time of expiration of the period set forth in paragraph 1 (excluding the obligee set forth in (b) above) where such petition is based on a security interest that has been registered (including provisional registration for preservation prescribed in Article 53 (2) of the Civil Preservation Act) prior to registration of the seizure pertaining to the first commencement order for compulsory administration
(ii) The obligee(s) effecting a provisional seizure (limited to an obligee who has filed a petition for execution of a provisional seizure through compulsory administration by the time of expiration of the period set forth in paragraph 1).
(iii) Obligees who made a demand for liquidating distribution by the time of expiration of the period set forth in paragraph (1)

Diagram of Acceptance of the Right to Apply for Extension of the Operation Period as a Natural Right, Based on paragraph 1, Article 43-3-32 of the Reactor Regulation Act



(3) Influence that Statements by Commissioners, etc. of the Nuclear Regulation Authority can have on a Trial

As indicated in 2-2. (3), Commissioners of the Nuclear Regulation Authority, at the Authority's various official meetings and press conferences, have made remarks multiple times suggesting the termination of inspections as the handling in cases where the initial operation period expires while an inspection is in progress. However, although the Nuclear Regulation Authority has expert technical discretion in formulating regulatory standards on technical safety, their discretion in interpreting the law is restricted. Based on this point, even if the Nuclear Regulation Authority suggests "ways of thinking," etc., they are not "conventions/customs" that can be accepted in a trial, but they are mere expressions of interpretation of the Nuclear Regulation Authority, which cannot be considered as grounds for an interpretation of the law.

In the past, remarks from Commissioners of the Nuclear Regulation Authority were asserted in court (for details, refer to the Kagoshima District Court's April 22, 2015 decision[26] and the Miyazaki Branch of the Fukuoka High Court's April 8, 2016

[26] "Provisional Disposition for Injunction Against Operation of Sendai Nuclear Power Plant," Heisei 26 (Yo), No. 36, Kagoshima District Court

decision[27]), but such remarks are not accepted as having an effect on the trial.

Although the possibility of the Nuclear Regulation Authority publishing an interpretation of the termination of inspections as an administrative document cannot be denied, administrative documents generally do not have legally binding force, while they do possess various legally binding force (restraints). Even if this is not merely an administrative document, but an internal regulation (administrative regulation) that binds the relevant administrative agency, the legal binding force of internal regulations also varies. For this reason, even if the remarks here and documents based on these remarks are made public, it cannot necessarily be said that they would work to the benefit of the Nuclear Regulation Authority in a trial.

Rather, due to disadvantages from their comments and published documents, in the case where the practical atrophic effects of inspection termination are brought about, it is also possible to file suit for an injunction against the Nuclear Regulation Authority's actions.

Kagoshima District Court Decision, April 22, 2015 (excerpt)

The obligees point out, in connection with the rationality of the new regulatory standards, that Chairperson B of the Nuclear Regulation Authority made remarks that the approved conformity to new regulatory standards does not guarantee safety. The obligees then assert that Chairman B has acknowledged that "safety" is not guaranteed even if the conformity to the new regulatory standards is confirmed by the Nuclear Regulatory Authority.

In this regard, the content reported as remarks by Chairman B at the Authority's press conference on July 16, 2014 is as mentioned in (1) a (c) – namely, regarding the approval issued on the same day by the Nuclear Regulatory Authority for the draft inspection report (Defendant's Exhibit No. 2) concerning the nuclear reactor facility in this appeal, Chairman B made remarks that, "I will not say that it is safe" and "I cannot say that we have done everything we could do"; if only these remarks are looked at without considering any contexts, then there may be a possibility that they can be understood in the way as brought forth by the obligee.

However, prior to this, Chairman B indicated the basic idea (Plaintiff's Exhibit No.137) on the positioning of new regulatory standards as described in (1) a (c) as his own idea. In his idea, on the premise that guaranteeing "absolute safety" for the use of nuclear power reactors is infeasible, and while recognizing the importance of continuously increasing safety, he seemed to be concerned about the establishment of a new "safety myth" that the Nuclear Regulation Authority's judgment on the suitability of new regulatory standards would guarantee the "absolute safety" of the nuclear power plant in question. Therefore, his own idea mentioned above contained the sentences that, "The Nuclear Regulation Authority plays a role in confirming whether a nuclear power plants meets regulatory standards and explaining the safety level achieved by the result" and "The Nuclear Regulation Authority must stipulate regulations that mirror the latest scientific knowledge of the time and ones that can actually be realized. On the other hand, operators must always aim to achieve a safety level higher than the regulations. As a result of the two working together, continuous safety improvement will be achieved." These suggest that it was also the understanding of Chairperson B that securing a certain degree of safety by regulation under the new regulatory standards was regarded as a premise. (omitted)

According to the above, the meaning of the word "safety" in Chairman B's remarks that "I will not say that it is safe" should be taken to mean "absolute safety," and the purpose of these remarks should also be understood in the way that the Nuclear Regulation Authority's approval of the draft inspection report with regards to the nuclear reactor facility in this appeal does not mean that absolute safety has been guaranteed. Therefore, it should be said that the above comments by the obliges distort the intended meaning of Chairman B and are not appropriate.

Miyazaki Branch of the Fukuoka High Court Decision, April 8, 2016

Decision, April 22, 2015
<http://www.courts.go.jp/app/files/hanrei_jp/509/085509_hanrei.pdf> (Accessed August 31, 2018)

[27] "Immediate Appeal Against Rejection of Provisional Disposition for Injunction Against Operation of Sendai Nuclear Power," Heisei 27 (Ra), No. 33, Miyazaki Branch of the Fukuoka High Court Decision, April 8, 2016

"The appellants intend to use the Chairman Tanaka's remarks at the July 16, 2014 press conference as evidence that the new regulatory standards are insufficient to ensure the safety of nuclear power plants, but with the current standard of science and technology, it is impossible to accurately predict the timing and degree of an earthquake's ground motion that will occur, and even conforming to the new regulatory standards in that sense, it is inevitable that there will be remaining risks that an earthquake exceeding the standards might occur and cause damage to the soundness of nuclear power reactor facilities. Chairman Tanaka's above remarks should be understood in this sense, and therefore it is infeasible to accept the above claims of the appellants."

(4) Necessity of Discussion Based on the Legal Interpretation

As mentioned above, the situation surrounding the discussion regarding the application procedure for extension of the operation period for nuclear power plants is that both sides, those who argue for and against the termination of inspections, are developing their respective arguments without presenting any legal grounds. If both parties discuss the existing Reactor Regulation Act on the premise that there is only the one option of terminating inspections in terms of interpretations, it is a concern that all discussion points converge to "the necessity or lack thereof for revisions to the Reactor Regulation Act," and that this will reduce the room for discussion by both parties on the legal interpretation of the existing law.

In light of these points, as a starting point for the discussion between both parties, those for and against the termination of inspections for the extension of the operation period, it is important to recognize the ambiguity of provisions of the current Reactor Regulation Act and the existence of room for interpretation. In addition, based on the point that, in the short term, as the matter cannot be resolved via revision of the law through consideration of the necessary period, etc., it is important for the operators and other stakeholders to discuss reasonable legal interpretations among themselves while referencing the various statements of other laws (such as the Mining Act and Civil Execution Act, etc. mentioned above). In the medium to long term, in addition to the above efforts to eliminate the ambiguity of the Reactor Regulation Act, it is desirable that discussions on topics including revisions to laws and regulations, etc. are held.

3. Systems for Extension of the Operation Period in Other Countries

In the previous section, regarding the discussion on the procedures for application for extension of the operation period of nuclear power reactors in Japan, we outlined the viewpoints of those for and against termination of inspections and of the legal interpretations. In the following section, we analyze related laws in the United States, France, England, Canada and South Korea[28] as example cases from foreign countries, and also analyze differences with Japan.

3-1. The United States

(1) Application Period

The period of application for extension of the operation period of a nuclear power reactor in the Unites States is stipulated in the Code of Federal Regulations (CFR) Title 10 Chapter I Part 54.17. As this provision does not allow for application for approval of extension of operation earlier than 20 years before the current license expires, the license application can be made from the point 20 years before the current license expires or later.

§ 54.17 Filing of application. [29]

(c) An application for a renewed license may not be submitted to the Commission earlier than 20 years before the expiration of the operating license or combined license currently in effect.

[28] The top five countries with nuclear reactors, excluding China, Russia and Ukraine. These countries were excluded from the comparison considering the low average age of nuclear power reactors in the case of China, and the large differences in the general design of nuclear reactors and ideas about safety between Russia/Ukraine and Japan and the above five countries.

[29] U.S Government Publishing Office, Code of Federal Regulations Title 10 – Energy Chapter I - NUCLEAR REGULATORY COMMISSION (CONTINUED) Part 54 - REQUIREMENTS FOR RENEWAL OF OPERATING LICENSES FOR NUCLEAR POWER PLANTS, <https://www.gpo.gov/fdsys/pkg/CFR-2014-title10-vol2/pdf/CFR-2014-title10-vol2-part54.pdf > (Accessed August 31, 2018)

(2) Handling in Cases Where Inspections Have Not Ended Before Expiration of the Initial Operation Period

The provision concerning application for extension of the operation period of a nuclear power plant in the United States is stipulated in CFR Title10 Part 2.109.

> § 2.109 Effect of timely renewal application.[30]
> (b) If the licensee of a nuclear power plant licensed under 10 CFR 50.21(b) or 50.22 files a sufficient application for renewal of either an operating license or a combined license at least 5 years before the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined.

In paragraph (b) of the provision, as it is stipulated that "If the licensee of a nuclear power plant [...] files a sufficient application for renewal of either an operating license or a combined license at least 5 years before the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined," inspections will be continued even in cases where the inspection for operation extension takes considerable time and exceeds the initial operation period, and meanwhile, the operation can continue to operate the nuclear power plant.

(3) Upper Limit on the Operation Period

The length of extensions to the operation period for nuclear power reactors in the United States are stipulated in CFR Title10 Chapter I Part 54. The initial license period of 40 years can be extended, for a period not to exceed 20 years, upon obtaining approval for extension from the NRC (§ 54.31 Issuance of a renewed license). In the United States, an upper limit on the number of times that extension of the operating period can be renewed is not stipulated.[31]

> § 54.31 Issuance of a renewed license.
> (b) A renewed license will be issued for a fixed period of time, which is the sum of the additional amount of time beyond the expiration of the operating license or combined license (not to exceed 20 years) that is requested in a renewal application plus the remaining number of years on the operating license or combined license currently in effect. The term of any renewed license may not exceed 40 years.

3-2. France

(1) Application Period

An application for extension of the operation period of a nuclear power reactor in France can be filed by the operator five years before the expiration of the current license. The operator can start requesting that the French Nuclear Safety Authority implement a comprehensive orientation one year before the date when they can apply, and it is possible to hold a meeting in advance with the French Nuclear Safety Authority about the items to be reviewed.[32]

(2) Handling in Cases Where Inspections Have Not Ended Before Expiration of the Initial Operation Period

In France, a system to regularly review the safety of nuclear reactor facilities has been introduced via Periodic Safety Reviews (PSR), which are conducted every 10 years since the start of operations. Regulations with respect to guaranteeing the safety of nuclear facilities, including the implementation of PSRs every 10 years, stipulated in "ACT No. 2006-686 of 13 June 2006 on

[30] U.S Government Publishing Office, Code of Federal Regulations Title 10 – Energy § 2.109 (b), <https://www.gpo.gov/fdsys/pkg/CFR-2018-title10-vol1/xml/CFR-2018-title10-vol1-sec2-109.xml> (Accessed August 31, 2018)
*emphasis added by the author

[31] U.S Government Publishing Office, Code of Federal Regulations Title 10 – Energy Chapter I - NUCLEAR REGULATORY COMMISSION (CONTINUED) Part 54 - REQUIREMENTS FOR RENEWAL OF OPERATING LICENSES FOR NUCLEAR POWER PLANTS, <https://www.gpo.gov/fdsys/pkg/CFR-2014-title10-vol2/pdf/CFR-2014-title10-vol2-part54.pdf> (Accessed August 31, 2018)

[32] Autorité de sûreté nucléaire(2015), NPP Periodic Safety Reviews (PSR) in France, pg. 14, <http://www.ensreg.eu/sites/default/files/FR%20-%20PSR%20in%20France%2004-2015%20v1.pdf> (Accessed August 31, 2018)

Transparency and Security in the Nuclear Field," and in paragraph 2, Article 29 of the Act, "The licensee of a basic nuclear installation carries out periodic safety reviews of his installation by taking account of the best international practices" and "Safety reviews take place every ten years" are stipulated.[33]

Other than the provision stipulating the implementation of PSRs every 10 years, there is no provision restricting the start or end period of safety review procedures. Additionally, in the case that the safety review has not been completed within 10 years, there is no provision that can be interpreted as a permanent closing down of the path to resuming operation for the facilities for said reactor (e.g. the facilities for said reactor will be immediately considered as decommissioned).

Paragraph 2, Article 41 of the Act stipulates that "When an installation or an operation subject to authorization, approval or notification is created, operated or carried out without having been the subject of said authorization, approval or notification, the Nuclear Safety Authority serves a notice on the concerned party to regularize his situation," and as such, "by a reasoned decision, it can suspend the operation of the installation or the execution of the operation until the notification has been filed or until a ruling has been made on the authorization or approval application." Under the condition that the safety review will not be completed by the deadline, and if the operator "continues operations" at the nuclear facility, they are considered to be in violation of the provision. However, in the above provision, the suspension period is limited until the proper procedure is completed by a reasonable decision.

Therefore, in France, even if the safety review does not become completed within the period, this does not seem to lead to the situation where the immediate decommissioning of nuclear reactor facilities is required or where the resuming of the operation of a nuclear reactor facility becomes permanently impossible.

(3) Upper Limit on the Operation Period

In France, there is no legal lifetime for nuclear power plants, and nuclear power plant reactors whose safety at the time of extension has been certified by PSRs every 10 years can continue to operate for another 10 years after authorization.[34]

3-3. The United Kingdom

(1) Application Period

There is no specific provision stipulated by laws and regulations regarding the application period for application to extend the operation period of nuclear power plants in the United Kingdom.

However, the Office for Nuclear Regulation (ONR), encourages operators to engage in preliminary discussions with the ONR about the latest regulatory standards, etc. regarding PSRs. The ONR lists an advantage of holding the early dialogue with operators as having a chance to grasp discussion points of the PSR method made by the operators in an early stage, while the operators can also obtain advice on the discussion points regarding PSR from the regulatory authorities.[35]

In the information disclosure documents concerning PSR published by the ONR, it is actually possible to confirm cases in which past preliminary discussions about PSRs were used to smoothly extend applications. For example, in the PSR applications for Hinkley Point B and Hunterston B made by British Energy Group plc. (Currently EDF Energy, hereinafter referred to as "BE") in 2006, BE and the regulatory authority conducted preliminary discussions before the PSR application was submitted, and it is recorded that the deadline for PSR submission by BE was set for 2005 as a result of the consultation.[36] [37]

[33] OURNAL OFFICIEL DE LA RÉPUBLIQUE FRANÇAISE, (2006) "LOI no 2006-686 du 13 juin 2006 relative à la transparence et à la sécurité en matière nucléaire (1)" <https://www.legifrance.gouv.fr/jo_pdf.do?id=JORFTEXT000000819043> (Accessed August 31, 2018)

[34] Research Organization for Information Science and Technology, Extension of the Lifetime of Nuclear Power Plants in France (14-05-02-13), <http://www.rist.or.jp/atomica/data/dat_detail.php?Title_No=14-05-02-13> (Accessed August 31, 3018)

[35] ONR(2015), *Nuclear Future,* Volume10 issure6, Periodic safety review, <http://www.onr.org.uk/documents/2015/nuclear-future-article.pdf> (Accessed August 31, 2018)

[36] Health and Safety Executive, HINKLEY POINT B AND HUNTERSTON B PERIODIC SAFETY REVIEW PROJECT OVERVIEW REPORT OF NII FINDINGS AND DECISION ON CONTINUED OPERATION, p.2, <http://www.onr.org.uk/periodic-safety-review/hinkley-huntb.pdf> (Accessed August 31, 2018)

[37] The actual application by BE was submitted in 2006, delayed about three months from the plan.

(2) Handling in Cases Where Inspections Have Not Ended Before Expiration of the Initial Operation Period

PSR implementation in the UK is based on the Nuclear Installations Act 1965.[38] The Act states that "No site may be used in GB for the purpose of installing or operating a nuclear reactor or prescribed nuclear installation unless a license has been granted by ONR and is in force."[39] In addition, article 15 of the license terms of the license granted to each operator requires each license holder to periodically and systemically perform a safety review, with the ONR performing the main PSR inspection, and if the design standards, both from the time of licensing approval and the latest versions thereof, are met, then operation will be permitted to continue.[40]

The PSR itself is not an inspection for license renewal or continuation/discontinuation, but is an inspection for the operational advisability of a nuclear reactor. Therefore, even if the PSR inspection does not end by the expiration of the permissible operation period (normally 10 years), which was set by the previous PSR, decommissioning is not required, and the operator is only required to shut down the nuclear reactor until the PSR is completed.

Since licenses in the United Kingdom do not have a defined expiration period, they do not lapse unless the ONR approves an application from the operator for license discontinuance or the ONR deprives the operator of their license.

(3) Upper Limit on the Operation Period

In the United Kingdom, as there are no laws or regulations concerning the operation period, nuclear power plant reactors whose safety at the time of extension has been certified by PSRs every 10 years can continue to operate for another 10 years after authorization.[41]

3-4. Canada

(1) Application Period

Specific provisions stipulated by laws and regulations regarding the application period for application to extend the operation period of nuclear power plants in Canada could not be confirmed.[42] On the other hand, as will be described later, there are cases where operations were resumed at nuclear power plants that had been inactive for an extended period after receiving permission for extension of operation from the Canadian Nuclear Safety Commission (CNSC). It appears that license discontinuance does not mean decommissioning and a flexible license application is possible.

[Example of Extension of the Operation Period for a Nuclear Power Plant that was Inactive for an Extended Period[43]]
Four Pickering (A) power plants and four Bruce (A) power plants, which began commercial operations in the 1970s, lost economic efficiency due to an increase in administrative expenses and low equipment utilization rate, and from 1995 to 1998 all eight units were put into a state of inactivity.
Regarding the Bruce (A) power plant, Bruce Power L.P., the proprietor, spent $720 million Canadian dollars on improvement and repair work for Units 3 and 4, and resumed operations at Unit 4 in October 2003 and at Unit 3 in January 2004.
As for the Pickering (A) power plant, the proprietor, Ontario Power Generation Inc., performed backfitting, with a total budget

38 ONR, Nuclear Safety Technical Assessment Guide, p.2,
<http://www.onr.org.uk/operational/tech_asst_guides/ns-tast-gd-050.pdf> (Accessed August 31, 2018)

39 ONR, Licensing Nuclear Installations 4th edition: January 2015, p.13,
<https://www.google.co.jp/search?q=GB+%E8%A8%B3&oq=GB%E3%80%80%E8%A8%B3&aqs=chrome..69i57.4670j1j7&sourceid=chrome&ie=UTF-8> (Accessed August 31, 2018)

40 Same as the above, p.18

41 Research Organization for Information Science and Technology, Development of Nuclear Power Generation in England (14-05-01-02)
<http://www.rist.or.jp/atomica/data/dat_detail.php?Title_No=14-05-01-02> (Accessed August 31, 2018)

42 For details concerning the process for application to extend the operation period of nuclear power plants in Canada, please see CNSC,RD-360: Life Extension of Nuclear Power Plants, < http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/rd360/ > (Accessed on August 31, 2018). In the regulation, no information could be confirmed regarding the deadline for applications or the handing in cases where the initial operation lifetime expires while an inspection for extension of the operation period is in progress.
In addition, we carried out research to see if there was any information related to the Canadian laws and regulations with regards to the above, but could not confirm any additional materials. As such, this item is under investigation at the time of writing this paper.

43 Research Organization for Information Science and Technology, Useful Life of Nuclear Power Plants in Major Countries (02-02-03-13)
<http://www.rist.or.jp/atomica/data/dat_detail.php?Title_No=02-02-03-13> (Accessed August 31, 2018)

of $1.1 billion Canadian dollars, and decided to start operations. Operations resumed at Unit 4 in September 2003, and at Unit 1 in August 2005.

(2) Handling in Cases Where Inspections Have Not Ended Before Expiration of the Initial Operation Period[42]

There is no provision concerning the definite handling of cases in which the license period expires while the inspection is ongoing. However, even at a nuclear power plant that has been inactive for an extended period of time, operations can be resumed through obtaining approval for extension of operations from the CNSC. Therefore, license discontinuance does not mean decommissioning of the reactor at a nuclear power plant.

(3) Upper Limit on the Operation Period

We could not confirm the legal provisions concerning the upper limit on the operation period for nuclear power plants in Canada.[44]

3-5. South Korea

(1) Application Period

The application period for extension of the operation period of nuclear power plants in South Korea is from five to two years before the initial design life is reached (Enforcement Decree of the Nuclear Safety Act, Article 36 (4)).[45]

Article 36 (Timing, etc. for Periodic Safety Reviews)

(4) Notwithstanding paragraph (2), when any operator of a nuclear power reactor intends to continue to operate reactor facilities after the design lifespan of the reactor facilities expires (hereinafter referred to as "continuous operation"), he/she shall submit a review report within two to five years before the base date for review which is the date of expiration of the design lifespan (including every 10th anniversaries thereafter).

(2) Handling in Cases Where Inspections Have Not Ended Before Expiration of the Initial Operation Period

Article 39 of the Enforcement Decree of the Nuclear Safety Act stipulates that regulators should complete the review within 18 months of application for extension of operation made by the operator. However, it is stipulated that the period of time required for revisions or supplements by the operator to the application is not subject to the above period. Therefore, if revisions or supplements by the operator to the application are necessary, then the inspection period will be extended beyond 18 months.

As an example of the initial operation period expiring while the inspection is still in progress, Wolsong Unit 1 may be mentioned. Wolsong Unit 1, operated by Korea Hydro & Nuclear Power Co., Ltd., submitted in 2009 an application for extension of the operation period, but as the inspection took an extended period of time, the design lifetime was reached in 2012 and operations were halted. Then, in 2015, the regulatory authority authorized the extension of operators until 2022.[46]

Article 39 (Periods for Examining Periodic Safety Review Reports)

(1) Upon receipt of a review report submitted under Article 36 (2) or a review report submitted paragraph (4) of the same Article, the Commission shall examine it and notify the relevant person of the results of the examination within 12 months, and 18 months, respectively.

(2) None of the following periods shall be included in the calculation of the period for examination:

[44] Same as the above

[45] Enforcement Decree of the Nuclear Safety Act, <https://elaw.klri.re.kr/eng_service/lawView.do?hseq=44163&lang=ENG> (Accessed August 31, 2018)

[46] South Korea's Nuclear Safety and Security Commission Approves Extension of Operations at Wolsong#1, *Nuclear Power Industry Newspaper,* No. 2757, March 5, 2015, Page 3, <http://www.jaif.or.jp/news_db/data/2015/0305-03-05.html> (Accessed August 31, 2018)

1. A period required to supplement or correct a review report;
2. A period additionally required for compelling reasons, such as testing for verifying safety.

(3) Upper Limit on the Operation Period

In South Korea, the regulations that the regulatory authorities should base their actions on are the Nuclear Safety Act[47] and the aforementioned Enforcement Decree of the Nuclear Safety Act. However, neither of them contains wording that stipulates an upper limit on the operation period of nuclear power plants. In South Korea, there is no legal lifetime for nuclear power plants, and nuclear power plant reactors whose safety at the time of extension has been certified by safety reviews every 10 years can continue to operate for another 10 years after authorization (However, if the inspection is not completed before the expiration of the initial operation period, then the excess is deducted from the extension period of 10 years).

3-6. Comparison of the Extended Systems for Extension of the Operation Period in Each Country

The provision of the period during which it is possible to apply to extend the operation period of nuclear power plants varies greatly across different countries – 20 years before the expiration of the current approval in the United States, 5 years before the expiration of the current approval in France and South Korea, and no explicit provision in the United Kingdom and Canada. Until the revision of the Commercial Reactor Ordinance on September 20, 2017 by the Nuclear Regulation Authority's decision, the application period in Japan was set to be from one year to one year and three months before expiration, which stands out in the international comparison as an extremely short period. With the revision to the Commercial Reactor Ordinance, the provision was changed and currently, it is possible to apply from the day that results are obtained from a special inspection performed after 35 years have elapsed since the start of operations. (Note, however, that even after the amendment, Japan's regulation does not allow applications to be made until the period closest, among the comparable countries, to when the current authorization period expires)

In comparison with comparable countries, the regulatory authority in the United Kingdom and France recommends, before application is made by an operator, pre-application meetings between the regulatory authority and the operator where they can discuss points emphasized by the regulatory agency in the inspection, the inspection schedule, and other matters. Matching recognition through active dialogue between the regulatory authority and the operator about important matters in the period before an operator creates their application in earnest is considered to be an initiative that contributes to facilitating the inspection process and realizing more effective inspections, which is therefore deemed to be a useful effort to refer to in other countries.

As for the handling of the case in which inspections are not completed by the time the initial authorization period expires, there are clearly stipulated provisions in the United States in which if an application for renewal of operation authorization has been appropriately completed, then the operation authorization will not be deemed to have expired until the NRC issues a decision on the application. Meanwhile, as for the other five countries, there are no clearly stipulated provisions in legislation.

Of the five countries that have no clearly stipulated provisions, for Canada and South Korea, the regulatory authority approves the extension of operation for a nuclear power plant after the initial operation period has expired, and as there are examples of the resumption of operations at nuclear power plants, it can be ascertained from past treatment that inspections will not be terminated even after the initial operation period expires.

In regards to the United Kingdom and France, a firm judgment cannot be made as actual examples of operation being approved could not be confirmed, as in the case of Canada and South Korea. Nevertheless, according to the relevant laws and regulations in the United Kingdom and France, there are no stipulations that can be interpreted as enabling the termination of inspections by the regulatory authority's decision in cases where the inspection does not end before the expiration of the initial operation period. Therefore, it is assumed with a fair degree of certainty that operations are carried out in a similar manner to Canada and South.[48]

[47] Nuclear Safety Act, Korea Institute of Nuclear Safety, <http://www.kins.re.kr/en/img/global/pdf/Nuclear_Safety_Act.pdf> (Accessed on August 31, 2018)

[48] There is no legal operating lifetime in both the United Kingdom and France, and regarding PSRs, it is not an inspection that identifies the pros and cons of extending the operation of a nuclear reactor, but it is positioned as an inspection required for continued operation of a nuclear reactor. Thus,

(As for the handling in Japan, as stated in 1., there is no provision clearly stipulated in the law, and although there are various suggestions, etc. from the regulatory authority, the definite handling is unknown.)

○Applications and systems about lifespan extention. (The top 6 countries holding nuclear reactors excluding China, Russia and Ukraine.)

	Japan	United States	France	United Kingdam	Canada	Republic of Korea
Filing Period of Claim for Review	［Before Sep-27,2017］ Period between 1 year 3 months before and 1 year before license expiration ［After Sep-28,2017］ 1 year before the license expiration	Period between 20 years before and 5 years before license expiration	From 5 years before license expiration. Note1:No substantive enactment about time limit for submission. Note2: Licensee can hold the meeting with Nuclear Safety Authority(ASN) to discuss about review process and schedule during the period between 5 years before and 6 years before license expiration.	No substantive enactment Note:Licensee can hold the meeting with The Office for Nuclear Regulation(ONR) to realize efficient and effective reviewing process.	No substantive enactment Note:Even the NPPs in length shutdown can file for the license renewal.	2 to 5 years before
Treatment when the license renewal procedure is delayed and the license is expired.	No substantive enactment. Note1:Dr.Fuketa,Chairman of NRA implied that NRA will reject the filing about lifespan expansion of Tokai Daini Nuclear Power Plant, because NRA cannot complete the review for the license renewal by 40 year's time limit. Note2:The Asahi Shimbun reported that if NRA rejects the reviewing process,Tokai Daini Nuclear Power Plant is forced to be permanent shutdown.	If the licensee of a nuclear power plant licensed under 10 CFR 50.21(b) or 50.22 files a sufficient application for renewal of either an operating license or a combined license at least 5 years before the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined.	No substantive enactment. There is No substantive provisions which require permanent shutdown of the NPPs. Note: If NPP's operator use NPP without valid lisence,ASN can direct to shotdown NPPs.Even in such case,shotdown period is only the period until the operator get valid lisence. 'LOI n° 2006-686 du 13 juin 2006 relative à la transparence et à la s écurité en matière nucléaire (1)' Article 41	No substantive enactment. There is No substantive provisions which require permanent shutdown of the NPPs. ※Reviews for lifespan extension are based on Nuclear Installations Act 1965. It is expected that offenders of the law get penalties such like fines,imprisonment and licence deprivation according to the degree of culpability.	No substantive enactment. There is No substantive provisions which require permanent shutdown of the NPPs.	No substantive enactment. There is No substantive provisions which require permanent shutdown of the NPPs.
Legal lifespan of NPPs	40years Note: It is possible to expand the lifespan to 60 years under the license authorised by Nuclear Regulation authority.	40years Note1: It is possible to expand the lifespan to 60 years under the Subsequent License Renewal(SLR) authorised by Nuclear Regulation Committee. Note2: It is possible to expand the lifespan to 80 years under the 2nd SLR.	No legal limit for the lifespan of NPPs. Note: Safety of the lifespan expansion is certificated by PSR which held every 10 years.	Same as the left.	No legal limit for the lifespan of NPPs. Note: It is possible to expand the lifespan under the license authorised by uclear Canadian Nuclear Safety Committee.	No legal limit for the lifespan of NPPs. Note: Safety of the lifespan expansion is certificated by PSR which held every 10 years.

even if a PSR does not end within the deadline, the reactor in question will not be considered to have reached the end of its lifetime (although operation will not be permitted). (For details, refer to 3-2 and 3-3)

○Applications and systems about lifespan extention. (The top 6 countries holding nuclear reactors excluding China, Russia and Ukraine.)

	Japan	United States	France	United Kingdam	Canada	Republic of Korea
Filing Period of Claim for Review	[Before Sep-27,2017] Period between 1 year 3 months before and 1 year before license expiration [After Sep-28,2017] 1 year before the license expiration	Period between 20 years before and 5 years before license expiration	From 5 years before license expiration. Note1:No substantive enactment about time limit for submission. Note2: Licensee can hold the meeting with Nuclear Safety Authority(ASN) to discuss about review process and schedule during the period between 5 years before and 6 years before license expiration.	No substantive enactment Note:Licensee can hold the meeting with The Office for Nuclear Regulation(ONR) to realize efficient and effective reviewing process.	No substantive enactment Note:Even the NPPs in length shutdown can file for the license renewal.	?please tell me
Treatment when the license renewal procedure is delayed and the license is expired.	No substantive enactment. Note1:Dr.Fuketa,Chairman of NRA implied that NRA will reject the filing about lifespan expansion of Tokai Daini Nuclear Power Plant, because NRA cannot complete the review for the license renewal by 40 year's time limit. Note2:The Asahi Shimbun reported that if NRA rejects the reviewing process,Tokai Daini Nuclear Power Plant is forced to be permanent shutdown.	If the licensee of a nuclear power plant licensed under 10 CFR 50.21(b) or 50.22 files a sufficient application for renewal of either an operating license or a combined license at least 5 years before the expiration of the existing license, the existing license will not be deemed to have expired until the application has been finally determined.	No substantive enactment. There is No substantive provisions which require permanent shutdown of the NPPs. Note: If NPP's operator use NPP without valid lisence,ASN can direct to shotdown NPPs.Even in such case,shotdown period is only the period until the operator get valid lisence. 'LOI n° 2006-686 du 13 juin 2006 relative à la transparence et à la s écurité en matière nucléaire (1)' Article 41	No substantive enactment. There is No substantive provisions which require permanent shutdown of the NPPs. ※Reviews for lifespan extension are based on Nuclear Installations Act 1965. It is expected that offenders of the law get penalties such like fines,imprisonment and licence deprivation according to the degree of culpability.	No substantive enactment. There is No substantive provisions which require permanent shutdown of the NPPs.	?please tell me
Legal lifespan of NPPs	40years Note: It is possible to expand the lifespan to 60 years under the license authorised by Nuclear Regulation authority.	40years Note1: It is possible to expand the lifespan to 60 years under the Subsequent License Renewal(SLR) authorised by Nuclear Regulation Committee. Note2: It is possible to expand the lifespan to 80 years under the 2nd SLR.	No legal limit for the lifespan of NPPs. Note: Safety of the lifespan expansion is certificated by PSR which held every 10 years.	Same as the left.	No legal limit for the lifespan of NPPs. Note: It is possible to expand the lifespan under the license authorised by uclear Canadian Nuclear Safety Committee.	?please tell me

4. Conclusion and Further Topics

The procedures for extension of the operation period of nuclear power plants in Japan is prescribed in the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors." Regarding the operation period of nuclear power plants, Article 43 of the Reactor Regulation Act stipulates that it is for 40 years from the date the pre-use inspection is successfully passed, which can be extended, once only, for a period not exceeding 20 years. However, there is no clear provision for handling the case in which the initial operation period expires while the inspection is ongoing.

Concerning this handling of the situation, while the Nuclear Regulation Authority has made remarks suggesting the termination of inspections, the Nuclear Regulation Authority's international advisors and the Japan Society of Maintenology have expressed opposition to the termination of inspections, creating the situation where opinions among stakeholders are largely divided. In the present situation, both parties continue to express their views with respect to their desired handling without presenting their legal interpretation of the Reactor Regulation Act as a basis for their arguments. This, regardless of the long-term debate of both parties, seems to be behind the situation that the debate regarding the pros and cons of terminating inspections is not progressing in the least.

In this paper, in recognition of the above problem, we have examined the legal interpretation regarding application for extension of the operation period, as laid out in the Reactor Regulation Act, and revealed that that either interpretation, for either termination or continuation of inspections, superficially appears to be possible. In addition, as a countermeasure for the short-term situation, based on the point that consideration of the necessary period will prevent us from resolving the matter of the necessary period via revision of the law, etc., we have pointed out that it is important to discuss the reasonable legal interpretation of the current law while referring to the wording of other laws and regulations, instead of expanding upon a polarizing argument by both parties for or against the termination of inspections.

Additionally, in order to examine medium to long-term measures that can take into account revision of the law as an option, we have compared Japan's procedures for extension of the operation period with those of the United States, France, the United Kingdom, Canada and South Korea. According to the comparison, it has been found that (1) Japan's period in which an application can be made is the shortest among the six countries compared, and that (2) excluding Japan, there is no country among the five countries that opts to terminate inspections in the case where the initial operation period expires while an inspection is in progress.

Of course, the point that, from an international comparison, Japan's handing of the operation period extension inspections is unique is merely a fact, and with that point alone, it is impossible to immediately decide that it is necessary to review the law, etc. as a long-term response. However, taking into account the magnitude of the impact that termination of the inspection for extension of a nuclear power plant's operation period would have on the operations of the plant operator and eventually the national economy, it is not considered appropriate that regulatory authorities independently make consequential decisions regarding inspections while there is no consensus among stakeholders. Despite these views, if Japan still continues to stick to its own way of handling the operation period extension inspections different to international standards based on its own judgement, it will be necessary to prove the rationality for such a decision.

In this paper, in relation to the extension of a nuclear power plant's operation period, we have analyzed the legal interpretation and implementation of the current law from the perspective of international comparison. However, in order to make a more accurate understanding regarding the ideal way for the extension application of the operating period, interdisciplinary discussions, such as to the scientific safety of extending the operation period of nuclear reactors, in addition to further deepening the discussion on laws and regulations by experts, are required. With regards to this matter, it is desirable to aim for further understanding involving experts in various fields, such as law and engineering.