

Plan to Achieve Mid to Long-term Objectives  
of the Japan Atomic Energy Agency (JAEA)  
(Mid to Long-term Plan)

(April 1, 2015 - March 31, 2022)

Approval: April 1, 2015

Approval for Changes: March 3, 2016

Approval for Changes: April 1, 2016

Approval for Changes: April 1, 2017

Japan Atomic Energy Agency (JAEA)

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## Introduction

In accordance with the provisions in Article 35-5 of the Act on General Rules for Incorporated Administrative Agencies (Act No. 103 of 1999), the Japan Atomic Energy Agency (hereinafter referred to as, “Agency”), a National Research and Development Agency, shall create a plan to achieve mid to long-term objectives from April 1, 2015 to March 31, 2022 (hereinafter referred to as, the “Mid to long-term plan”)

## Preface

JAEA was launched in October 2005 as the only comprehensive nuclear R&D institute in Japan that includes activities from basic and fundamental research on nuclear power to project R&D on the major premises of peaceful use, securing safety and trust from society in accordance with the Atomic Energy Basic Act (Act No. 186 of 1955).

Since then, JAEA has conducted operations focusing on four major projects in the 1st and the 2nd medium periods based on the nuclear energy, science and technology policies of Japan: “R&D on FBR cycle technology” and “R&D on high-level radioactive waste disposal,” which aim at the establishment of the nuclear fuel cycle essential to secure mid to long-term energy in Japan, “R&D on nuclear fusion,” which aims at future energy source development in international collaboration research and “R&D on quantum beam application,” which is expected to develop new fields of science and technology and support industry etc., through various applications of radiation. In addition, after the “accidents at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company” on March 11, 2011 (hereinafter referred to as, the “accident at Fukushima Daiichi Nuclear Power Station”), we have considered the recovery and reconstruction from the accident and have actively worked on them, making the most of our scientific and technical expertise.

On the other hand, in the 2nd medium objectives period, the defect of maintenance and management of the fast-breeder reactor “MONJU” (hereinafter referred to as, “MONJU”) and the radioactive material leak at Japan Proton Accelerator Research Complex (J-PARC) led to a fundamental revision of the organization and operations of JAEA. Therefore, based on the “Reform Plan of Japan Atomic Energy Agency” (JAEA, September 2013; hereinafter referred to as, “JAEA reform plan”) formulated by JAEA itself in light of the “Basic Direction of the Reform of Japan Atomic Energy Agency” (MEXT Headquarters for Reforming JAEA on August 2013; hereinafter, the

“basic direction of the reform”), we have carried out reform of JAEA (hereinafter referred to as “JAEA reform”) to enhance management functions, secure safety and develop a safety culture, streamline operations and establish a safe and independent operation management system for “MONJU”. As part of this and from the viewpoint of affinity and potential of comprehensive R&D on quantum science research, the Agency decided to separate part of R&D on nuclear fusion and applied research on quantum beams from JAEA and integrate them into the National Institute of Radiological Sciences (NIRS) (A new national research and development agency, Japan Agency for Quantum and Radiological Science and Technology (QST) was established in April 2016).

JAEA shall consider results gained during the periods for the 1<sup>st</sup> and the 2<sup>nd</sup> medium-term objectives and remorse over defects of maintenance and management of “MONJU,” and maximize R&D results while making its best effort to tackle challenges shown in the 3<sup>rd</sup> mid to long-term objectives to contribute to the development of nuclear science and technology. Specifically, JAEA shall focus on “responding to the accident at Fukushima Daiichi Nuclear Power Station,” “improving the safety of nuclear power”, “R&D on atomic fundamentals, generic research and developing human resources,” “R&D on Fast-Breeder Reactors (FBR)” and “R&D on reprocessing related to the nuclear fuel cycle and treatment, fuel fabrication and disposal of radioactive waste” based on the energy policies of Japan including nuclear energy and science and technology policies such as “the Basic Energy Plan” (Cabinet decision in April 2014, hereinafter referred to as the “Basic Energy Plan”) and the “Fifth Science and Technology Basic Plan” (Cabinet decision in January 2016, hereinafter referred to as the “Fifth Science and Technology Basic Plan”).

To carry out R&D, the Agency shall not only maximize results of its own R&D as a National Research and Development Agency but will also create revolutionary nuclear science and technology through cooperation with universities and the industrial world and play an intermediary role to implement them in society as well as contribute to the maximization of R&D outcomes in the nuclear science and technology sector across Japan. In addition, the Agency shall promote R&D through effective international cooperation. Moreover, JAEA shall play a critical role in the technical assistance necessary to properly enforce nuclear safety regulations based on “Safety Research in the “Nuclear Regulatory Authority (NRA)” etc. formulated by NRA. Then, we shall share technology and knowledge learned through the accident at Fukushima Daiichi Nuclear Power Station with the world and contribute to the

improvement of safety, the enhancement of disaster prevention functions and the improvement of nuclear security.

JAEA shall enhance management functions and distribute agile and flexible management resources to implement operations. In addition, we shall effectively operate governance and internal control in sectors and continuously improve our operational quality with a proper management control cycle. Moreover, we shall make efforts for organizational and operational reform including making reforms in JAEA take root. Moreover, JAEA shall promote close coordination and cooperation with QST to implement the separated R&D operations smoothly and help create further R&D results. We shall give the highest priority to safety and streamline it as well as actively continuously provide and release information and ensure trust from society and in siting areas. Furthermore, the JAEA shall formulate a mid to long-term facility plan to maintain and develop R&D functions concerning nuclear power in future; under the basic premise of ensuring safety and intentionally enhance safety by concentrating and prioritizing the existing facility, decommissioning and disposing of radioactive waste, complying with new regulation standards for nuclear facilities, taking aging countermeasures and earthquake proofing method.

Based on the above, JAEA shall develop a new mid to long-term plan.

#### I. Measures to Be Taken for Achieving Objectives Concerning Administration of Operations, Which Put Utmost Priority on Safety

To give higher priority to safety than all else, all officers and staff of JAEA shall not only comply with laws and regulations but also take a close interest in safety, consider safety as the highest priority, make the idea take root in the organization and consistently review what the organization should be to put the utmost priority on safety. In addition, we shall constantly strive to improve the nuclear safety of facilities, including “MONJU” and Tokai Reprocessing Plant, which are transiting to the decommissioning stage and projects and manage nuclear materials properly.

The Agency shall sufficiently secure management resources necessary for making these efforts and improve nuclear power safety by incorporating the achievements gained through R&D on nuclear power safety etc. Moreover, JAEA shall build the confidence of the public and communities by releasing accident or incident information and analyze the causes and handling status in a rapid and easily understandable way.

## 1. Matters concerning ensuring safety

Ensuring safety is the top priority for the administration of operations, we stand on the recognition that our own nuclear facilities potentially handle hazardous materials. We shall provide basic items pertaining to safety management, actively promote voluntary safety activities and ensure nuclear safety related to facilities and projects.

We shall make the following efforts in accordance with the policies above:

- Based on the quality policy related to nuclear safety determined by the President, the action policy related to the creation of a safety culture and compliance with laws and regulations, the basic policy for safety and health management and the basic environmental policy, we shall determine an action plan concerning safety securement and continuously make improvements through management reviews etc., by the President. In addition, we shall properly conduct audits etc. and ensure the operation of the management system and continuous improvement.
- Each member of staff shall recognize again the importance and risk of R&D as JAEA mission, continuously work on safety culture creation with a heart always eager to learn safety, improve and ask questions, continuously execute actions to improve staff safety awareness and aim at securing safety culture. At that time, officers who are responsible for their duties shall advance efforts. In addition, we shall try to create a safety culture based on our characteristics as an R&D facility on nuclear power, understand the conditions of JAEA safety culture, monitor the safety culture using knowledge of non-JAEA specialists to understand the conditions of JAEA safety culture, carry out improvements by ourselves and take necessary measures based on the results of monitoring.
- We shall share not only accidents and incidents, but also information contributing to safety improvement rapidly and systematically, rapidly develop a system in the field to lead to effective and efficient improvement, continuously review the situation, regularly verify the state of retention and carry out necessary reviews. In addition, we shall continuously maintain and improve the system and procedure of maintenance and management and responses to emergencies from the viewpoint of ensuring effectiveness. We shall collect information on accidents and incidents and best practice, promote consistency and develop it rapidly and properly as a whole of JAEA and properly comply with new regulation standards in a well-planned and proper



manner. In addition, we shall regularly verify the effects of recurrence prevention measures etc., based on past accidents and incidents and carry out necessary reviews.

- We shall effectively conduct maintenance and management activities based on the aging of facilities, formulate plans to reform and update etc. facilities and equipment and respond to the plan based on priorities. In addition, from a cross-sectional viewpoint, we shall flexibly allocate resources related to safety measures in JAEA.
- To properly conduct emergency response at the time of accidents and incidents, we shall organize a response system etc., concerning the information sharing in JAEA and the provision of information outside of JAEA, improve the system as required and verify the effectiveness in disaster prevention training etc. In addition, we shall continuously review standards to report accident/incident information to relevant organizations and dissemination standards and rapidly provide information that is easy to understand.
- We shall continuously review and strengthen the functions of each division, which unifies the safety in JAEA to effectively and surely implement the efforts as described above.

## 2. Matters concerning nuclear security

As an institution that handles many nuclear materials and radioactive nuclides, we shall comply with international conventions for nuclear security, international agreements such as safeguard agreements and relevant domestic laws and properly manage nuclear facilities and nuclear materials etc. We shall establish an activity policy related to compliance with laws and regulations related to nuclear security and an activity policy related to the development of nuclear security culture, carry out activities in every hub and continuously promote improvement. In particular, we shall improve and strengthen education on opinions and roles of each member of staff for fostering of nuclear security culture, regularly grasp the state of retention and take necessary measures.

In addition, we shall properly perform operations related to the transportation of nuclear fuel materials.

## II. Measures to Be Taken for Achieving the Objectives Concerning the Maximization of the Results of R&D and Improvement of the Quality of any Other Operations

As the only comprehensive nuclear R&D institute in Japan, JAEA focuses on items that can be implemented only by JAEA under proper role sharing with private operators and universities etc., considers safety the highest priority, promotes the following R&D, improves the safety of nuclear power, solves problems resulting from the utilization of nuclear power including the treatment and disposal of radioactive waste, promotes a higher level of nuclear energy utilization, ensures energy resources in Japan, reduces loads on the environment, promotes science and technology, learning and industry and creates innovation.

Especially, we shall not only create achievements only through our own activities but also always be aware of linkages to society to actively contribute to nuclear development and usage all over Japan through our activities, nuclear safety improvement in and out of Japan and the creation of innovation and work on R&D with autonomy as an organization. In addition, we shall engage in operations always from the viewpoints of the public, giving the first priority to the enhancement of understanding and trust of the public.

Furthermore, since atomic research and development requires long-term sustained efforts, we intentionally develop human resources and hands down technology and knowledge in JAEA to promote R&D.

#### 1. R&D in response to the accident at Fukushima Daiichi Nuclear Power Station

The accident at Fukushima Daiichi Nuclear Power Station produced a multitude of globally unprecedented difficult challenges such as decommissioning of the power station, the contaminated water, environmental pollution etc. and R&D are quite important to solve these problems. Therefore, we shall maximize JAEA's human resources and research facilities and focus on what only JAEA can do based on national policies such as the Basic Energy Plan and social needs. We shall surely carry out R&D toward decommissioning of Units 1-4, R&D on responses to the environmental pollution for the reconstruction and revitalization of Fukushima and reinforce the basis of R&D such as the input of research resources in a concentrated manner based on national policies.

In addition, we shall maximize JAEA's total ability and reorganize and use the organization, personnel and facilities of divisions flexibly, effectively and efficiently so that we can flexibly respond to a change in R&D direction

In addition, we shall develop human resources responsible for mid to long-term R&D and related activities as well as coordination among businesses, academia and government and international cooperation with research institutions in foreign

countries. We shall share technologies and knowledge gained through these efforts and contribute to improving safety at nuclear facilities in each country.

JAEA promotes these efforts focusing on or cancelling R&D based on R&D outcomes regarding decommissioning etc. in foreign countries, the progress of decommissioning and the appropriate division of roles with the government, Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF), TEPCO while taking into account government policies and social needs, bringing outcomes and details of each piece of R&D and methods of utilizing them towards putting the decommissioning of the TEPCO Fukushima Daiichi Nuclear Power Station into shape under specific processes and advancing partnerships with relevant organizations.

Furthermore, we shall acquire external funds in carrying out the review.

#### (1) R&D for decommissioning reactors

To decommission TEPCO's Fukushima Daiichi Nuclear Power Station and dispose of the waste, we shall carry out R&D shown in Mid to long-term Roadmap towards the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station Units 1-4 (Nuclear Emergency Response Headquarters/Council for the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station in June 2013; hereinafter, the "Mid to long-term Roadmap towards Decommissioning") established by the government of Japan. In addition, in light of policies such as the strategic plans formulated by NDF and necessities on site from mid to long-term perspectives, we shall put our focus on training and securing human resources, ensuring consistency between basic and fundamental R&D related to fuel debris retrieval, disposal of radioactive waste, clarification of accident progress scenarios and remote operation technology etc. and steadily advance them.

The results gained from this R&D shall support practical technologies including decommissioning, lead to proposals of alternative technologies that may promote processes including decommissioning and contribute to safe and reliable implementation of decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station. In addition, we shall contribute to the safety improvement of nuclear facilities by actively releasing results gained through clarification of the accident progress scenario in and out of Japan. Also, we shall support NDF etc. in formulating a decommissioning strategy and planning/promoting R&D by providing expert knowledge and technical information etc.

In implementing R&D etc., we shall use the newly established Collaborative

Laboratories for Advanced Decommissioning Science, cooperate with relevant organizations such as domestic and foreign research institutions, universities and industry to gather knowledge, use personnel and facilities of JAEA's divisions etc. and develop human resources responsible for mid to long-term R&D, relevant activities and future nuclear safety in a well-planned manner.

(2) R&D related to environmental recovery

Based on “Environmental creation center mid to long-term approach policy” (operation and strategy meeting of Fukushima Prefecture Environment Creation Center) and gradual policies at a 3-4 year interval etc., formulated by the policy to properly advance efforts based on the “Basic Policy for Recovery and Reconstruction of Fukushima” (Cabinet decision in July 2012), we shall surely implement R&D related to the environment recovery necessary for residents to restore safe and secure life.

As for the environmental monitoring mapping technologies, we shall monitor the zone of life and the individual radiation dose evaluation technology in the midst of the objectives period and establish dose evaluation methods for non-decontaminated forests, rivers and coastal areas etc. In addition, as for environmental science research, we shall evaluate cesium behavior etc., provide technologies that contribute to the revival of agriculture, forestry industry etc. in the midst of the objectives period and then judge whether investigation should be continued based on evaluation from external experts. We shall build a comprehensive evaluation system based on this, provide information supported by scientific evidence in a timely and appropriate manner, contribute to the formulation of reasonable safety measures, revival of agriculture, forest industry etc., the lifting of the evacuation order and the planning of return by local authorities.

In addition, we shall clarify the cesium transition mechanism etc., use the results, properly study and propose a reasonable volume reduction method and contribute to the reduction of burdens related to management of removed soil etc.

In carrying out R&D, we shall closely coordinate and collaborate with Fukushima Prefecture and the National Institute for Environmental Studies and steadily implement results on site such as using the Fukushima Prefecture Environment Creation Center as an activity base and taking in results on the assumption of technology transfer etc., to private companies and local governments in the planning stage and contribute to the return of residents.

Furthermore, we shall properly review our efforts in this operation in consideration of opinions and advices from the Citizens' Committee of Fukushima Prefecture Environment Creation Center.

### (3) Building the basis of R&D

To contribute to promote R&D to ensure the implementation of decommissioning TEPCO's Fukushima Daiichi Nuclear Power Station more safely, with the objectives start period shown in the Mid to long-term Roadmap towards the Decommissioning in mind, we shall develop development and verification facilities for remote control equipment and devices and R&D centers required for analysis and research. We started operation of some development and verification facilities for remote control equipment and devices around summer in 2015, developed and improved a standard test method which contributes to the advancement of using facilities to promote decommissioning, developed and improved a virtual space training system to improve the operation technology of remote control devices and developed robot simulators to use to develop/remodel robots. On the other hand, we shall start construction work of a facility for analysis and research of radioactive materials after an authorization procedure, develop it aiming at starting operation within 2017, develop technologies and upgrade equipment necessary for analysis and research related to the disposal of radioactive waste produced with decommissioning, fuel debris etc.

To steadily develop the "Acceleration Plan of Reactor Decommissioning R&D for Fukushima Daiichi NPS, TEPCO" (MEXT in June 2014), we established the Collaborative Laboratories for Advanced Decommissioning Science (CLADS) in 2015. We shall develop the International Collaborative Research Building (provisional name) around TEPCO's Fukushima Daiichi Nuclear Power Station at an early stage, gather knowledge at home and abroad including the usage of development and verification facilities for remote control equipment and devices and analysis and research facilities for radioactive materials, carry out R&D on mid to long-term issues to decommission TEPCO's Fukushima Daiichi Nuclear Power Station and promote R&D and human resource development through collaboration among industry, universities and the government in an integrated manner. In addition, we shall maintain and repair existing facilities as required.

## 2. Technical support and safety research for nuclear safety regulation and

administration

JAEA is requested to provide technical support to the nuclear safety and regulation and nuclear disaster prevention etc. We shall separate the organization for duties related to this technical assistance from the management organization for nuclear facilities, continuously maintain and enhance research resources and improve technical abilities of the organization. In addition, the validity of measures to ensure the effectiveness, neutrality and transparency of the duty and the implementation situation shall be deliberated in the Regulation Support Council consisting of external intellectuals established in JAEA, the opinions of the council are respected and duties are carried out.

(1) Technical support and safety research for nuclear safety regulation and administration

To provide technical support to nuclear safety and regulation, in line with research fields and timing shown in “Safety Research in the Nuclear Regulation Authority,” we shall conduct safety research based on lessons from TEPCO’s Fukushima Daiichi Nuclear Power Station and the latest technical knowledge on matters concerning ensuring nuclear safety (including matters related to regulations to implement safeguards based on international agreements and other peaceful use of nuclear energy) upon presentation or request of technical issues from the committee, contribute to the development of scientific and reasonable regulation standards and confirm the safety of nuclear facilities.

We shall acquire external funds in carrying out the review.

In addition, in accepting requests from the committee, JAEA contributes to ensure safety such as by identifying accidents and failures of nuclear facilities etc.

1) Safety research

We shall improve thermal-hydraulic behavior of the nuclear power reactor system such as the Containment Integral Measurement Apparatus (CIGMA) by the midst of the objectives period, advance analysis code through experiments and research by using this and the Large Scale Test Facility (LSTF) and accurately evaluate the progress of accidents including severe accidents of light water reactors (LWRs) and the validity of safety measures etc. In addition, we shall get knowledge concerning fuel behavior from normal operation conditions to the condition exceeding a design basis accident by using the Nuclear Safety Research Reactor (NSRR) and the Reactor Fuel Examination Facility (RFEF),

reflect it on a fuel behavior analysis code to improve the performance and enable fuel safety to be evaluated. Moreover, we shall advance the material deterioration prediction evaluation method based on data etc. obtained by using neutron irradiation materials and the structural integrity evaluation method by the probabilistic method from the normal operation condition to the phenomena beyond the assumptions in design and enable the soundness of aged light water reactors (LWRs) to be evaluated.

To contribute to safety evaluation in the nuclear fuel cycle facility, we shall get the evaluation of likelihood of a severe accident and its influence and experimental data concerning the validity, improve the performance of analysis code and enable the progress of phenomena to be accurately evaluated. To contribute to the criticality safety control of nuclear fuel materials including fuel debris, we shall obtain criticality characteristic data in an experimental and analytical method on the assumption of various nuclear fuel materials by using the Nuclear Fuel Cycle Safety Engineering Research Facility (NUCEF) with the Static Experiment Critical Facility (STACY), whose reform shall be completed by the midst of the objectives period, build criticality scenario analysis and influence evaluation methods and enable the criticality risk to be evaluated.

Based on knowledge of the accident at TEPCO's Fukushima Daiichi Nuclear Power Station, we shall advance the source term evaluation method of various nuclear facilities and including the exposure of the general public in consideration of various routes, strengthen the coordination of both methods and build the technical infrastructure that enables reasonable risk evaluation at the time of severe accidents and the optimal protection strategy for nuclear disaster prevention.

To contribute to the safety management of radioactive waste, we shall establish safety evaluation methods related to the storage and disposal of waste, etc, including pollutants created by TEPCO's accident at Fukushima Daiichi Nuclear Power Station and decommissioning of nuclear facilities, quantify the influence over the general public and operators, build a long-term performance evaluation model of materials whose safety function is expected and make it available in safety evaluation codes.

In addition, we shall carry out research on the analysis technology of minute environmental samples required for safeguards upon request from NRC.

Moreover, having learned lessons from the accident at TEPCO's Fukushima Daiichi Nuclear Power Station, we shall look at external events that may pose a

threat to nuclear facilities.

Through these research, we shall ensure and maintain the infrastructure necessary for the technical assistance to nuclear safety regulations and administration, contribute to the development of scientific and reasonable regulation standards and safety confirmation of nuclear facilities by actively releasing obtained results and making technical proposals and aid the improvement of nuclear power safety and the improvement of reliability of nuclear power.

In carrying out research, we shall carry out cooperative research and information exchange with domestic and foreign research institutions, reflect the latest wide technical knowledge on nuclear power safety, get a good evaluation from external experts and continuously improve details of the research based on opinions from NRC. Besides, we shall keep neutral positions and transparency of the operation, effectively and efficiently use personnel and facilities of JAEA divisions and contribute to the development of human resources responsible for future nuclear safety.

## 2) Cooperation for relevant administrative organizations

We shall provide scientific data etc., to contribute to the development of regulation standards. In addition, we shall provide human and technical assistance to investigations etc. to investigate the causes of accidents and failures of nuclear facilities upon specific requests from regulatory administrative bodies etc. Moreover, we shall collect and analyze information on regulation information including that regarding accidents and failures to contribute to regulation and research activities.

## (2) Technical support for nuclear disaster prevention

As a designated public institution based on the Basic Act on Disaster Control Measures (Act No. 223 of 1961) and the Act on Ensuring Peace and Independence of Japan and Security of the State and People in Armed Attack Situations etc. (Act No. 79 of 2003), JAEA shall provide physical and technical support during nuclear emergencies at the request from relevant administrative organizations and local governments.

We shall support human resource development of staff responsible for nuclear disaster prevention of NRA and those all over Japan including prefectures having nuclear facilities through the verification of effects of human resource programs,



training, support human resource development of not only experts in JAEA but also questionnaires etc., based on the lessons learned from the accident at TEPCO's Fukushima Daiichi Nuclear Power Station. In addition, we shall specifically sort out effective partnership with NRA and local governments etc. in activities as a designated public institution responsible for nuclear disaster prevention, enhance effectiveness through training etc. and support strengthening of the foundation of the nuclear emergency response system in Japan.

We shall conduct surveys and studies and transmit information concerning nuclear disaster prevention etc., to improve the nuclear disaster prevention system.

We shall make an international contribution to the nuclear disaster prevention sector through participation in the framework of international expert activity support in nuclear disasters abroad and technical support to nuclear disaster prevention in Asian countries.

### 3. R&D to improve nuclear safety and activities to contribute to nuclear non-proliferation and nuclear security

The accident at Fukushima Daiichi Nuclear Power Station made us recognize again that the top priority should be given to safety without considering the circumstances. It is important to continuously pursue safety at the top international level. We shall perform R&D in collaboration with industry, universities etc. to contribute to the improvement of nuclear power safety as well as conduct activities that contribute to global nuclear non-proliferation and nuclear security, create achievements properly responding to issues and needs and support the peaceful use of nuclear power as a country without nuclear weapons.

#### (1) R&D to improve nuclear safety

We shall carry out basic R&D necessary for combustible materials and equipment contributing to the safety improvement of light water reactors (LWRs) etc. and the development of safer decommissioning technologies of nuclear facilities. Specifically, we shall develop the oxidation/melting characteristic evaluation method of candidate materials for accident-resistant fuel cladding and characteristics evaluation methods etc., such as nuclide composition and activation amount of spent fuels, structural materials etc. Moreover, we shall verify the availability of developed technologies and contribute to the safety improvement of light water reactors (LWRs) and a nuclear system developed by ourselves.

In addition, we shall contribute to the safety improvement of nuclear facilities by actively releasing results gained through clarification in and out of Japan while clarifying accident progress scenarios in R&D toward decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station.

We shall get external funds in carrying out R&D, clarify objectives and a time limit for every issue and create R&D achievements responding to issues and needs of industry etc.

(2) Activities that contribute to the nuclear non-proliferation and nuclear security

We shall carry out activities contributing to the development of technologies used in the International Atomic Energy Agency (IAEA), other international organizations and in the nuclear non-proliferation and nuclear security sector in countries and ensuring transparency related to the management and use of nuclear materials in Japan. In addition, we shall continue human development support projects to contribute to capacity building in the nuclear non-proliferation and nuclear security sector in Asian and other countries, be a global center of excellence (COE) and work on enhancing the peaceful use of nuclear power and nuclear non-proliferation and nuclear security. Furthermore, to do detailed activities, we should respond flexibly in light of domestic and foreign situations.

1) Technology development

We shall develop basic technologies that contribute to safeguards of the future nuclear fuel cycle facilities etc. and the enhancement of nuclear proliferation resistance. In addition, we shall develop technologies required to enhance nuclear security such as measuring and detecting nuclear materials in light of international and domestic trends. In carrying out these technology developments, we shall set themes and objectives etc. based on domestic and foreign issues and needs and promote them in cooperation with IAEA, the U.S., Europe etc.

2) Policy research

We shall research policies based on technical knowledge and help relevant administrative organizations examine policies such as policy planning in light of international trends concerning nuclear non-proliferation and nuclear security. In addition, we shall collect information concerning nuclear non-proliferation and nuclear security, make them into database and share the information with

relevant administrative organizations.

3) Support for capacity building

To support capacity building in the nuclear non-proliferation and nuclear security sector in Asian and other countries, we shall enlighten the importance of securing nuclear non-proliferation and nuclear security, develop a training curriculum, make training facilities satisfactory and offer seminars and workshops to develop human resources.

4) Contribution to the international verification system related to the Comprehensive Nuclear-Test-Ban Treaty (CTBT)

Based on national basic policies to promote the peaceful use of nuclear power and nuclear non-proliferation, we shall develop verification technologies related to radioactive nuclides in international and domestic systems to verify compliance with the CTBT, operate data centers in Japan for CTBT monitoring facilities and nuclear test monitoring in Japan, which are stipulated in a protocol of the treaty and contribute to international nuclear non-proliferation.

5) Efforts to enhance understanding and international contribution

We shall actively transmit information by using JAEA web pages, hold an international forum etc., once a year and enhance understanding of nuclear non-proliferation and nuclear security, which is essential to promote the peaceful use of nuclear power.

We shall enhance international nuclear non-proliferation and nuclear security through participation in international discussion forums concerning nuclear non-proliferation and nuclear security and research cooperation with the IAEA.

4. Basic and fundamental research and human resource development for nuclear power

To promote research, development and utilization of nuclear power, it is necessary to promote basic and fundamental research of nuclear power that supports these cross-field activities and develop human resources in the nuclear power sector. For this purpose, we shall improve competitiveness in science and technology, create new nuclear utilization technology and carry out basic and fundamental research contributing to industrial applications with an aim to create common

science and technology infrastructure related to nuclear R&D applications in Japan. We shall actively publicize obtained achievements through publication of scientific papers and press releases etc., link them to the development of science, technology and academic research all over Japan and contribute to industrial promotion through technology transfer. In addition, we shall enhance our efforts to develop human resources to contribute to the maintenance and improvement of nuclear infrastructure in Japan.

To ensure these smooth R&D activities etc., we shall maintain and manage infrastructure based on users' needs in a well-planned and proper manner and properly deal with facilities, which need the confirmation of conformity to new regulation standards.

(1) Promotion of basic and fundamental research, advanced nuclear scientific research and research on neutron utilization that underpin nuclear power

We shall carry out basic and fundamental research of nuclear power to create scientific knowledge and technologies supporting nuclear energy utilization in Japan and aggressive and creative cutting-edge nuclear science and research that have the potential for the development of nuclear science. In addition, with a view to creating revolutionary achievements in wide sectors of science and technologies and academia, we shall carry out nuclear science and research on materials to support nuclear energy and materials science by using neutron and synchrotron radiation. Moreover, we shall produce R&D achievements properly responding to issues and needs in collaboration with industry and universities and work on utilization of the achievements.

1) Basic and fundamental research of nuclear power

To support nuclear energy utilization and create scientific contributions to various social needs and new nuclear energy utilization, we shall systematically and continuously reinforce nuclear data and reactor engineering, fuels and materials engineering, nuclear chemistry, environment and radiation science. We shall not only create excellent science, technology and academic achievements, but also accelerate JAEA's core projects and set themes to contribute to solving issues in response to social needs.

Specifically, we shall accumulate knowledge on nuclear data, fuel/material aging behavior, behavior of radioactive nuclides in the environment etc., develop measurement and analysis technologies including quantitative analysis of

long-life nuclides and the nondestructive measurement of nuclear fuel materials. In addition, we shall expand basic data to develop models such as neutronic characteristics, thermal hydraulics, environmental dynamics, radiation transportation, aseismatic evaluation and complex phenomena in the reactor at the time of severe accident and data expansion, develop measurement and analysis methods to verify reliability and validity and develop databases and computer simulation technologies. The promotion of this research shall enable us to respond to mid to long-term issues of the accident at TEPCO's Fukushima Daiichi Nuclear Power Station, dispose of radioactive waste including separation and conversion technologies, advance nuclear power reactor technologies including LWRs and contribute to sectors of the environmental impact assessment and radiological protection.

To undertake R&D, we shall receive an intermediate evaluation on the progress and direction of R&D from external experts and properly reflect it on our efforts. In addition, to enhance basic technologies, we shall merge strengthened coordination with advanced analysis technology using advanced nuclear science and research and neutron etc. quantum neutron beams. In addition, we shall clarify objectives and a time limit for every issue while giving due consideration to requests from business, academia and government. We shall produce R&D achievements responding to issues and needs in collaboration with industry and universities to proceed with core research, which will be the basics and fundamentals supporting nuclear power in Japan.

## 2) Advanced nuclear science and research

We shall promote world cutting-edge nuclear science and research with very strong academic and technical impact that takes the initiative in the development of nuclear science, aiming at finding new principles/phenomena, creating new materials and revolutionary technologies and playing our part as an international COE in this sector.

Specifically, we shall enhance and promote advanced actinides science related to atomic nucleus science and heavy element science aiming at the creation of new concepts and contribute to R&D including separation and conversion. In addition, we shall search physical properties and functions of new energy, strengthen and promote advanced nuclear materials science to develop new materials for it and contribute to R&D of fuel physical properties and radiation resistant devices etc.

In implementing research, we shall discover cutting-edge research themes not only in JAEA but also from Japan and abroad and strengthen our efforts in R&D through collaboration to maintain and strengthen cutting-edge nuclear science and research and generate research results that may bring innovative development of nuclear energy utilization in the future. Moreover, playing our part as an international COE, we shall set flexible research themes, revise or abolish groups and invite globally renowned group leaders with rapid and flexible operations under the leadership of the research center director in response to new R&D trends. Furthermore, we shall properly reflect intermediate evaluations by domestic and foreign external experts while actively making efforts to get external funds.

### 3) Neutron utilization research etc.

We shall provide a world cutting-edge R&D environment by continuing R&D to develop advanced technologies related to J-PARC operated in collaboration with the High Energy Accelerator Research Organization (KEK) and keep the performance of the neutron experiment device group at the top level in the world. In addition, we shall carry out cutting-edge research concerning materials science effectively using the neutron experiment device group. In addition, we shall carry out R&D toward stronger and safer accelerators to maintain leading-edge research in the world in the future.

We shall develop neutron utilization technology by utilizing features of steady neutron sources such as JRR-3 and apply it to strength reliability evaluations of advanced material development and large structures based on clarification of structure-function correlation. In addition, as nuclear science and research using neutron and synchrotron radiation, we shall develop new extractant, clarify the mechanism of the adsorption-desorption reaction of radioactive materials into the soil etc. and contribute to decommissioning reactors and waste disposal for the separation of minor actinide (MA).

In carrying this work out, we shall work on R&D with social needs in consideration of scientific significance and final utilization, promote collaboration among research centers and hubs and actively coordinate with domestic and foreign universities, research institutions and industry. Centering on such coordination and cooperation, we shall aim at participating in the national government's public invitations to create scientific and technical innovation.

As for R&D tasks, we shall clarify objectives and periods per task and receive intermediate evaluations from external specialists in the midst of the objectives period.

(2) R&D on high-temperature gas reactors and associated heat utilization technologies

Due to the Basic Energy Plan, various industrial applications including power generation and hydrogen production are expected. To contribute to a further diversification and advancement of nuclear energy utilization through R&D contributing to the practical application of high-temperature gas furnaces having high safety, we shall clarify objectives and development periods, verify the safety of high-temperature gas furnaces as follows based on national policies, prioritize R&D to contribute to the verification of the safety of high-temperature gas furnaces as follows, establish specific technologies and establish technologies for connection of heat utilization systems.

In the case of safety securement of the high temperature engineering test reactor (HTTR), we shall give the highest priority to securing safety, reduce maintenance and management costs before the restart and quickly restart operations upon confirmation of conformity to new regulation standards.

To prove the safety of a high-temperature gas furnace and establish specific technologies, we shall carry out emergency simulation tests such as loss-of-core cooling tests and thermal load fluctuation tests to verify the specific safety of high-temperature gas furnaces. In addition, we shall use HTTR to obtain operation data, develop safety standards of practical high-temperature gas furnace systems under international cooperation and develop fuel factors for high burnup and high output density for practical applications in the future.

To establish technologies related to the connection of the heat utilization system, we shall proceed with the system design of HTTR-heat utilization test facilities and safety evaluations etc. Furthermore, in starting the construction stage of the facility, we shall obtain an evaluation on R&D progress from an external committee around 2016 and get its judgment for the construction.

In addition to these efforts, as for innovative hydrogen production technology (thermochemistry IS process) by the thermal decomposition of water, we shall verify the operation control technology, reliability etc. with a continuous hydrogen production test device made of anticorrosive industrial material by the midst of the objectives period and complete engineering R&D by creating a strength evaluation

method for ceramic structures necessary for high pressure operation of ceramic equipment. In addition to this, we shall clarify research objectives at an early stage from the perspective of economic feasibility, clarify research objectives for the future actual use and technology transfer to private operators etc. at an early stage, summarize these achievements and contribute to the realization of a hydrogen society.

Moreover, we shall finish elemental technology development such as technologies for deposit reduction of fission products in gas turbine high efficiency power generator systems.

Besides, we shall use HTTR as a place for human resource development, make domestic and foreign researchers etc. learn knowledge on safety of high-temperature gas furnaces, develop human resources skilled in high-temperature gas furnaces to inherit technologies.

Upon implementation, based on national policies etc., we shall confer with business, academia and government to verify specific actual uses, issues to realize actual use of high-temperature gas furnaces and heat utilization technology in the future and achievements to be gained, possibility of actual use, R&D direction, cooperation with industry and proceed with R&D and international cooperation.

### (3) Promotion of public utilization of the specific advanced large research facilities

As for the J-PARC Neutrino Experimental Facility, we shall aim at supply and operate the world's strongest pulse beam at the operation rate of 90% or more through the year. Specifically, we shall realize stable use and operation of beam output equivalent to 1 MW by the midst of the objectives period. Moreover, we shall make efforts to enable closer collaboration with the national government, related local authorities, organizations promoting the use of registered facilities and KEK and carry out operations (excluding usage promotion services by registered institution for facilities) prescribed in paragraph 2 of Article 5 of the Act on the Promotion of Public Utilization of the Specific Advanced Large Research Facilities (Act No. 78 of 1994). To carry out specified operations, we shall enhance the system for application, registration and results for users and transmission of achievements and information to users to promote uses and create achievements. In addition, we shall continue to enhance safety control management to realize safer and more stable operation of facilities. Moreover, we shall hold research meetings to increase exchanges of research institutions and researchers etc., share the latest knowledge through collaboration with basic and fundamental research and



international cooperation and promote the integration etc. of various knowledge.

These efforts shall widely provide the world's highest R&D environment using neutron ray as a probe as the global center of the neutron science research and support the development of science, technology and academia and the advancement of industry.

We shall also promptly review necessary matters on current reduction of service charges.

(4) Development of nuclear human resources and promotion of service facility uses

Maximizing JAEA's atomic energy basis and fundamentals, we shall develop nuclear researchers and engineers in the R&D sites who have high problem-solving abilities in the nuclear power sector, human resources via training corresponding to the needs of industry, universities, government agencies etc., human resources who are active both domestically and abroad and human resources for nuclear power upon requests etc. from relevant administrative organizations.

In order to develop human resources for atomic energy and create R&D results in science and technology sector, JAEA shall maintain and enhance stable operation and performance of the facilities such as the engineering test reactor and radioactive substance treatment facilities, which are difficult for private operators, universities etc., to maintain and provide the facilities to many external users in a wide range of sectors domestically and abroad. In particular, we shall restart operations of facilities, which have stopped operation after the earthquake disaster, immediately after receiving the certification of compliance with new regulation standards and contribute not only to the nuclear power sector but also the creation of innovations in material and medical sectors and academic research etc.

1) Securing and developing R&D human resources

We shall enhance a human resources development program by using characteristic facilities possessed by JAEA and R&D sites and developing human resources in various infrastructure sectors that support nuclear power development projects and the nuclear power industry among national policies. In addition, we shall develop a system of human resources engaged in research which are rich in originality and creativity from a broad perspective.

(2) Develop nuclear human resources

To develop human resources for nuclear power in Japan, we shall further expand training corresponding to needs of domestic industry, universities, government agencies etc., including responses to the accident at TEPCO's Fukushima Daiichi Nuclear Power Station, use JAEA's characteristic facilities and enhance and promote coordination and collaboration with universities including the Japanese university network. Moreover, we shall promote human resources for nuclear power mainly in Asia upon request etc. from relevant administrative organizations and contribute to the enhancement of international cooperation. We shall promote activities of the network of human resources development for nuclear power such as collecting, analyzing and releasing information on human resources for nuclear power in coordination and collaboration with domestic and foreign relevant organizations. Our stable efforts in these programs shall contribute to human resources development in the domestic and foreign nuclear power sectors.

(3) Promote the use of service facilities

We shall contribute to the development of human resources for nuclear power and the creation of R&D achievements by promoting the use of service facilities by external institutions such as domestic and foreign industry and universities.

For shared use of facilities etc., we shall take opinions and advice on screening and acceptance of issues for use etc. to ensure transparency and fairness related to the use of facilities. In addition, we shall understand user needs of universities and industry to promote wider external use.

In addition, we shall create a satisfactory user support system such as providing education on safety and security, driving support etc. to users.

5. R&D on Fast-Breeder Reactors (FBR)

In the Basic Energy Plan, "Fast-Breeder Reactors Development Policy" (Decision by the Council of Ministers Related to Nuclear Energy in December 2016), fast-breeder reactors (FBR) are required not only to use uranium resources effectively in a conventional way but also are expected to play a new role of reducing the volume and toxicity of high-level radioactive waste and improving technologies related to non-proliferation. For this purpose, while giving the highest priority to safety and promoting international cooperation, we shall carry out R&D to establish verification technologies for FBR and contribute to the formulation and

realization of energy policies of Japan in the future. In addition, as for “MONJU,” efforts have been made to implement safe and steady decommissioning based on the “Government's Policy on Handling of 'MONJU” (Decision by the Council of Ministers Related to Nuclear Energy in December 2016).

(1) Efforts to decommission “MONJU”

The following efforts shall be made to implement safe and steady decommissioning:

- [1] The Agency shall establish a basic plan concerning decommissioning by April 2017, improve the decommissioning system designed to gather knowledge in Japan and abroad, and then promptly apply for the decommissioning plan.
- [2] The Agency shall undertake the necessary efforts, aiming to complete retrieval of fuel from a reactor core to a fuel pond (water pool) while safety is secured within about five and a half years since formulation of the basic plan concerning decommissioning.
- [3] In advancing future efforts, the Agency shall prioritize ensuring safety and endeavor to enhance local and other citizens' understanding above all.

(2) Global strategy planning aiming at the establishment of verification technologies for Fast-Breeder Reactor (FBR) and maximization of R&D results

1) R&D aiming at the establishment of verification technologies for Fast-Breeder Reactors (FBR)

To establish verification technologies for FBR, while using achievements gained in “MONJU” R&D such as equipment/system design technologies etc. and the breeder laboratory reactor “Joyo,” the irradiation field of fuels and materials (hereinafter, “Joyo”), we shall carry out FBR R&D through participation in international projects such as the ASTRID reactor in France, which is in the verification stage.

As for “Joyo,” we shall restart it after receiving confirmation of conformity to the new regulation standards and gain data to improve fuel performance including irradiation data of fuel-cladding pipe material that is resistant to breaking.

As for the supply of mixed oxide fuel (MOX), we shall take the necessary measures to meet new regulation standards.

Japan and France shall carry out basic design of the ASTRID reactor, which starts in 2016 in accordance with the “Arrangement on Implementation of Cooperation of French Next-Generation Reactor Plan and Sodium FRB” (concluded in August 2014) and obtain technical/information infrastructure

contributing to examining policies related to R&D to establish FBR verification technologies in and after 2020, when the arrangement is finished.

The countries shall improve existing facilities such as Advanced Technology Experiment Sodium (Na) Facility (AtheNa) and carry out the test in the midst of the objectives period, establish a heat removal system in a severe accident and obtain data required for behavior analysis when the core is damaged. In addition, we shall build a safety evaluation method based on the test data.

While obtaining structure/material data for FBR and promoting an evaluation method development, we shall develop FBR plant simulation system, test technologies required for it and basic technologies that support the enhancement of safety such as building test database.

In addition, we shall collaborate with the U.S. for R&D projects concerning nuclear power energy for consumers and carry out R&D on FBR, simulation technologies and advanced fuels etc. as part of them.

To proceed with the international cooperation, we shall use necessary human resources etc. and develop human resources with the international negotiation skills. In carrying out R&D, we shall make efforts to gain external funding, receive an intermediate evaluation from an external specialist in the midst of the objectives period and reflect it in future plans.

These efforts shall contribute to the improvement of Japan's international competitiveness in the technology of FBR, whose development is globally promoted.

2) Global strategy planning aiming at the maximization of R&D results and contribution to policy planning etc.

To implement R&D in (1) and (2)1), in light of effective use of resources, reduction of high-level radioactive waste and toxicity, considering technical, economical and social risks we shall draft an international strategy for R&D on FBR including external approaches including the U.S., the U.K., France and the Generation IV International Forum (GIF) to maximize results of safe and efficient R&D on FBR. To this end, we shall conduct investigations on policy developments concerning R&D on FBR all over the world and R&D progress on a timely manner and grasp an actual state. In addition, we shall use human and other resources in JAEA and make efforts to maintain and develop FBR technologies and human resources all over Japan including JAEA to realize the smooth transfer to the implementation process and the effective and efficient

resource allocation.

In addition, we shall closely coordinate with the industry such as the Federation of Electric Power Companies of Japan (FEPC) and the Japan Electrical Manufacturers' Association (JEMA), agree on policies with interested parties including the government and make necessary contribution to policy planning etc., in the government.

### 3) Leading the internationalization of FBR safety design standards

To lead the international standardization of FBR safety design standards by Japanese initiative, we built a development policy for FBR safety design standard draft at an early stage of 2015, agreed on policies with interested parties including the government and shall lead the international standardization of FBR safety design standards by using the Generation-IV International Forum (GIF) and ASTRID cooperation between Japan and France.

With these efforts, we shall globally contribute from the viewpoint of ensuring safety.

## 6. R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste

As shown in the Basic Energy Plan, to efficiently use resources, reduce high level radioactive waste and toxicity etc., our country has a basic policy to reprocess spent fuels and promote the nuclear fuel cycle that efficiently uses collected Pu etc., R&D on the technology to support this policy is required. In addition, we need a technology to certainly execute countermeasures against radioactive waste that are surely generated in using nuclear power lest the present generation that has generated the waste should push the burden toward the future. Technology is required to ensure the countermeasures. Therefore, we shall carry out technology development concerning reprocessing of spent fuels and fuel fabrication and R&D on reduction of radioactive waste and toxicity. We will also carry out R&D concerning high-level radioactive waste disposal technologies etc., work on decommissioning of nuclear facilities and disposal of radioactive waste in a well-planned manner and take them in the related technology development. To ensure these smooth R&D activities etc., we shall properly comply with the new regulation standards.

(1) Technology development for reprocessing spent fuel and fuel fabrication

We shall develop basic technologies toward the advancement of reprocessing technology and reprocessing of light water reactor MOX fuel etc. and offer technical support to nuclear fuel cycle projects based on these results. In addition, we shall develop basic technologies, keeping the production process of MOX fuel for FBR and reprocessing of MOX fuel for FBR in mind and enhance basic data (separation characteristics, fuel physical properties etc.) necessary for maximization of the design to improve reliability and productivity. These help future reprocessing and the establishment of the fuel fabrication technology system and contribute to ensuring the energy security of Japan.

We have stopped some facilities of Tokai Reprocessing Plant, which resolve and shear spent fuels and shall clarify the process and the period until decommissioning, re-organize the R&D system of spent fuel reprocessing technology after decommissioning, utilize facilities for the time being and create a decommissioning plan etc. after that as a preparation for the decommissioning and systematically formulate a decommissioning plan. Moreover, we shall prioritize securing safety and reducing risks above all and work on improving safety based on new regulation standards to safely manage stored spent fuel and waste steadily implement a plan to decommission the Tokai Reprocessing Plant, which was submitted under the direction from NRA. We will also implement plans to reduce the risks related to high-level radioactive waste liquid storage and shorten the vitrification of high-level radioactive liquid waste to complete the process of solidifying and stabilizing plutonium solution and high-level radioactive waste liquid in 2028 to reduce potential sources of danger. We shall contribute to the establishment of decommissioning technology systems including reprocessing facilities etc., with these efforts.

In carrying out these activities, we shall effectively use technological knowledge in coordination among divisions, develop human resources to support future nuclear fuel cycle technology and reduce risks of nuclear materials at facilities etc. In addition, we shall receive an intermediate evaluation on the results of technology development from an external specialist by the midst of the objectives period and reflect it in future plans.

1) Reprocessing technology development

For further advancement of glass solidification technology as the advancement of reprocessing technology, we shall gain and evaluate data

concerning behaviors of platinum group elements, design and develop new types of reactors for a facility for vitrification technology (TVF: Tokai Vitrification Facility), contribute to the early completion of vitrification of high-level radioactive liquid waste, work on the development of basic technologies for reprocessing of light water reactor MOX fuel and provide technical support to the nuclear fuel cycle project based on these achievements. In addition, we shall study elemental technology development and plant concepts to reprocess FRB MOX fuel and obtain achievements to contribute to determining how promising technologies are to establish reprocessing technology in the future.

## 2) Development of MOX fuel fabrication technology

We shall develop technologies for advancement of the pellet manufacturing process of FRB MOX fuel and elemental technology related to a simplified pellet method. Besides, we shall develop dry recycling technologies to reuse scrap generated in MOX fuel fabrication as a raw material. Moreover, we shall improve the reliability and maintainability of automatic fuel fabrication equipment and gain data contributing the study of remote automation of MOX fuel fabrication plants.

## 3) Tokai Reprocessing Plan

We shall work on the Tokai Reprocessing Plan by improving safety based on new regulation standards, continue the control of stored used fuel and waste and responses based on aging of facilities and make the following efforts:

We shall prioritize securing safety and reducing risks above all, complete solidifying and stabilizing plutonium solution by MOX powderization, while constructing/maintaining facilities in a well-planned manner, and take all actions required, aiming to dispose of around 40% of high-level radioactive liquid waste and ensuring we implement a plan to decommission the Tokai Reprocessing Plant, which was submitted under the direction of NRA. We will also implement plans to reduce the risks related to high-level radioactive waste liquid storage and shorten the vitrification of high-level radioactive liquid waste to complete vitrification of high-level radioactive liquid waste by 2028. In addition, to manage high-level radioactive waste, we shall study storage methods of vitrified waste packages etc. and take proper measures.

We shall also prepare for decommissioning of the Tokai Reprocessing Plant, apply for permission for the decommissioning plan in the first half of 2017 and



start efforts to establish the decommissioning technology system of the reprocessing facility. As for high radioactive solid waste, we shall develop technologies concerning remote extraction to contribute to proper storage management. As for the low-level radioactive waste treatment facility (LWTF), we shall steadily develop and maintain a cement solidification facility and a nitrate radical analysis facility to carry out construction improvements to the incineration facility and start operation within the objectives period.

As for the recycle equipment test facility (RETF), we shall consider the facility's utilization.

(2) R&D on reducing the volume and toxicity of radioactive waste

We shall promote technical R&D that may have a large impact on the reduction of high-level radioactive waste and toxicity by using international networks such as nuclear conversion with FBR/accelerators. These efforts enhance safety, reliability, efficiency etc., concerning disposal of radioactive waste and ensure a wide choice of options.

In implementing R&D, we shall carry out R&D while receiving an evaluation from an external committee to confirm the adequacy of the progress and direction. In addition, we shall enhance collaboration between basic and fundamental research and engineering technology development in JAEA and collaborate with business, academia and government in wide sectors in and out of Japan because cross-sectoral collaboration in wider science and technology sectors on a long-term basis are required and because nuclear conversion technology with accelerators are transiting from the conceptual study stage to the proof-of-principle stage. Moreover, we shall develop nuclear power human resources and contribute to the development of science and technology in Japan through this R&D.

1) R&D on common basic technologies to separate and convert MA

We shall get the process data of multiple candidate technologies on MA separation technology and separation collection data etc., of tests using high-level radioactive liquid waste etc., to evaluate the technical feasibility on MA separation and collection. We shall acquire the basic data of MA fuel with wide composition, test devices including pellet manufacturing and evaluate the technical feasibility of MA fuel fabrication.

To acquire technical information throughout the MA separation conversion cycle, we shall start a small MA cycle verification test consisting of a series of tests from MA separation, pellet manufacturing to fast neutron irradiation in an

existing facility.

2) R&D on nuclear conversion technology using FBR

As R&D to flexibly and effectively use Pu and MA in FBR, we shall verify the reactor core design method by using data acquired in “MONJU” performance tests etc., research reactor core design, acquire irradiation behavior data of homogeneous MA cycle MOX fuel, develop long-life reactor core materials and carry out a joint irradiation test with the U.S. and France to understand the irradiation performance of MOX fuel containing MA after restart of “Joyo,”

3) R&D on nuclear conversion technology using the accelerator driven system (ADS)

We shall develop elemental technology required to construct J-PARC Transmutation Experimental Facility, examine the facilities, evaluate safety etc. As for the ADS objectives test facility, we shall start construction of the facility by the midst of the objectives period after receiving evaluations of closer investigations on expenses necessary for facility development at an early stage and the outlook for solving technical issues by an external committee. As for the Transmutation Physics Experimental Facility (T-FEP), we will aim at acquiring permission for the establishment and start construction within the objectives period after receiving an evaluation from an external committee on the outlook of solving technical issues to acquire permission for the design and establishment of the facility.

In addition, we shall create an ADS concept design, evaluate target window materials, MA fuel dry processing technology and accelerate ADS development through international cooperation.

(3) R&D concerning processing technologies of high-level radioactive waste etc

We shall steadily develop basic R&D required to realize the geological disposal of high-level radioactive waste, develop and provide technical infrastructure for geological environment investigations by the implementing entity, carry out a design/safety evaluation of the disposal system and government measures on safety regulations. Further, through these efforts, JAEA shall promote personnel exchanges with the implementing entity to promote smooth technology transfers.

In addition, JAEA shall proceed with surveys and studies on direct disposals of

spent fuel as an alternate disposal option.

These efforts shall create research results that contribute to future geological disposal planning in Japan and geological disposal projects based on the geological disposal plan.

R&D shall be based on the latest scientific knowledge and we shall acquire and provide cutting-edge technologies and knowledge through technical cooperation and joint research with domestic and foreign implementing entities, R&D institutions, universities etc. and contribute to enhancing technologies and developing human resources concerning geological disposal in Japan.

In addition, we shall promote mutual understanding on geological disposal with the public through inspection of Mizunami underground research laboratory and information disclosure on R&D results by using websites.

#### 1) Mizunami underground research laboratory

As for the Mizunami Underground Research Laboratory Project Plan (crystalline rock: Mizunami City, Gifu Pref.) and Horonobe Underground Research Laboratory Project (sedimentary rock: Horonobe-cho, Hokkaido), we shall steadily develop them, focusing on R&D by consigning R&D based on the basic direction of the reform while improving efficiency of projects carried out by JAEA. We shall confirm R&D progress etc., at about the end of 2019 through evaluation from an external specialist. Furthermore, we shall carry out surveys and study land lease periods for the Mizunami Underground Research Laboratory Project Plan.

As for the Mizunami Underground Research Laboratory Project Plan, we shall focus on the development of engineering countermeasures in underground audits, modeling methodology for mass transport and drift backfilling technologies. We shall work on this research on the assumption that we shall produce results within five years by the end of 2019. In addition, we shall determine procedures after drift backfilling on the assumption that the backfilling will be completed by the end of the land lease period (January 2019) based on discussions in the committee to study the usage of land after lease by the end of the year.

As for the Horonobe Underground Research Laboratory Project, we shall focus on confirmation of the availability of an artificial barrier in the actual geological environment, demonstration of disposal concept options and verification of cushioning ability of sedimentary rock in crustal movements. In

addition, we shall determine the process by the end of the research period and backfilling after that by the end of 2019.

2) Research on the long-term stability of the geological environment

We shall develop technologies for predicting and evaluating geological environmental changes associated with natural phenomena by using cutting-edge facilities and equipment related to geochronology.

3) R&D concerning geological disposal of high-level radioactive waste

We shall use the Mizunami underground research laboratory plan and research results of long-term stability of the geological environment, develop cutting-edge technologies of disposal system construction and evaluation analysis related to geological disposal of high-level radioactive waste and systematize them.

4) R&D on direct disposal of spent fuels

We shall investigate the latest technical trends concerning direct disposal abroad, utilize results of R&D on geological disposal of high-level radioactive waste, work on R&D on direct disposal of spent fuels and summarize results.

(4) Well-planned performances and technological developments in decommissioning of nuclear facilities and treatment and disposal of radioactive waste

Under our responsibility as a licensee of nuclear facilities and a generator of radioactive waste, on the assumption of safety securement, we shall carry out decommissioning of nuclear facilities and dispose of waste generated in the operation and decommissioning of the facilities in a well-planned and efficient manner by using clearance after targeting cost reductions, which will be externally evaluated.

Upon implementation, while collaborating with domestic and foreign relevant organizations, we shall advance technologies, reduce costs, pass on knowledge and technologies as a part of human resources development and carry out the following operations:

1) Decommissioning of nuclear facilities

As for decommissioning of nuclear facilities, in consideration of the

development/maintenance status of facilities and equipment for waste disposal such as treatment and disposal of waste and carrying out waste packages to a repository on the assumption of safety securement, using knowledge of senior staff who are familiar with the facility, we shall take the internal risk levels and economical efficiency into consideration, formulate a reasonable decommissioning plan including priority and hold points, receive evaluations from external experts and proceed with them. Upon implementation, we shall prioritize items which achieve a maximum effect in a secured budget, focusing on facilities stipulated in JAEA reform.

In addition, we shall proceed with decommissioning of the advanced thermal reactor “Fugen” handling spent fuels.

## 2) Disposal of radioactive waste

As for low-level radioactive waste, we shall carry out processes related to storage management of waste, reduce the volume of waste and stabilize waste including the disposal of waste accepted from external operators according to agreements. Furthermore, as for the Oarai Waste Reduction Treatment Facility (OWTF), we will aim to acquire verification data contributing to the disposal of waste contaminated by high-level radioactivity and transuranic nuclide and complete construction.

As for treatment and disposal, in consideration of facility decommissioning plans and scheduled periods for carrying out waste packages to repositories, we shall take actions such as building a quality assurance system necessary to create waste packages, evaluating radioactive concentration and developing/maintaining facilities and equipment.

As for underground waste disposal of low-level radioactive waste generated in research institutions, in light of basic national policies in consideration of the status of development of regulation standards and social situations etc., we shall formulate specific processes etc., as early as possible.

In addition, we shall make efforts necessary to establish underground waste disposal facilities, investigate technologies for basic designs of them and make adjustment related to transport of waste packages.

## 3) Technology development concerning decommissioning / treatment and disposal of radioactive waste

As for the technology development necessary for the decommissioning and

disposal of radioactive waste, we shall consider the contribution to the decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station, taking into account the status of facilities and characteristics of waste, actively work on pioneering technology development related to decommissioning, carry out property evaluations of waste, treat and dispose of waste, acquire data for confirmation of waste disposal and construct safe and reasonable processes.

7. Activities to promote industry-academia-government collaboration and gain trust from society

When JAEA carries out operations as a national research and development agency, it is required to maximize research results and return the results widely to the public and society, leading to the creation of innovation. To do this, based on the Basic Energy Plan and the Fifth Science and Technology Basic Plan, we shall return the results to society through strengthening collaboration among business, academia and government to create innovation etc., support nuclear fuel cycle technology for private nuclear operators and global collaboration and contribution, increase understanding and ensure the trust of society by strengthening public relations and outreach activities. Furthermore, in handling information, JAEA shall pay attention to information on physical protection and the handling of intellectual property.

(1) Efforts to create innovation

We shall maximize R&D results and widely return them to the public and society, formulate strategies to create innovation etc. and implement them in JAEA programs. Specifically, we shall make use of R&D characteristics of divisions such as basic and applied research and project types and the total ability of JAEA through cross-divisional efforts, solve nuclear issues and widely respond to social needs, create R&D results and seeds, which can be widely used and act as a "bridge". To do this, we shall build R&D systems such as effective collaboration in JAEA with business, academia and government, understand the needs from the R&D planning stage from the viewpoint of the public and strategically work on formulating research plans to implement results in society and return results to society and create innovation.

Moreover, we shall promote research collaboration through joint research and create R&D results to work closely with industry, universities etc. As for created R&D achievements, in consideration of the meaning and cost-efficiency, we shall

promote the authorization of selected intellectual property, focusing on basic technologies related to nuclear power and technologies that are likely to be used by industry etc. Moreover, we shall enhance partners by actively introducing our intellectual property such as patents and examples of practical applications of the intellectual property at technology exchange conferences etc. In addition, we shall systematically organize the information on our scientific papers, intellectual property, research facilities etc., analysis codes, databases etc. developed/maintained by JAEA and provide them in an integrated and easily usable form for external persons. These shall promote the technology transfer of JAEA's R&D achievements to business, academia and government, external use and development.

We shall widely collect, organize and provide domestic and foreign academic information on nuclear science and technology and support R&D activities in industry, universities etc. In particular, we shall efficiently collect and send domestic and foreign reference information on the accident at TEPCO's Fukushima Daiichi Nuclear Power Station and the Internet information sent by government agencies etc. in a coordinated manner with relevant organizations. In addition, to globally share the nuclear information and disseminate the results abroad, we shall provide information on domestic R&D achievements of nuclear power widely at home and abroad including international organizations.

In addition, we shall support activities such as policy planning etc., in response to requests upon request from relevant administrative organizations.

(2) Support for the nuclear fuel cycle operations of private nuclear business operators

Technical support to nuclear fuel cycle projects of private nuclear operators is reflected in the implementation of a smooth trial run, transition to operation, implementation of safe and stable operation and maintenance management and is quite important to establish nuclear fuel cycle technology. To this end, as for nuclear fuel cycle technology, we shall use JAEA's resources including transferred technologies upon requests from a private nuclear operator, continuously providing information, physical support by dispatching engineers and training by accepting personnel, work on tests and problem solving etc. by using JAEA's test facilities etc. and provide technical support necessary to promote private business.

(3) Promotion of international cooperation

In each R&D sector including responses to the accident at Fukushima Daiichi Nuclear Power Station, we shall maximize R&D results through the use of the wisdom of foreign countries etc., formulate an international strategy based on the characteristics of R&D sectors and promote international cooperation and globalization of JAEA to use Japanese nuclear technology and experiences etc., not only in Japan but also in the world, Upon implementation of international cooperation, we shall build various frameworks suitable for individual cooperation and conclude arrangements with foreign research institutions and international organizations for effective and efficient implementation.

Upon request from relevant administrative organizations, we shall participate in making international standards by the dispatch of experts to international organization's committees and make global contributions.

Furthermore, we shall ensure export control, which is an important risk management activity due to activation of international cooperation.

#### (4) Efforts to gain trust from society and siting areas

JAEA shall actively provide and release information on its research results, accidents, incidents etc., to ensure the transparency of programs. In providing and releasing information, we shall turn the information into knowledge mainly in sectors that attract the attention of the public including safety and radioactive waste and actively provide and release easy-to-understand knowledge in an easily accessible way for the public.

In addition, in consideration of the return of R&D achievements to society and risk communication with society, we shall gain understanding and trust toward JAEA from society and siting areas through careful public hearings, public relations activities and dialog. Moreover, JAEA shall coordinate with external organizations such as academic societies etc. and organize and transmit issues of nuclear power from the interdisciplinary view.

Moreover, in making these efforts, we shall use advice from third parties to more effectively contribute to activities from the viewpoint of various stakeholders and the public.

##### 1) Active provision and release of information and ensuring transparency

We shall always send correct, objective and easily understandable information on the status of facilities, our efforts to ensure safety, measures against failures and incidents based on scientific knowledge and data etc. At that time, we shall



turn the information based on scientific knowledge into knowledge mainly in fields of public interest including safety and radioactive waste, enhance contents by actively using JAEA web pages and public relations magazines so that the public can easily access the information and understand its contents. In addition, in advancing R&D, we shall transmit easy-to-understand information on the risks a new technology has from the R&D stage. Moreover, we shall consider transmitting the information abroad and effectively transmit the information on R&D results etc., at low cost.

In addition, we shall implement facility inspection tours and briefings and interviews etc. as well as press releases.

Moreover, we shall properly disclose information possessed by JAEA according to laws and regulations.

## 2) Promotion of understanding through public hearing, public relations and dialog

We shall effectively carry out activities to promote understanding such as opening of research facilities to the public, inspection tours, briefing and entry at external exhibition. In addition, we shall fulfill the potential as R&D and work on outreach activities, which are two-way communication activities and actively support math/science education such as by delivering science cafe and experiment schooling programs.

JAEA shall coordinate with external organizations such as academic societies etc. and organize and transmit the technical and social challenges of nuclear power from an interdisciplinary viewpoint.

In addition, as for the meaning and risks of JAEA's R&D, we shall work on risk communication activities including the status of our activities for safety securement.

## III. Measures to Be Taken for Achieving the Objectives Concerning the Improvement of the Efficiency of the Administration of the Operations

### 1. Streamlining and efficiency of operations

#### (1) Streamlining and efficiency of operational expenses

In JAEA's operations, we shall thoroughly review and improve the efficiency of existing projects, reduce general administrative expenses (excluding tax and other dues) by 21% or more versus 2014 during the period for mid to long-term objectives and reduce other business expenditures by 7% or more (excluding

required expenses, which are generated due to provisions of law, business expenditures from external sources of finance) during the period for mid to long-term objectives versus 2014. If a new operation is added or an operation is enhanced, we shall improve the efficiency of these expenses in a similar way. In addition, we shall enhance the efficiency of personnel expenses according to the next paragraph.

Furthermore, in streamlining and efficiency of operational expenses, we shall pay consideration not to lose safety due to a peculiarity of JAEA, which is a juridical person that handles potentially risky materials and give the highest priority to ensuring safety if it is necessary to ensure safety. In addition, we shall pay consideration to consistency with the maximization of R&D results.

From a viewpoint of streamlining and efficiency of operational expenses, we shall continue to introduce private sector vitality to develop/maintain research tunnels related to the Horonobe Underground Research Laboratory Project.

## (2) Appropriateness of management of personnel expenses

We shall continue streamlining and efficiency of personnel expenses based on “Basic Policy on Reform of the Incorporated Administrative Agencies” (Cabinet decision in December 2013) as well as strictly review the salaries of employees in light of government policies on total personnel expenses.

As for salary levels, we shall carefully consider the salary levels of national public officers and those of private companies of closely associated industries, verify what salaries for officers and staff should be, maintain proper levels in light of special characteristics of duties and release verification results and the state of efforts. In addition, we shall be able to set flexible salaries as required to secure suitable human resources and at that time, provide satisfactory explanations to the public.

## (3) Appropriateness of contracts

In accordance with Basic Policy on Reform of the Incorporated Administrative Agencies” (Cabinet decision in December 2013), we shall improve the mechanism of goods and service agreements etc., related to R&D, checked by the agreement monitoring committee.

Treating general competitive bidding as a principle, we shall proceed with contracts in a reasonable way combining with private contracts addressing the special characteristics of R&D projects. At that time, we shall clarify causes

according to private contracts and ensure transparency and fairness. In addition, in concluding contracts after general competitive bidding etc., we shall review extreme bidding conditions to create specifications which are easy to understand to tenderers and ensure a sufficient public notice period. These efforts shall contribute to agreements at fair prices. We shall also analyze and review causes for a high bid probability including 100% etc. in proposed contracts by more than one bidder in a general competitive bidding to increase the fairness of contracts.

As for a fair implementation of bidding and contracts including the implementation status of the streamlining initiatives such as procurement, we shall have the agreement monitoring committee inspect the status and release the results on the JAEA web site. Moreover, we shall continue activities to improve the efficiency of contract office work such as unified procurement for proposed procurement for similar contents.

(4) Utilization of information technology etc.

We shall continue streamlining operations by utilizing IT. In addition, based on the information security measures in government agencies including Common Standards of Information Security Measures for Government Agencies (the Information Security Policy Conference), JAEA shall take proper measures and maintain and strengthen IT infrastructure.

IV. Measures to Be Taken for Achieving the Objectives Concerning the Improvement of the Financial Conditions

We shall increase equity income such as income from joint research, competitive research funds, commission revenue, facility use fee revenue etc. to increase the financial soundness.

In addition, we shall execute budgets in a well-planned manner in consideration of debt service payments operating support funds. We shall properly dispose of tenements that are no longer required and transfer important property in a well-planned manner.

1. Budget (including an estimate of personnel expenses), an income and expenditure plan and a funding plan

## (1) Budget

## Fiscal 2015-2021 budget

(Unit: million yen)

Classification	General account									Total
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non - proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	
Income										
Management expense grant income	44,452	15,292	3,099	126,645		54,636	5,853	8,751	39,616	298,344
Grants for facility expenses	1,250			476						1,726
Grants for nuclear fusion R&D facility expenses							2,338			2,338
Grant for International Thermonuclear Experimental Reactor (ITER) R&D expenses							16,522			16,522
Grants for advanced nuclear fusion R&D expenses							2,767			2,767
Grant for specified advanced large-scale research facility operation expenses				74,163						74,163
Grant for business expenditures including nuclear security enhancement			3,832							3,832
Grants for nuclear conversion technology R&D expenses						1,870				1,870
Grant for nuclear fuel material transportation business expenditures				10,740						10,740
Commissioned research income	1,250	2,288	42	435		5	28	5		4,054
Other income	221	143	50	1,427		646	10,043	96	510	13,136
Balance carried forward from the previous term (balance carried forward from the previous term)						72				72
Total	47,173	17,723	7,023	213,888		57,229	37,550	8,852	40,126	429,564

(Unit: million yen)

Classification	General account									
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non - proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Expenditures										
Administrative expenditures (excluding tax and other dues)									33,194	33,194
Salaries and other personal expenditures (for managers)									18,804	18,804
Impersonal expenses									13,316	13,316
Tax and other dues									5,488	5,488
Business expenditures	44,673	15,435	3,148	128,073		55,292	5,915	8,847	14,389	14,389
Salaries and other personal expenditures (for managers)	18,665	8,528	2,044	62,061		13,052	3,062	5,039	6,932	268,315
Money transferred to the disposal business account						423			301	112,751
Impersonal expenses	26,008	6,90	71,105	66,012		42,239	2,854	3,808	6,631	423
Money transferred to the disposal business account						7,507				7,507
Grants for facility expenses	1,250			476						1,726
Grant expenses for nuclear fusion R&D facility expenses							2,338			2,338
Grant expenses for International Thermonuclear Experimental Reactor (ITER) R&D expenses							26,502			26,502
Grant expenses for advanced nuclear fusion R&D expenses							2,767			2,767
Grant expenses for specified advanced large-scale research facility operation expenses				74,163						74,163
Grant expenses for business			3,832							3,832

expenditures including nuclear security enhancement										
Grant expenses for nuclear conversion technology R&D expenses						1,870				1,870
Grant expenses for nuclear fuel material transportation business expenditures				10,740						10,740
Commissioned research expenditure, etc.	1,250	2,288	42	435		5	28	5		4,054
Waste disposal business expenditure carried forward to the next term						63				63
Total	47,173	17,723	7,023	213,888		57,229	37,550	8,852	40,126	429,564

(Unit: million yen)

Classification	Power source usage account									
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non - proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Income										
Management expense grant income	64,443	4,235	2,180	10,053	241,042	378,725		12,401	60,989	774,069
Grants for facility expenses					623	7,681				8,304
Commissioned research income	10	208	463	449	2,771	1,003		115		5,019
Other income	41	3	2	14	220	11,888		46	161	12,377
Waste disposal expenditures						65,800				65,800
Balance carried forward from the previous term (waste disposal expenditures carried forward)						38,812				38,812
Balance carried forward from the previous term (balance carried forward from the previous term)						67				67
Total	64,495	4,446	2,645	10,516	244,656	503,977		12,562	61,151	904,447
Expenditures										
Administrative expenditures (excluding tax and other dues)									53,943	53,943
Salaries and other personal expenditures (for managers)									26,985	26,985
Impersonal expenses									17,905	17,905
Tax and other dues									9,080	9,080
Business expenditures	64,485	4,238	2,182	10,067	241,262	415,807		12,447	7,207	757,695
Salaries and other personal expenditures (for managers)	11,362	1,519	878	5,927	44,582	80,973		5,418	386	151,046
Money transferred to the disposal business account						1,036				1,036
Impersonal expenses	53,123	2,719	1,304	4,140	196,680	334,834		7,029	6,822	606,650
Money transferred to the disposal business account						16,886				16,886

Grants for facility expenses					623	7,681				8,304
Commissioned research expenditure, etc.	10	208	463	449	2,771	1,003		115		5,019
Waste disposal expenditures carried forward to the next term						79,349				79,349
Waste disposal business expenditure carried forward to the next term						137				137
Total	64,495	4,446	2,645	10,516	244,656	503,977	0	12,562	61,151	904,447



(Unit: million yen)

Classification	Disposal business account									
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non - proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Income										
Received from other accounts						25,852				25,852
Commissioned research income						24				24
Other income						2,168				2,168
Balance carried forward from the previous term						22,546				22,546
Total						50,589				50,589
Expenditures										
Business expenditures						26,783				26,783
Salaries and other personal expenditures						1,460				1,460
Disposal expenses						25,324				25,324
Disposal reserve funds carried forward to the next term						23,806				23,806
Total						50,589				50,589

Note 1: The budgets above are estimates based on rules concerning the calculation of government subsidies for national university corporations under certain conditions. Furthermore, as necessary expenses related to “MONJU” for given years fluctuate depending on investigations/reviews by NRA, necessary expenses other than the budgets above arise. As for budgets in fiscal years, we shall consider that necessary expenses vary widely depending on the development of projects and determine them after recalculation in a budget compilation process for each fiscal year. We shall produce a provisional estimate for tax and other dues in administrative expenditures, but shall determine specific amounts after recalculation in a budget compilation process for each fiscal year.

Note 2: The integrated value in columns may not match the sum total column due to rounding.

Note 3: The commissioned research expenditure etc. includes expenditures for research commissioned from the national government.

Note 4:

- Types of usages of “waste treatment and disposal expenditures” are limited to operations concerning treatment, storage management, transport and disposal of low-level radioactive waste related to reprocessing service agreements with electricity utilities (agreements from 1977 through 1994).
- The following is a usage plan in the period for mid to long-term objectives:
  - Amount to be used in 2015-2021: 25,263 million yen from 53,751 million yen of total expenses for all projects.
  - i) Waste treatment expenses:
    - Amount to be used: 2015-2021: 2,657 million yen in total
  - ii) Waste storage management expenses:
    - Amount to be used: 2015-2021: 10,238 million yen in total
  - iii) Waste disposal expenses:
    - Amount to be used: 2015-2021: 12,367 million yen in total
- Waste treatment and disposal expenditures are carried over to the next period for mid to long-term objectives.

Note 5:

- The general account and “other income” in the power source usage account include expenses for treatment, storage and disposal of radioactive waste generated in accordance with agreements including commissioned research and joint research etc., based on Article 17, paragraph 1 of the Act on the Japan Atomic Energy Agency, Independent Administrative Agency (hereinafter “Act on JAEA”).
- A part of expenses for treatment and storage in the expenses shall be carried forward to the next mid to long-term objective period to be used in and after 2022.

**【Estimate of amounts equivalent to personnel expenses】**

JAEA will spend 297,687 million yen in total in the period for mid to long-term objectives. (This may be increased or decreased due to the acquisition condition of entrustment expense fees, grants, competitive research funds from the national government and private capital.)

**【Calculation method of subsidies for operating expenses】**

We shall use a rule method. The following numerical expressions are used to determine government subsidies for national university corporations (A) for each fiscal year:

$$A(y) = \{(C(y)-Pc(y)-T(y)) \times \alpha_1(\text{coefficient}) + Pc(y) + T(y)\} + \{(R(y)-Pr(y)-\zeta(y)) \times \alpha_2(\text{coefficient}) + Pr(y) + \zeta(y)\} + \varepsilon(y) - B(y) \times \lambda(\text{coefficient})$$

$$C(y) = Pc(y) + Ec(y) + T(y)$$

$$B(y) = B(y-1) \times \delta(\text{coefficient})$$

$$R(y) = Pr(y) + Er(y)$$

$$P(y) = \{Pc(y) + Pr(y)\} = \{Pc(y-1) + Pr(y-1)\} \times \sigma(\text{coefficient})$$

$$Ec(y) = Ec(y-1) \times \beta(\text{coefficient})$$

$$Er(y) = Er(y-1) \times \beta(\text{coefficient}) \times \gamma(\text{coefficient})$$

Expenses and coefficient values are as follows:

**B(y):** Estimate for equity income in the fiscal year (limited to the stationary expected equity income and excluding income whose amount cannot be expected such as the presumed increase and extraordinary revenues including donations, commission revenue and intellectual property revenue). B(y-1) is B(y) of the most recent fiscal year

**C(y):** Administrative expenditures in the fiscal year.

**Ec(y):** Impersonal expenses in administrative expenditures in the fiscal year. Ec(y-1) is Ec(y) of the most recent fiscal year.

**Er(y):** Impersonal expenses in business expenditures in the fiscal year. Er(y-1) is Er(y) of the most recent fiscal year.

**P(y):** Personnel expenses in the fiscal year (including retirement allowances).

**Pc(y):** Personnel expenses in administrative expenditures in the fiscal year. Pc(y-1) is Pc(y) of the most recent fiscal year.

**Pr(y):** Personnel expenses in business expenditures in the fiscal year. Pr(y-1) is Pr(y) of the most recent fiscal year.

**R(y):** Business expenditures in the fiscal year.

**T (y):** Tax and other dues in the fiscal year.

**ε(y):** Special expenses in the fiscal year. Expenses incurred only in the year or temporarily due to the implementation of priority measures, change of the nuclear safety regulation system, occurrence of an accident, or increase/decrease of the number of retirees whose scale may influence the calculation rule of government subsidies for national university corporations. These will be specifically determined in a budget compilation

process for each fiscal year.

$\zeta(y)$ : Mandatory expenditures incurred due to provisions of various laws and regulations and business expenditures acquired from external funds.

$\alpha 1$ : General administrative efficiency coefficient. Based on reduction targets concerning administrative expenditures shown in the mid to long-term objectives, we shall determine a specific coefficient for the fiscal year in a budget compilation process for each fiscal year.

$\alpha 2$ : Project efficiency coefficient. Based on reduction targets shown in the mid to long-term objectives, we shall determine a specific coefficient for the fiscal year in a budget compilation process for each fiscal year.

$\beta$ : Consumer price index. We shall determine a specific coefficient for the fiscal year in a budget compilation process for each fiscal year.

$\gamma$ : Operation policy coefficient. We shall determine a specific coefficient for the fiscal year in a budget compilation process for each fiscal year.

$\delta$ : Equity income policy coefficient. We shall determine a specific coefficient for the fiscal year in a budget compilation process for each fiscal year in consideration of past results.

$\lambda$ : Income adjustment coefficient. We shall determine a specific coefficient for the fiscal year in a budget compilation process for each fiscal year in consideration of rate of returns on the equity income in past results.

$\sigma$ : Personnel expenses adjustment coefficient. We shall determine a specific coefficient for the fiscal year in a budget compilation process for each fiscal year in consideration of salary raise ratio etc.

**【Specific coefficient used in the estimated budget for the mid to long-term plan and its setting basis etc.】**

Based on the calculation rule above, we shall produce a provisional estimate under the following assumptions:

- As for the estimate of subsidies for operating expenses, we shall not consider  $\varepsilon$  (special expenses).  $\alpha 1$  (general administrative efficiency coefficient) is reduced during the period for mid to long-term objectives by 21 % from the budget in 2014.  $\alpha 2$  (project efficiency coefficient) is reduced during the period for mid to long-term objectives by 7% from the budget in 2014. In provisional calculations,  $\lambda$  (income adjustment coefficient) is a flat value of 1.
- In provisional calculations of impersonal expenses in business expenditures,  $\beta$  (consumer price index) does not fluctuate ( $\pm 0\%$ ) and  $\gamma$  (operation policy coefficient) is a flat value of 1.
- In provisional calculations of personnel expenses,  $\sigma$  (personnel expenses adjustment coefficient) does not fluctuate ( $\pm 0\%$ ) and the number of retirees neither increases or decreases. etc.
- In provisional calculations of the estimate of equity income,  $\delta$  (equity income policy coefficient) does not fluctuate ( $\pm 0\%$ ).

- In provisional calculations for the estimate of grants, the demand for funds prospected per grant are accumulated.

(2) Income and expenditure plan

Fiscal 2015-2021 revenue and expenditure plan

(Unit: million yen)

Classification	General account									
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non - proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Expenses	47,760	16,929	7,427	227,855	0	53,726	35,388	8,370	40,279	437,735
Ordinary expenses	47,760	16,929	7,427	227,855	0	53,726	35,388	8,370	40,279	437,735
Business expenditures	40,583	14,028	6,696	201,325	0	52,135	34,646	8,042	25,104	382,558
Money transferred to the disposal business account	0	0	0	0	0	7,930	0	0	0	7,930
Administrative expenditures	0	0	0	0	0	0	0	0	11,378	11,378
Commissioned research expenditure, etc.	1,250	2,288	42	435	0	5	28	5	0	4,054
Depreciation expenses	5,927	612	689	26,095	0	1,587	714	323	3,798	39,745
Financial expenses	0	0	0	0	0	0	0	0	0	0
Extraordinary loss	0	0	0	0	0	0	0	0	0	0
Income	47,760	16,929	7,427	227,855	0	53,726	35,388	8,370	40,279	437,735
Income from Management expense grant income	40,362	13,885	2,813	114,994	0	49,610	5,314	7,946	35,971	270,896
Grant income	0	0	3,832	84,903	0	1,870	19,289	0	0	109,895
Commissioned research income	1,250	2,288	42	435	0	5	28	5	0	4,054

Other income	221	143	50	1,427	0	655	10,043	96	510	13,144
Reversal of per contra liabilities for property acquisition	5,927	612	689	26,095	0	1,587	714	323	3,798	39,745
Extraordinary income	0	0	0	0	0	0	0	0	0	0
Net income	0	0	0	0	0	0	0	0	0	0
Reversal of appropriated surplus of the previous medium-term objectives period	0	0	0	0	0	0	0	0	0	0
Gross income	0	0	0	0	0	0	0	0	0	0

(Unit: million yen)

Classification	Power source usage account									
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non - proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Expenses	57,934	4,158	2,361	9,301	220,348	380,286	0	11,243	58,284	743,914
Ordinary expenses	57,934	4,158	2,361	9,301	220,348	380,286	0	11,243	58,284	743,914
Business expenditures	55,978	3,679	1,894	8,740	209,444	365,815	0	10,810	34,959	691,321
Money transferred to the disposal business account	0	0	0	0	0	17,922	0	0	0	17,922
Administrative expenditures	0	0	0	0	0	0	0	0	18,141	18,141
Commissioned research expenditure, etc.	10	208	463	449	2,771	1,003	0	115	0	5,019
Depreciation expenses	1,946	271	3	112	8,133	13,469	0	318	5,184	29,434
Financial expenses	0	0	0	0	0	0	0	0	0	0
Extraordinary loss	0	0	0	0	0	0	0	0	0	0
Income	57,934	4,158	2,361	9,301	220,348	380,286	0	11,243	58,284	743,914
Income from Management expense grant income	55,937	3,676	1,892	8,726	209,224	328,734	0	10,764	52,939	671,892
Commissioned research income	10	208	463	449	2,771	1,003	0	115	0	5,019
Income from waste disposal expenditures	0	0	0	0	0	25,263	0	0	0	25,263
Other income	41	3	2	14	220	11,819	0	46	161	12,307
Reversal of per contra liabilities for property	1,946	271	3	112	8,133	13,469	0	318	5,184	29,434

acquisition											
Extraordinary income	0	0	0	0	0	0	0	0	0	0	0
Net income	0	0	0	0	0	0	0	0	0	0	0
Reversal of appropriated surplus of the previous medium-term objectives period	0	0	0	0	0	0	0	0	0	0	0
Gross income	0	0	0	0	0	0	0	0	0	0	0



(Unit: million yen)

Classification	Disposal business account									
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non-proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Expenses						11,734				11,734
Ordinary expenses						11,734				11,734
Business expenditures						11,676				11,676
Administrative expenditures						0				0
Depreciation expenses						58				58
Financial expenses						0				0
Extraordinary loss						0				0
Income						26,404				26,404
Received from other accounts						24,154				24,154
Income from waste disposal including research facilities						24				24
Reversal of per contra liabilities for property acquisition						58				58
Other income						2,168				2,168
Extraordinary income						0				0
Net income						14,670				14,670
Reversal of appropriated surplus in Article 21 of the Act on the Japan Atomic Energy Agency,						0				0

Independent Administrative Agency Gross income						14,670				14,670
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Note 1: The integrated value in columns may not match the sum total column due to rounding.

Note 2

- Types of usages of “waste treatment and disposal expenditures” are limited to operations concerning treatment, storage management, transport and disposal of low-level radioactive waste related to reprocessing service agreements with electricity utilities (agreements from 1977 through 1994).
- The following is a usage plan in period for the mid to long-term objectives:  
Amount to be used in 2015-2021: 25,263 million yen of 53,751 million yen of total expenses for all projects.

i) Waste treatment expenses:

Amount to be used: 2015-2021: 2,657 million yen in total

ii) Waste storage management expenses:

Amount to be used: 2015-2021: 10,238 million yen in total

iii) Waste disposal expenses:

Amount to be used: 2015-2021: 12,367 million yen in total

- Waste treatment and disposal expenditures are carried over to the next period for mid to long-term objectives.

Note 3

- The general account and “other income” in the power source usage account include expenses for treatment, storage and disposal of radioactive waste generated in accordance with agreements including commissioned research and joint research etc., based on Article 17, paragraph 1 of the Act on JAEA.
- A part of expenses for treatment and storage in the expenses shall be carried out to the next period for mid to long-term objectives to be used in and after 2022.

(3) Funding plan

Fiscal 2015-2021 budget

(Unit: million yen)

Classification	General account									
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non-proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Fund expenditure	47,173	17,723	7,023	213,888	0	57,229	37,550	8,852	40,126	429,564
Expenditure from operating activities	41,833	16,316	6,738	201,760	0	52,139	34,674	8,047	36,481	397,990
Money transferred to the disposal business account	0	0	0	0	0	7,930	0	0	0	7,930
Expenditure from investment activities	5,340	1,407	285	12,128	0	5,027	2,876	805	3,645	31,512
Expenditure from financial activities	0	0	0	0	0	0	0	0	0	0
Surplus carried forward to the next medium-term objectives period	0	0	0	0	0	63	0	0	0	63
Fund income	47,173	17,723	7,023	213,888	0	57,229	37,550	8,852	40,126	429,564
Income from operating activities	45,923	17,723	7,023	213,411	0	57,157	35,213	8,852	40,126	425,429
Management expense grant income	44,452	15,292	3,099	126,645	0	54,636	5,853	8,751	39,616	298,344
Grant income	0	0	3,832	84,903	0	1,870	19,289	0	0	109,895
Commissioned research income	1,250	2,288	42	435	0	5	28	5	0	4,054
Other income	221	143	50	1,427	0	646	10,043	96	510	13,136
Income from investment activities	1,250	0	0	476	0	0	2,338	0	0	4,064

Income from facility expenses	1,250	0	0	476	0	0	2,338	0	0	4,064
Income from financial activities	0	0	0	0	0	0	0	0	0	0
Balance carried forward from the previous medium objectives period	0	0	0	0	0	72	0	0	0	72

(Unit: million yen)

Classification	Power source usage account									
	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non-proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Fund expenditure	64,495	4,446	2,645	10,516	244,656	503,977	0	12,562	61,151	904,447
Expenditure from operating activities	55,988	3,887	2,358	9,189	212,215	366,818	0	10,925	53,100	714,480
Money transferred to the disposal business account	0	0	0	0	0	17,922	0	0	0	17,922
Expenditure from investment activities	8,507	559	288	1,327	32,440	57,673	0	1,637	8,051	110,481
Expenditure from financial activities	0	0	0	0	0	0	0	0	0	0
Surplus carried forward to the next medium-term objectives period	0	0	0	0	0	79,486	0	0	0	79,486
Fund income	64,495	4,446	2,645	10,516	244,656	503,977	0	12,562	61,151	904,447
Income from operating activities	64,495	4,446	2,645	10,516	244,033	457,417	0	12,562	61,151	857,264
Management expense grant income	64,443	4,235	2,180	10,053	241,042	378,725	0	12,401	60,989	774,069
Commissioned research income	10	208	463	449	2,771	1,003	0	115	0	5,019
Income from waste disposal expenditures	0	0	0	0	0	65,800	0	0	0	65,800
Other income	41	3	2	14	220	11,888	0	46	161	12,377
Income from investment activities	0	0	0	0	623	7,681	0	0	0	8,304

Income from facility expenses	0	0	0	0	623	7,681	0	0	0	8,304
Income from financial activities	0	0	0	0	0	0	0	0	0	0
Balance carried forward from the previous medium objectives period	0	0	0	0	0	38,879	0	0	0	38,879

(Unit: million yen)

Disposal business account										
Classification	R&D in response to the accident at Fukushima Daiichi Nuclear Power Station	Technical support and safety research for nuclear safety regulation and administration	R&D to improve nuclear safety and activities to contribute to nuclear non-proliferation and nuclear security	Basic and fundamental research and human resource development for nuclear power	R&D on Fast - Breeder Reactors (FBR)	R&D of reprocessing related to the nuclear fuel cycle and treatment of fuel fabrication and disposal of radioactive waste	Nuclear fusion R&D	Activities to promote industry - academia - government collaboration and gain trust from society	Common to legal persons	Total
Fund expenditure						41,453				41,453
Expenditure from operating activities						11,676				11,676
Expenditure from investment activities						29,777				29,777
Expenditure from financial activities						0				0
Surplus carried forward to the next medium-term objectives period						0				0
Fund income						41,453				41,453
Income from operating activities						28,044				28,044
Received from other accounts						25,852				25,852
Income from waste disposal including research facilities						24				24
Other income						2,168				2,168
Income from investment activities						13,409				13,409
Income from financial activities						0				0
Balance carried						0				0

forward from the  
previous medium  
objectives period

Note 1: The integrated value in columns may not match the sum total column due to rounding.

Note 2:

- Types of usage of “waste treatment and disposal expenditures” are limited to operations concerning treatment, storage management, transport and disposal of low-level radioactive waste related to reprocessing service agreements with electricity utilities (agreements from 1977 through 1994).

- The following is a usage plan in the period for mid to long-term objectives:

Amount to be used in 2015-2021: 25,263 million yen of 53,751 million yen of total expenses for all projects

i) Waste treatment expenses:

Amount to be used: 2015-2021: 2,657 million yen in total

ii) Waste storage management expenses:

Amount to be used: 2015-2021: 10,238 million yen in total

iii) Waste disposal expenses:

Amount to be used: 2015-2021: 12,367 million yen in total

- Waste treatment and disposal expenditures are carried over to the next period for mid to long-term objectives.

Note 3:

- The general account and “other income” in the power source usage account include expenses for treatment, storage and disposal of radioactive waste generated in accordance with agreements including commissioned research and joint research etc., based on Article 17, paragraph 1 the Act on JAEA.

- A part of expenses for treatment and storage in the expenses shall be carried forward to the next period for mid to long-term objectives to be used in and after 2022.



2. Maximum amount of short-term borrowings

The maximum amount of short-term borrowings shall be 35 billion yen. Short-term borrowing is prospected when the acceptance of subsidies for operating expenses is delayed etc.

3. If JAEA has any unnecessary property or any property that is expected to be unnecessary, a plan for disposal of such property shall be made

The tenement shall be verified to see whether it is necessary or not to ensure operations in the future and if it is determined that it is not necessary, it shall be disposed of in accordance with the Act on General Rules for Incorporated Administrative Agencies.

4. The plan to assign or mortgage important property other than as provided in the previous item

For the National Route 245 widening project by Ibaraki Pref., part of residential land, forest and miscellaneous sites in Tokai village, Naka district, Ibaraki shall be sold to Ibaraki Prefecture.

5. Use of surplus

When surpluses occur in the settlement of accounts,

▪ They are appropriated to the following operations:

i) Measures for ensuring safety at nuclear facilities

ii) Expenses required for decommissioning of nuclear facilities and treatment of radioactive waste

▪ Surpluses shall be used for procurement of equipment etc., which will be additionally required in promoting R&D activities.

V. Other Important Matters Concerning the Administration of Operations

1. Establishment of effective and efficient management systems

(1) Effective and efficient administration of organization

To maximize R&D results, putting utmost priority to safety as a nuclear research institute that comprehensively implements various R&D activities, we shall enhance management support functions such as planning of management strategy and control safety securement activities and make swift and appropriate decisions

and distribute management resources agilely and flexibly. In addition, divisions established per main project shall give considerable authority and responsibility to directors, direct operation policies by the President, realize reasonable governance and swift operation management through governance in the division and enhance coordination. Furthermore, we shall constantly remove harmful results of the introduction of divisions and review operations and work flow to maximize merits.

To execute operations, we shall build and implement proper management control cycles and continuously improve operation quality. Moreover, the President, Executive Vice President and Executive Directors shall communicate directly with site staff, make the management policies known to staff, timely and properly understand issues on site and properly handle them. Moreover, we shall manage projects in a sound, effective and efficient way and ensure the transparency of project management based on external advice and proposals. Furthermore, we shall respect the opinions of the Regulation Support Council established in JAEA, which is composed of external experts, on operations related to technical support to the nuclear safety regulation administration and nuclear disaster prevention, while ensuring effectiveness, neutrality and transparency.

The management control cycle shall continuously verify various reform efforts concerning the organization and operations included in the JAEA reform plan lest the efforts lose substance.

## (2) Reinforcement of internal control

To promote sustainable development through operational streamlining, backed up by legality, soundness and transparency of project activities trusted by society, we shall develop and operate a proper internal control environment through reasonable decision-making by management to ensure correct safeguarding. To do this, while making officers and staff comply with laws and regulations according to the management concept and behavior standards and making proper and efficient decisions led by the President, we shall develop and operate internal regulations and execute effective operations. In addition, in implementing project activities, we shall prevent risks from becoming apparent through unified risk management activities including promotion of compliance; we shall develop/maintain speedy responses to the materialization of risks for the worst. Moreover, we shall secure checking functions in various operations under jurisdiction and organization control such as R&D operations, safety and security management, backing up by nuclear security, financial accounting management and contract office work

procedures.

In addition, we shall continue occasional and regular monitoring and verification of development/maintenance status and its effective functioning through internal audits etc. We shall enhance the internal audit system as well as technical aspects of nuclear safety, develop a system to ensure effectiveness of audits, conduct effective monitoring and proper evaluation of operations done by organizations to lead to the remedy and improvement of operations.

In addition, we shall systematically formulate organization plans to prevent misconduct in R&D activities etc. and misuse of research funds, provide ethic education training etc., provide inspection and required reviews of activities in the organization, strengthen the system to respond to misconduct and promote fair R&D activities trusted by the public and society.

In addition, while referring to “*Dokuritsu Gyosei Hojin no Gyomu no Tekisei Wo Kakuho surutame no Taisei to no Seibi* (Development of Systems etc. to Secure Appropriateness of Operations of Incorporated Administrative Agencies)” (Notification by the Director-General of the Administrative Management Bureau, the Ministry of Internal Affairs and Communications in November 2014), we shall make necessary efforts.

(3) Maximization of R&D results through cooperation among research organizations and R&D evaluation

1) Maximization of R&D results through cooperation among research organizations

President and directors etc., shall flexibly set research themes or organize teams in consideration of R&D needs and issues in and out of JAEA, which require cross-cutting and cross organizational efforts and enhance efforts to maximize research results as a whole of JAEA. In addition, we shall take measures to actively support staff’s voluntary cross-organizational efforts.

We shall also improve our database so that non-JAEA organizations can effectively use research infrastructure in JAEA.

Moreover, to pass down knowledge to young researchers and engineers and improve their ability etc., we shall effectively manage knowledge in divisions and deploy good practices through horizontal business networks in JAEA.

Moreover, JAEA promotes close coordination and cooperation with QST to implement the separated R&D operations smoothly and helps create further

R&D results.

2) Effective and efficient promotion of operations by evaluation

We shall establish an external evaluation committee to evaluate R&D for each main project and evaluate the project's validity such as its plan, progress and results from the viewpoints of consistency with national policies, social needs, research management, outcomes etc., based on "Guidelines for Incorporated Administrative Agency Evaluation." We shall properly reflect evaluation results in research management and resource allocations of budgets and human resources including revision or abolition of R&D organization, facilities and equipment.

To contribute to proper and strict evaluations, we shall develop objective achievement data as the JAEA R&D institution and release evaluation results through the JAEA website in an easily understandable way.

In addition, for self-assessment, in accordance with the Act on General Rules for Incorporated Administrative Agencies, JAEA shall pay due consideration to make self-evaluation objective and highly reliable and properly utilize evaluation results of the external evaluation committee.

(4) Promote operational reforms

To further improve the efficiency of operations, we shall keep our will to continuously improve the administrations of operations in the future and promote the improvement and efficiency in operations, focusing on activities based on the operation reform promotion committee.

Besides, we shall continuously work on business improvement and efficiency proposal systems from staff etc. to listen to the opinions of the sites.

2. Plan concerning equipment and facilities

We shall steadily develop decommissioning of facilities shown in JAEA reform. We shall verify if JAEA should possess an exhibition facility in an early stage and if it no longer required, steadily dispose of it. We shall strictly verify whether JAEA is required to continuously possess asset holdings other than exhibition facilities, steadily promote disposals etc. under specific plans. In addition, we shall comprehensively consider future R&D needs and safety research needs to technically support nuclear regulatory administration, repair/maintenance costs etc. rapidly decommission unused facilities and equipment which have finished their

roles to technically support, and formulate the mid to long-term facility plans for collecting, focusing on and decommissioning existing facilities and steadily implement the same.

Furthermore, we shall focus on effectively upgrading and developing facilities and equipment required to perform operations and comply with earthquake resilience and new regulation standards in a well-planned proper manner.

The following are facilities and equipment to be obtained, developed, or maintained in 2015 through 2021:

(Unit: million yen)

Details of equipment and facilities	Estimated amount	Financial resources
Development/maintenance of Oarai Waste Reduction Treatment Facility	7,681	Grants for facility expenses
Establishment of disaster prevention building	623	Grants for facility expenses
Development/maintenance of building using activation products	476	Grants for facility expenses
Development/maintenance of Collaborative Laboratories for Advanced Decommissioning Science (CLADS)	1,250	Grants for facility expenses
Development/maintenance of wide approach related facilities	2,338	Grants for nuclear fusion R&D facility expenses

Note: The amounts are estimated amounts.

Furthermore, in addition to the above, facilities necessary to achieve mid to long-term objectives may be developed/maintained and large-scale repairs or advancements may be carried out for facilities etc. In addition, it is expected that repair etc. will be added in consideration of the degree of deterioration of facilities and equipment.

### 3. Matters concerning the faithful implementation of international agreements

With regard to the administrations of operations in JAEA, we shall faithfully carry out a convention on research, development and utilization of nuclear energy and other international agreements concluded by Japan in light of conditions of other countries.

### 4. Plans for personnel

We shall formulate a comprehensive human resource plan including the ideal type of human resources, hiring and training policies to maximize R&D results and efficiently carry out operations, paying special attention to the following points and strategically making efforts.

For researchers, we shall develop a fluid environment that enables JAEA to hire excellent researchers, ensure good domestic and foreign researchers, improve human exchanges with universities, research institutions etc. improve the ability of JAEA staff and contribute to the development of human resources for nuclear power

in Japan. Aiming at producing internationally successful human resources, we shall provide opportunities to carry out research at foreign universities and research institutions and dispatch our staff to international organizations.

We shall deploy human resources cross-organizationally and flexibly depending on R&D development and the job performance status. In addition, we shall allocate human resources to have the right people in the right jobs in order to improve R&D capabilities required for the organization and management and the ability to manage the organization.

To acquire knowledge and skills necessary for operations and improve the organization's management ability, we shall make an education research system including human exchanges with industry more satisfactory, effectively use the reemployment system and work on technology transmission between generations.

To ensure actively securing and using female staff, we shall actively work on gender equality and continuously promote a positive balance of work and life.

We shall properly and strictly implement the evaluation of abilities and operational performances of officers and staff and reflect the results in their treatment and clarify responsibilities to improve staff motivation and capability.

#### 5. Debt burden for the period exceeding mid to long-term objectives

The debt for the period exceeding mid to long-term objectives shall be assumed if the maintenance and repair of R&D facilities and equipment exceed the mid to long-term objective period and we judge the debt burden reasonable in consideration of its necessity and the influence on funding plans.

#### 6. Use of a reserve fund

The amount approved by the competent minister of the balance of reserved funds in the final fiscal year of the previous periods for mid to long-term objectives shall be appropriated to the following operations:

- i) Measures for ensuring safety at nuclear facilities
- ii) Expenses necessary for decommissioning of nuclear facilities, treatment and disposal of radioactive waste