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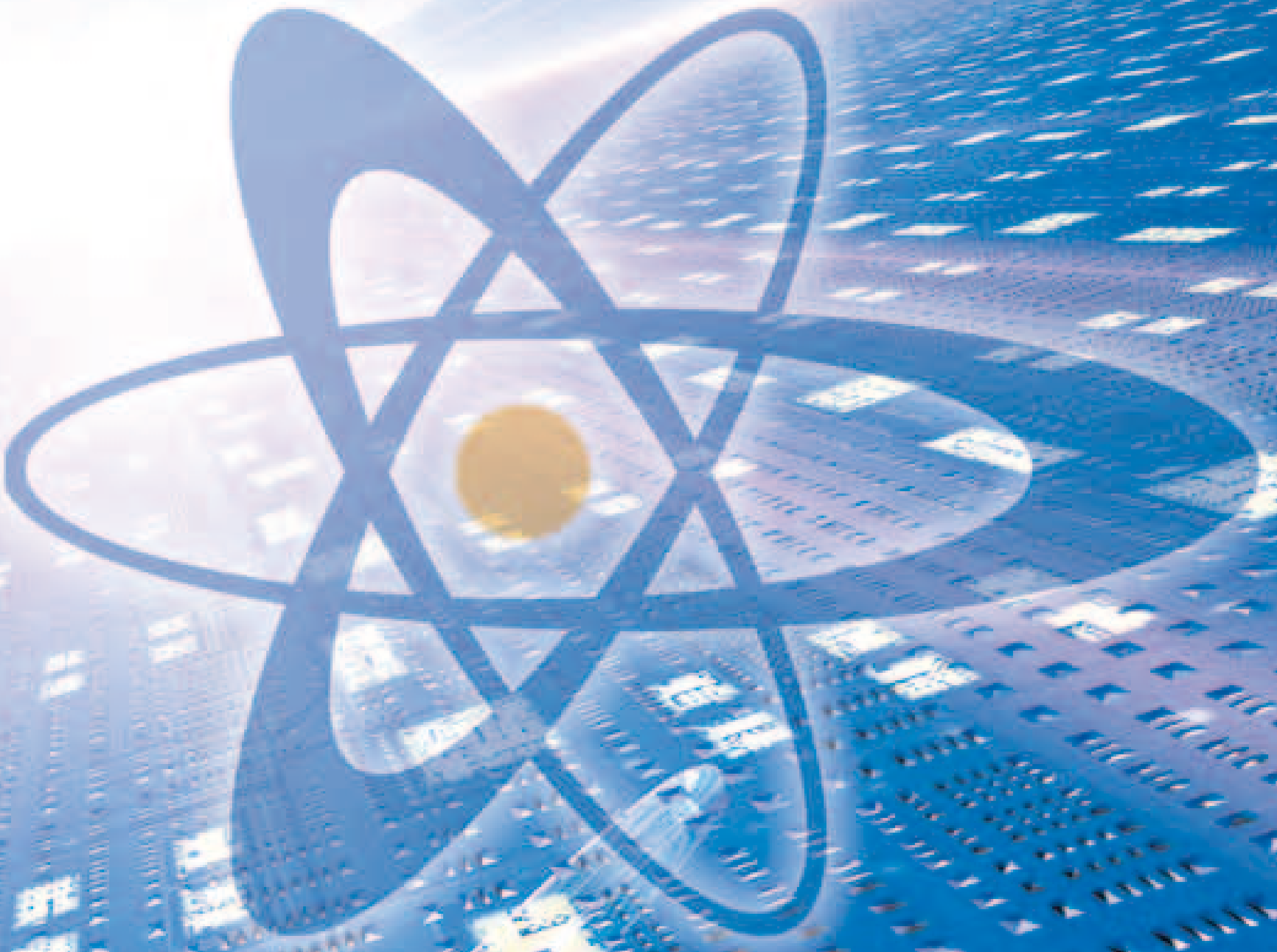
OPERATIONAL STATUS of NUCLEAR FACILITIES in JAPAN

2013 Edition



Japan Nuclear Energy Safety Organization

OPERATIONAL STATUS of NUCLEAR FACILITIES in JAPAN

2013 Edition

Japan Nuclear Energy Safety Organization

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Remarks: The contents of this annual report were compiled by the JNES based on items appearing on the Nuclear and Industrial Safety Agency website and materials obtained from the Nuclear and Industrial Safety Agency, unless otherwise specified. The supplementary chronological table was prepared by the JNES.

Preface

This document is a compilation which provides an outline of the administration of nuclear facility safety regulations as well as various data on nuclear power reactor facilities, nuclear power reactor facilities in the research and development stage, and fuel fabrication, reprocessing, disposal, and storage facilities in fiscal year 2012 (from April 2012 to March 2013).

Though we attempted to use the various data published by each affiliated organization in this compilation, it should be noted that some parts of this document differ from the format adopted in previous years. This is due to the influence of accident that occurred at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. as a result of the Tohoku District-Off the Pacific Ocean Earthquake on March 11, 2011, the mid-term efforts for decommissioning units 1 to 4 of the Fukushima Daiichi Nuclear Power Station just started, and the omission of some data in association with the abolishment of the Nuclear and Industrial Safety Agency.

The tasks including the approval for construction plans, pre-operation inspections, welding inspections, and periodic inspections, etc. had been done for the nuclear power reactor facilities in accordance with the provisions of the Electric Business Act, but recently these tasks were incorporated in the Nuclear Reactor Regulation Act. Details of these contents are explained in Chapter XVII "Safety Regulation Administration." It should also be noted that the results of periodic inspections, etc., which include the results in FY 2012, are presented in the conventional format.

In consideration of the accident that occurred at the Fukushima Daiichi Nuclear Power Station, the Japanese government established a highly independent regulatory organization, the Nuclear Regulation Authority and the Secretariat of NRA as an office of this operation on September 19, 2012. Under this new system, the Nuclear Regulation Authority is discussing the standards for new regulations which are by no means inferior to those in the U.S and E.U. It is expected to improve nuclear safety in future.

We sincerely hope this document is widely used by many people engaged in work related to ensuring nuclear safety.

December 2013

Planning Division
Japan Nuclear Energy Safety Organization,
Independent Administrative Agency

COMMERCIAL NUCLEAR POWER PLANTS AND NUCLEAR POWER PLANTS IN RESEARCH AND DEVELOPMENT STAGE

I OVERVIEW OF NUCLEAR POWER PLANTS

I-1 Status of Operation, Construction and Decommissioning of Nuclear Power Plants

(1) Commercial nuclear power plants

As of the end of FY2012, the number of plants in operation at nuclear electric power stations were 50 with their total output 46,148,000 kW.

Fukushima Daiichi Nuclear Power Station, Unit 1 (460,000 kW: BWR), Unit 2 (784,000 kW: BWR), Unit 3 (784,000 kW: BWR) and Unit 4 (784,000 kW: BWR) expired commercial operation on May 20, 2011 and have been in the decommissioning stage since April 19, 2012.

Hamaoka Nuclear Power Station, Units 1 (540,000 kW: BWR) and 2 (840,000 kW: BWR) expired commercial operation on January 30, 2009 and have been in the decommissioning stage since FY2009

The Japan Atomic Power Company's Tokai Power Station (166,000 kW: GCR) discontinued commercial operation at the end of FY1997 and has been in the decommissioning stage since FY2001.

As of the end of FY2012

		BWR	PWR	GCR	Total
Operating	Number of plants	26	24	—	50
	Output (10,000 kW)	2, 587. 0	2. 027. 8	—	4, 614. 8
Under construction	Number of plants	3	—	—	3
	Output (10,000 kW)	414. 1	—	—	414. 1
Being decommissioned	Number of plants	6	—	1	7
	Output (10,000 kW)	419. 2	—	16. 6	435. 8

As of the end of FY2012

		BWR	PWR	GCR	Total
Preparing for construction	Number of plants	5	3	—	8
	Output (10,000 kW)	691. 6	466. 6	—	1, 158. 2

(2) Nuclear power plants in research and development stage

As of the end of FY2012

		ATR (prototype reactor)	FBR (prototype reactor)	Total
Under construction	Number of plants	—	1	1
	Output (10,000 kW)	—	28. 0	28. 0
Being decommissioned	Number of plants	1	—	1
	Output (10,000 kW)	16. 5	—	16. 5

I-2 Status of Operation and Construction of Nuclear Power Plants

(1) Commercial nuclear power plants

	Name of establisher	Name of power plant	Address	Reactor type
Operating	The Japan Atomic Power Company Co., Ltd.	Tokai No. 2 Power Station	Tokai Village, Naka County, Ibaraki Prefecture	BWR
		Tsuruga Power Station Unit 1	Tsuruga City, Fukui Prefecture	BWR
		Tsuruga Power Station Unit 2	Tsuruga City, Fukui Prefecture	PWR
	Hokkaido Electric Power Co., Inc.	Tomari Power Station Unit 1	Tomari Village, Furuu County, Hokkaido	PWR
		Tomari Power Station Unit 2	Tomari Village, Furuu County, Hokkaido	PWR
		Tomari Power Station Unit 3	Tomari Village, Furuu County, Hokkaido	PWR
	Tohoku Electric Power Co., Inc.	Onagawa Nuclear Power Station Unit 1	Onagawa Town Oshika County and Ishinomaki City, Miyagi Prefecture	BWR
		Onagawa Nuclear Power Station Unit 2	Onagawa Town Oshika County and Ishinomaki City, Miyagi Prefecture	BWR
		Onagawa Nuclear Power Station Unit 3	Onagawa Town Oshika County and Ishinomaki City, Miyagi Prefecture	BWR
		Higashidori Nuclear Power Station Unit 1	Higashidori Village ,Shimokita County, Aomori Prefecture	BWR
	Tokyo Electric Power Co., Inc.	Fukushima Daiichi Nuclear Power Station Unit 5	Futaba Town and Okuma Town , Futaba County, Fukushima Prefecture	BWR
		Fukushima Daiichi Nuclear Power Station Unit 6	Futaba Town and Okuma Town , Futaba County, Fukushima Prefecture	BWR
		Fukushima Daini Nuclear Power Station Unit 1	Naraha Town and Tomioka Town, Futaba County, Fukushima Prefecture	BWR
		Fukushima Daini Nuclear Power Station Unit 2	Naraha Town and Tomioka Town, Futaba County, Fukushima Prefecture	BWR
		Fukushima Daini Nuclear Power Station Unit 3	Naraha Town and Tomioka Town, Futaba County, Fukushima Prefecture	BWR
		Fukushima Daini Nuclear Power Station Unit 4	Naraha Town and Tomioka Town, Futaba County, Fukushima Prefecture	BWR
		Kashiwazaki-Kariwa Nuclear Power Station Unit 1	Kariwa Village, Kariwa County, and Kashiwazaki City, Niigata Prefecture	BWR
		Kashiwazaki-Kariwa Nuclear Power Station Unit 2	Kariwa Village, Kariwa County, and Kashiwazaki City, Niigata Prefecture	BWR
		Kashiwazaki-Kariwa Nuclear Power Station Unit 3	Kariwa Village, Kariwa County, and Kashiwazaki City, Niigata Prefecture	BWR
		Kashiwazaki-Kariwa Nuclear Power Station Unit 4	Kariwa Village, Kariwa County, and Kashiwazaki City, Niigata Prefecture	BWR
		Kashiwazaki-Kariwa Nuclear Power Station Unit 5	Kariwa Village, Kariwa County, and Kashiwazaki City, Niigata Prefecture	BWR
		Kashiwazaki-Kariwa Nuclear Power Station Unit 6	Kariwa Village, Kariwa County, and Kashiwazaki City, Niigata Prefecture	ABWR
		Kashiwazaki-Kariwa Nuclear Power Station Unit 7	Kariwa Village, Kariwa County, and Kashiwazaki City, Niigata Prefecture	ABWR
	Chubu Electric Power Co., Inc.	Hamaoka Nuclear Power Station Unit 3	Sakura, Omaezaki City, Shizuoka Prefecture	BWR
		Hamaoka Nuclear Power Station Unit 4	Sakura, Omaezaki City, Shizuoka Prefecture	BWR
		Hamaoka Nuclear Power Station Unit 5	Sakura, Omaezaki City, Shizuoka Prefecture	ABWR
	Hokuriku Electric Power Co.	Shika Nuclear Power Station Unit 1	Shika Town, Hakui County, Ishikawa Prefecture	BWR
		Shika Nuclear Power Station Unit 2	Shika Town, Hakui County, Ishikawa Prefecture	ABWR
	The Kansai Electric Power Co., Inc.	Mihama Power Station Unit 1	Mihama Town, Mikata County, Fukui Prefecture	PWR
		Mihama Power Station Unit 2	Mihama Town, Mikata County, Fukui Prefecture	PWR
		Mihama Power Station Unit 3	Mihama Town, Mikata County, Fukui Prefecture	PWR
		Takahama Power Station Unit 1	Takahama Town, Ohi County, Fukui Prefecture	PWR
		Takahama Power Station Unit 2	Takahama Town, Ohi County, Fukui Prefecture	PWR
		Takahama Power Station Unit 3	Takahama Town, Ohi County, Fukui Prefecture	PWR
		Takahama Power Station Unit 4	Takahama Town, Ohi County, Fukui Prefecture	PWR
		Ohi Power Station Unit 1	Ohi Town, Ohi County, Fukui Prefecture	PWR
		Ohi Power Station Unit 2	Ohi Town, Ohi County, Fukui Prefecture	PWR
		Ohi Power Station Unit 3	Ohi Town, Ohi County, Fukui Prefecture	PWR
		Ohi Power Station Unit 4	Ohi Town, Ohi County, Fukui Prefecture	PWR
	The Chugoku Electric Power Co., Inc.	Shimane Nuclear Power Station Unit 1	Kashimacho, Matsue City, Shimane Prefecture	BWR
		Shimane Nuclear Power Station Unit 2	Kashimacho, Matsue City, Shimane Prefecture	BWR
	Shikoku Electric Power Co., Inc.	Ikata Power Station Unit 1	Ikata Town, Nishiuwa County, Ehime Prefecture	PWR
		Ikata Power Station Unit 2	Ikata Town, Nishiuwa County, Ehime Prefecture	PWR
		Ikata Power Station Unit 3	Ikata Town, Nishiuwa County, Ehime Prefecture	PWR
	Kyushu Electric Power Co., Inc.	Genkai Nuclear Power Station Unit 1	Genkai Town, Higashimatsura County, Saga Prefecture	PWR
		Genkai Nuclear Power Station Unit 2	Genkai Town, Higashimatsura County, Saga Prefecture	PWR
		Genkai Nuclear Power Station Unit 3	Genkai Town, Higashimatsura County, Saga Prefecture	PWR
		Genkai Nuclear Power Station Unit 4	Genkai Town, Higashimatsura County, Saga Prefecture	PWR
		Sendai Nuclear Power Station Unit 1	Satsumasendai City, Kagoshima Prefecture	PWR
		Sendai Nuclear Power Station Unit 2	Satsumasendai City, Kagoshima Prefecture	PWR
	Subtotal			(50 units)

As of the end of FY2012

Licensed output (10,000 kW)	Date of authorization by the Electric Power Development Coordination Council	Date of the establishment license issue	Date of the construction start (see note 2)	Date of the commercial operation
110.0	1972- 1	1972-12-23	1973- 4	1978-11-28
35.7	1965- 6	1966- 4-22	1967- 2	1970- 3-14
116.0	1979- 1	1982- 1-26	1982- 3	1987- 2-17
57.9	1982- 4	1984- 6-14	1984- 8	1989- 6-22
57.9	1982- 4	1984- 6-14	1984- 8	1991- 4-12
91.2	2000-11	2003- 7- 2	2003-11	2009-12-22
52.4	1970- 6	1970-12-10	1971- 5	1984- 6- 1
82.5	1987- 4	1989- 2-28	1989- 6	1995- 7-28
82.5	1994- 3	1996- 4-12	1996- 9	2002- 1-30
110.0	1996-7	1998-8-31	1998-12	2005-12-8
78.4	1971- 3	1971- 9-23	1971-12	1978- 4-18
110.0	1972- 1	1972-12-12	1973- 3	1979-10-24
110.0	1972- 7	1974- 4-30	1975- 8	1982- 4-20
110.0	1975- 3	1978- 6-26	1979- 1	1984- 2- 3
110.0	1977- 3	1980- 8- 4	1980-11	1985- 6-21
110.0	1978- 7	1980- 8- 4	1980-11	1987- 8-25
110.0	1974- 8	1977- 9- 1	1978-11	1985- 9-18
110.0	1981- 4	1983- 5- 6	1983- 8	1990- 9-28
110.0	1985- 4	1987- 4- 9	1987- 6	1993- 8-11
110.0	1985- 4	1987- 4- 9	1987- 6	1994- 8-11
110.0	1981- 4	1983- 5- 6	1983- 8	1990- 4-10
135.6	1988- 4	1991- 5-15	1991- 8	1996-11- 7
135.6	1988- 4	1991- 5-15	1991- 8	1997- 7- 2
110.0	1978-11	1981-11-16	1982- 6	1987- 8-28
113.7	1986-11	1988- 8-10	1988-10	1993- 9- 3
138.0	1997- 4	1998-12-25	1999- 3	2005- 1-18
54.0	1987- 1	1988- 8-22	1988-11	1993- 7-30
120.6	1997-4	1999-4-14	1999-8	2006-3-15
34.0	1966- 4	1966-12- 1	1967- 8	1970-11-28
50.0	1968- 1	1968- 5-10	1968-12	1972- 7-25
82.6	1971- 7	1972- 3-13	1972- 7	1976-12- 1
82.6	1969- 7	1969-12-12	1970- 4	1974-11-14
82.6	1970- 6	1970-11-25	1971- 2	1975-11-14
87.0	1978- 3	1980- 8- 4	1980-11	1985- 1-17
87.0	1978- 3	1980- 8- 4	1980-11	1985- 6- 5
117.5	1970-11	1972- 7- 4	1972-10	1979- 3-27
117.5	1970-11	1972- 7- 4	1972-11	1979-12- 5
118.0	1985- 2	1987- 2-10	1987- 3	1991-12-18
118.0	1985- 2	1987- 2-10	1987- 3	1993- 2- 2
46.0	1969- 7	1969-11-13	1970- 2	1974- 3-29
82.0	1981- 4	1983- 9-22	1984- 2	1989- 2-10
56.6	1972- 3	1972-11-29	1973- 4	1977- 9-30
56.6	1975- 3	1977- 3-30	1977-12	1982- 3-19
89.0	1983- 4	1986- 5-26	1986- 8	1994-12-15
55.9	1970- 6	1970-12-10	1971- 3	1975-10-15
55.9	1974- 8	1976- 1-23	1976- 5	1981- 3-30
118.0	1982-10	1984-10-12	1985- 3	1994- 3-18
118.0	1982-10	1984-10-12	1985- 3	1997- 7-25
89.0	1976- 3	1977-12-17	1978-11	1984- 7- 4
89.0	1978- 7	1980-12-22	1981- 3	1985-11-28
4,614.8				

	Name of establisher	Name of power plant	Address	Reactor type
Under construction	Tokyo Electric Power Co., Inc.	Higashidori Nuclear Power Station Unit 1	Higashidoori Village, Shimokita County, Aomori Prefecture	ABWR
	The Chugoku Electric Power Co., Inc.	Shimane Nuclear Power Station Unit 3	Kashimacho, Matsue City, Shimane Prefecture	ABWR
	Electric Power Development Co., Ltd.	Ohma Nuclear Power Station	Ohma Town, Shimokita County, Aomori Prefecture	ABWR
	Subtotal			(3 units)
Being decommissioned	Tokyo Electric Power Co., Inc.	Fukushima Daiichi Nuclear Power Station Unit 1 Fukushima Daiichi Nuclear Power Station Unit 2 Fukushima Daiichi Nuclear Power Station Unit 3 Fukushima Daiichi Nuclear Power Station Unit 4	Futaba Town and Okuma Town , Futaba County, Fukushima Prefecture	BWR BWR BWR BWR
	Chubu Electric Power Co., Inc.	Hamaoka Nuclear Power Station Unit 1	Sakura, Omaezaki City, Shizuoka Prefecture	BWR
		Hamaoka Nuclear Power Station Unit 2	Sakura, Omaezaki City, Shizuoka Prefecture	BWR
	The Japan Atomic Power Company Co., Ltd.	Tokai Power Station	Tokai Village, Naka County, Ibaraki Prefecture	GCR
	Subtotal			(7 units)

	Name of establisher	Name of power plant	Address	Reactor type
Preparing for construction (Note 3)	The Japan Atomic Power Company Co., Ltd.	Tsuruga Power Station Unit 3 Tsuruga Power Station Unit 4	Tsuruga City, Fukui Prefecture Tsuruga City, Fukui Prefecture	APWR APWR
	Tohoku Electric Power Co., Inc.	Higashidori Nuclear Power Station Unit 2	Higashidoori Village, Shimokita County, Aomori Prefecture	ABWR
	Tokyo Electric Power Co., Inc.	Higashidori Nuclear Power Station Unit 2	Higashidoori Village, Shimokita County, Aomori Prefecture	ABWR
	Chubu Electric Power Co., Inc.	Hamaoka Nuclear Power Station Unit 6	Sakura, Omaezaki City, Shizuoka Prefecture	ABWR
	The Chugoku Electric Power Co., Inc.	Kaminoseki Nuclear Power Station Unit 1	Kaminoseki Town, Kumage County, Yamaguchi Prefecture	ABWR
		Kaminoseki Nuclear Power Station Unit 2	Kaminoseki Town, Kumage County, Yamaguchi Prefecture	ABWR
	Kyushu Electric Power Co., Inc.	Sendai Nuclear Power Station Unit 3	Satsumasendai City, Kagoshima Prefecture	APWR
	Subtotal			(8 units)

(2) Nuclear power plants in research and development stage

	Name of establisher	Name of power plant	Address	Reactor type
Under construction	Japan Atomic Energy Agency, Tsuruga Head Office	Fast Breeder Reactor Research and Development Center	Tsuruga City, Fukui Prefecture	FBR (prototype reactor)
Being decommissioned		Fugen Decommissioning Engineering Center	Tsuruga City, Fukui Prefecture	ATR (prototype reactor)

As of the end of FY2012

Licensed output (10,000 kW)	Date of authorization by the Electric Power Development Coordination Council	Date of the establishment license issue	Date of the construction start (see note 2)	Date of the commercial operation (see note 3)
138.5	Sep. 2006	2010-12	2011-01	Undecided
137.3	2000-9 (see note 1)	2005-4-26	2005-12	Undecided
138.3	1999-8 (see note 1)	2008-4-23	2008-5	Undecided
414.1				
46.0 78.4 78.4 78.4	1966- 4 1968- 1 1969- 7 1971- 7	1966-12- 1 1968- 3-29 1970- 1-23 1972- 1-13	1967- 9 1969- 5 1970-10 1972- 5	1971- 3-26 1974- 7-18 1976- 3-27 1978-10-12
54.0 84.0	1969-7 1972-3	1970-12-10 1973-6-9 Approval of the decommissioning plan 2009-11-18	1971-2 1973-9 (commerced decommissioning) After FY2015 (planned)	1976-3-17 1978-11-29 (operation was discontinued) 2009-1-30
16.6	1959-12	1959-12-14 (Submission of the decommissioning plan (Nuclear Reactor Regulation Law)) 2001-10- 4 Approval of the decommissioning plan 2006-6-30	1961- 3 (commerced decommissioning) 2001-12	1966- 7-25 (operation was discontinued) 1998- 3-31 (approval of business discontinuance (Electricity Utilities Industry Law)) 2001-11-29
435.8				

As of the end of FY2012

Licensed output (10,000 kW)	Date of authorization by the Electric Power Development Coordination Council	Date of the establishment license issue	Date of the construction start (see note 2)	Date of the commercial operation (see note 3)
153.8	Aug. 2002 (see note 1)	Application submitted	Undecided	Undecided
153.8	Aug. 2002 (see note 1)	Application submitted	Undecided	Undecided
138.5			Undecided	Undecided
138.5	Sep. 2006		Undecided	Undecided
140.0			Undecided	Undecided
137.3	Jun. 2001 (see note 1)	Application being prepared	Undecided	Undecided
137.3	Jun. 2001 (see note 1)	Application being prepared	Undecided	Undecided
159.0			Undecided	Undecided
1158.2				

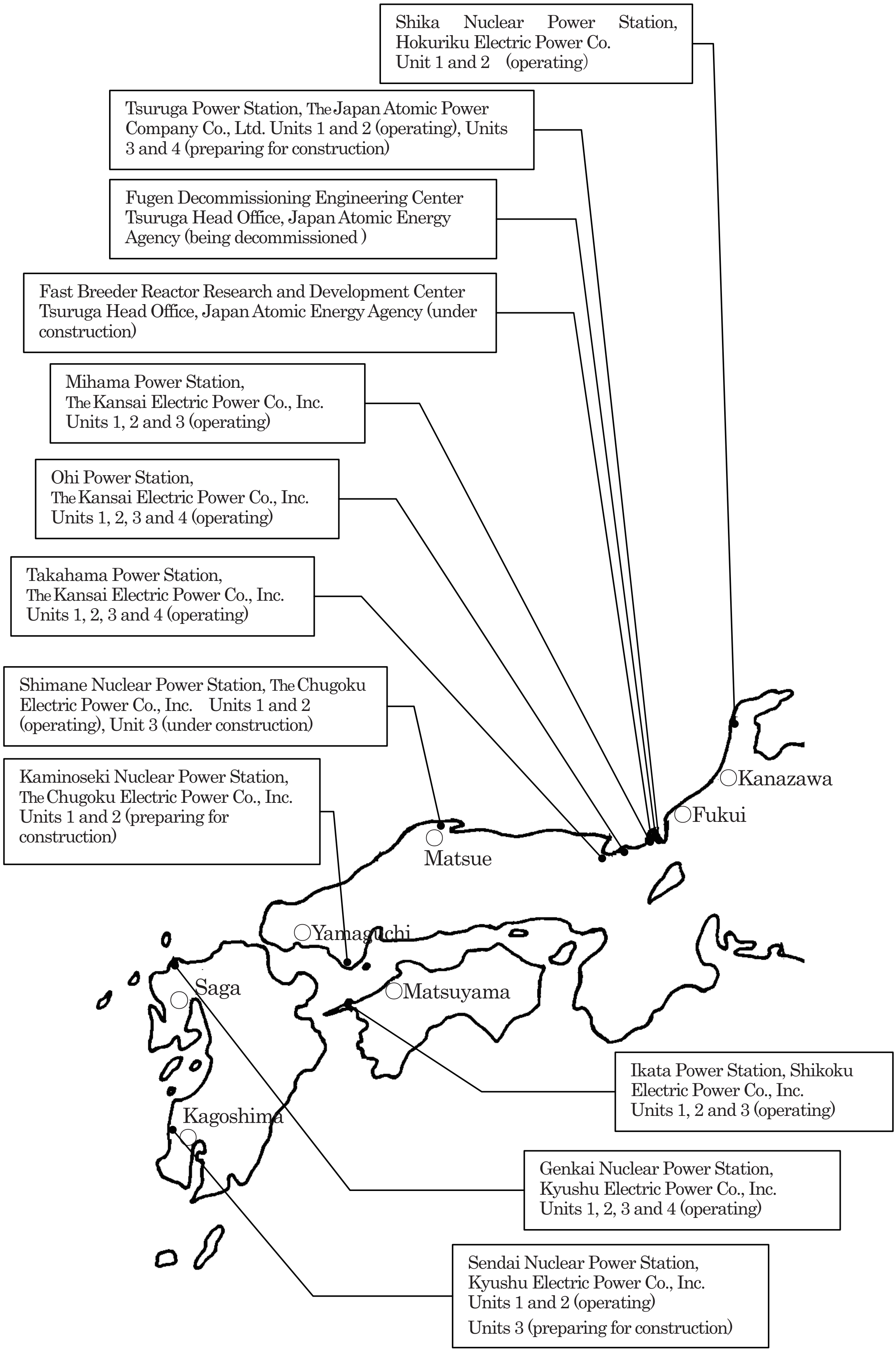
Notes:
1. The Basic Plan for Electric Power Development was canceled in October 2003. In February 2005, this reactor was designated by the "Program for Designation of Important Points of Electric Power Development" which was established as an alternative plan to the Basic Plan for Electric Power Development.
2. The date of the start of construction is the month when the first construction plan was approved.
3. "Preparing for construction" means the period from incorporation into the power supply plan to approval of the construction plan.

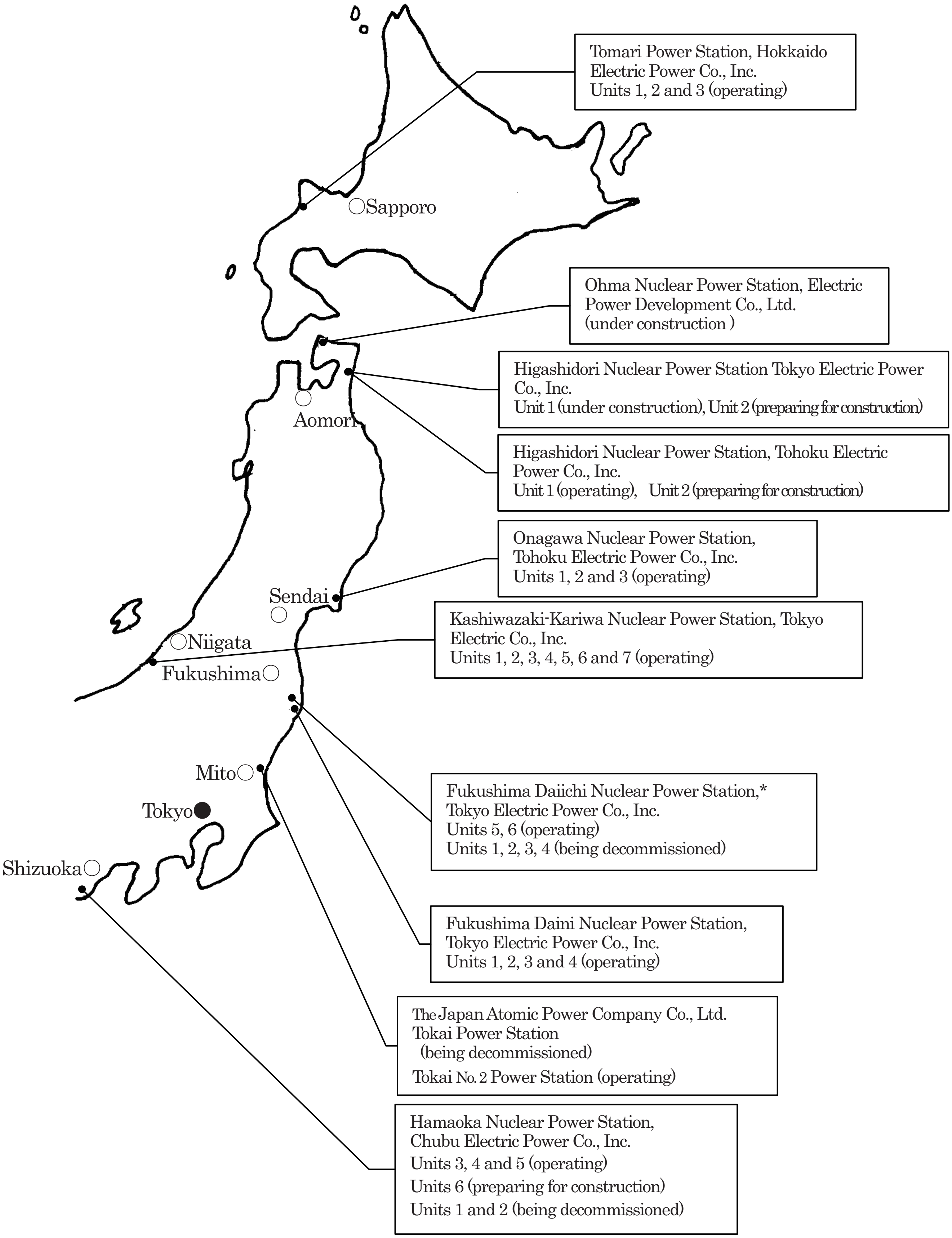
As of the end of FY2012

Licensed output (10,000 kW)	Date of decision by the Power Development Council	Date of issue of the license for reactor installation	Date of the start of construction (see note 1)	Date of the start of operation
28.0	-	1983- 5-27	1985- 9	Apr. 5, 1994 (critical) undecided
16.5	-	1970-11-30 Approval of the decommissioning plan 2008-2-12	(commerced decommissioning) 2008-5	1979- 3-20 (operation was discontinued) 2003- 3-29

Note: 1. The date of the start of construction is the month when the first construction plan was approved.

I-3 Nuclear Power Plant Site Map (as of the end of FY2012)




Tomari Power Station, Hokkaido Electric Power Co., Inc.
Units 1, 2 and 3 (operating)
Sapporo
Ohma Nuclear Power Station, Electric Power Development Co., Ltd.
(under construction)
Higashidori Nuclear Power Station Tokyo Electric Power Co., Inc.
Unit 1 (under construction), Unit 2 (preparing for construction)
Aomori
Higashidori Nuclear Power Station, Tohoku Electric Power Co., Inc.
Unit 1 (operating), Unit 2 (preparing for construction)
Onagawa Nuclear Power Station, Tohoku Electric Power Co., Inc.
Units 1, 2 and 3 (operating)
Sendai
Kashiwazaki-Kariwa Nuclear Power Station, Tokyo Electric Co., Inc.
Units 1, 2, 3, 4, 5, 6 and 7 (operating)
Niigata
Fukushima
Mito
Tokyo
Shizuoka
Fukushima Daiichi Nuclear Power Station,* Tokyo Electric Power Co., Inc.
Units 5, 6 (operating)
Units 1, 2, 3, 4 (being decommissioned)
Fukushima Daini Nuclear Power Station, Tokyo Electric Power Co., Inc.
Units 1, 2, 3 and 4 (operating)
The Japan Atomic Power Company Co., Ltd.
Tokai Power Station
(being decommissioned)
Tokai No. 2 Power Station (operating)
Hamaoka Nuclear Power Station, Chubu Electric Power Co., Inc.
Units 3, 4 and 5 (operating)
Units 6 (preparing for construction)
Units 1 and 2 (being decommissioned)

I-4 First Criticality and Synchronized to the Electric Grid

Plant name	Licensed output (10,000 kW)	Date of first fuel loading	Date of initial criticality	Date of grid connection	Date of initial commercial operation
Tokai※1	16.6	1965. 4.21	1965. 5. 4	1965.11.10	1966. 7.25
Tokai No. 2	110	1977.12.23	1978. 1.18	1978. 3.13	1978.11.28
Tsuruga Unit 1	35.7	1969. 9.20	1969.10. 3	1969.11.16	1970. 3.14
Tsuruga Unit 2	116	1986. 4.17	1986. 5.28	1986. 6.19	1987. 2.17
Tomari Unit 1	57.9	1988.10.17	1988.11.16	1988.12. 6	1989. 6.22
Tomari Unit 2	57.9	1990. 6.13	1990. 7.25	1990. 8.27	1991. 4.12
Tomari Unit 3	91.2	2009. 1.25	2009. 3. 3	2009. 3.20	2009.12.22
Onagawa Unit 1	52.4	1983. 9.22	1983.10.18	1983.11.18	1984. 6. 1
Onagawa Unit 2	82.5	1994.10.13	1994.11. 2	1994.12.23	1995. 7.28
Onagawa Unit 3	82.5	2001. 4. 2	2001. 4.26	2001. 5.30	2002. 1.30
Higashidori Unit 1	110	2005. 1.10	2005. 1.24	2005. 3. 9	2005.12. 8
Fukushima Daiichi Unit 1※2	46	1970. 7. 4	1970.10.10	1970.11.17	1971. 3.26
Fukushima Daiichi Unit 2※2	78.4	1973. 3.15	1973. 5.10	1973.12.24	1974. 7.18
Fukushima Daiichi Unit 3※2	78.4	1974. 8. 1	1974. 9. 6	1974.10.26	1976. 3.27
Fukushima Daiichi Unit 4※2	78.4	1977.12.15	1978. 1.28	1978. 2.24	1978.10.12
Fukushima Daiichi Unit 5	78.4	1977. 7. 2	1977. 8.26	1977. 9.22	1978. 4.18
Fukushima Daiichi Unit 6	110	1979. 1.16	1979. 3. 9	1979. 5. 4	1979.10.24
Fukushima Daini Unit 1	110	1981. 5. 8	1981. 6.17	1981. 7.31	1982. 4.20
Fukushima Daini Unit 2	110	1983. 4. 1	1983. 4.26	1983. 6.23	1984. 2. 3
Fukushima Daini Unit 3	110	1984. 9.27	1984.10.18	1984.12.14	1985. 6.21
Fukushima Daini Unit 4	110	1986.10. 1	1986.10.24	1986.12.17	1987. 8.25
Kashiwazaki-Kariwa Unit 1	110	1984.11.20	1984.12.12	1985. 2.13	1985. 9.18
Kashiwazaki-Kariwa Unit 2	110	1989.11. 8	1989.11.30	1990. 2. 8	1990. 9.28
Kashiwazaki-Kariwa Unit 3	110	1992.10.11	1992.10.19	1992.12. 8	1993. 8.11
Kashiwazaki-Kariwa Unit 4	110	1993.10. 7	1993.11. 1	1993.12.21	1994. 8.11
Kashiwazaki-Kariwa Unit 5	110	1989. 6.28	1989. 7.20	1989. 9.12	1990. 4.10
Kashiwazaki-Kariwa Unit 6	135.6	1995.11.30	1995.12.18	1996. 1.29	1996.11. 7
Kashiwazaki-Kariwa Unit 7	135.6	1996.10.10	1996.11. 1	1996.12.17	1997. 7. 2

※1: Tokai Power Station discontinued commercial operation on March 31, 1998 and have been in the decommissioning stage since FY2001.

※2: Fukushima Daiichi 1-4 expired commercial operation on May 20, 2011 and decided decommissioning on April 19, 2012, due to the accident with the Tohoku District - off the Pacific Ocean Earthquake on March 11, 2011.

Plant name	Licensed output (10,000 kW)	Date of first fuel loading	Date of initial criticality	Date of grid connection	Date of initial commercial operation
Hamaoka Unit 1※3	54	1974. 5. 29	1974. 6. 20	1974. 8. 13	1976. 3. 17
Hamaoka Unit 2※3	84	1978. 2. 1	1978. 3. 28	1978. 5. 4	1978. 11. 29
Hamaoka Unit 3	110	1986. 10. 30	1986. 11. 21	1987. 1. 20	1987. 8. 28
Hamaoka Unit 4	113. 7	1992. 11. 10	1992. 12. 2	1993. 1. 27	1993. 9. 3
Hamaoka Unit 5	138. 0	2004. 2. 28	2004. 3. 23	2004. 4. 30	2005. 1. 18
Shika Unit 1	54	1992. 11. 2	1992. 11. 20	1993. 1. 12	1993. 7. 30
Shika Unit 2	120. 6	2005. 5. 6	2005. 5. 26	2005. 7. 4	2006. 3. 15
Mihama Unit 1	34	1970. 7. 4	1970. 7. 29	1970. 8. 8	1970. 11. 28
Mihama Unit 2	50	1972. 3. 6	1972. 4. 10	1972. 4. 21	1972. 7. 25
Mihama Unit 3	82. 6	1975. 12. 11	1976. 1. 28	1976. 2. 19	1976. 12. 1
Takahama Unit 1	82. 6	1974. 2. 2	1974. 3. 14	1974. 3. 27	1974. 11. 14
Takahama Unit 2	82. 6	1974. 11. 15	1974. 12. 20	1975. 1. 17	1975. 11. 14
Takahama Unit 3	87	1984. 3. 1	1984. 4. 17	1984. 5. 9	1985. 1. 17
Takahama Unit 4	87	1984. 8. 31	1984. 10. 11	1984. 11. 1	1985. 6. 5
Ohi Unit 1	117. 5	1977. 10. 14	1977. 12. 2	1977. 12. 23	1979. 3. 27
Ohi Unit 2	117. 5	1978. 7. 28	1978. 9. 14	1978. 10. 11	1979. 12. 5
Ohi Unit 3	118	1991. 4. 1	1991. 5. 17	1991. 6. 7	1991. 12. 18
Ohi Unit 4	118	1992. 4. 13	1992. 5. 28	1992. 6. 19	1993. 2. 2
Shimane Unit 1	46	1973. 5. 1	1973. 6. 1	1973. 12. 2	1974. 3. 29
Shimane Unit 2	82	1988. 5. 7	1988. 5. 25	1988. 7. 11	1989. 2. 10
Ikata Unit 1	56. 6	1976. 12. 15	1977. 1. 29	1977. 2. 17	1977. 9. 30
Ikata Unit 2	56. 6	1981. 6. 16	1981. 7. 31	1981. 8. 19	1982. 3. 19
Ikata Unit 3	89. 0	1994. 1. 13	1994. 2. 23	1994. 3. 29	1994. 12. 15
Genkai Unit 1	55. 9	1974. 12. 24	1975. 1. 28	1975. 2. 14	1975. 10. 15
Genkai Unit 2	55. 9	1980. 4. 1	1980. 5. 21	1980. 6. 3	1981. 3. 30
Genkai Unit 3	118	1993. 4. 17	1993. 5. 28	1993. 6. 15	1994. 3. 18
Genkai Unit 4	118	1996. 9. 6	1996. 10. 23	1996. 11. 12	1997. 7. 25
Sendai Unit 1	89	1983. 7. 11	1983. 8. 25	1983. 9. 16	1984. 7. 4
Sendai Unit 2	89	1985. 2. 4	1985. 3. 18	1985. 4. 5	1985. 11. 28

※3: Hamaoka Nuclear Power Station Unit 1 and 2 expired commercial operation on January 30, 2009 and have been in the decommissioning stage since FY2009.

I-5 Capacity of Nuclear Power Plants

Japan's nuclear electric power plants have an installed capacity of 50 units and 46,148,000 kW as of the end of FY2012.

Table I-1 Trends in the Licensed Electric Output of Nuclear Power Plants

(Unit: 10,000 kW)

Reactor Type / Fiscal Year	GCR		BWR		PWR		Total	
1969	16.6	(1)	35.7	(1)	-		52.3	(2)
1970	16.6	(1)	81.7	(2)	34.0	(1)	132.3	(4)
1971	16.6	(1)	81.7	(2)	34.0	(1)	132.3	(4)
1972	16.6	(1)	81.7	(2)	84.0	(2)	182.3	(5)
1973	16.6	(1)	127.7	(3)	84.0	(2)	228.3	(6)
1974	16.6	(1)	206.1	(4)	166.6	(3)	389.3	(8)
1975	16.6	(1)	338.5	(6)	305.1	(5)	660.2	(12)
1976	16.6	(1)	338.5	(6)	387.7	(6)	742.8	(13)
1977	16.6	(1)	338.5	(6)	444.3	(7)	799.4	(14)
1978	16.6	(1)	689.3	(10)	561.8	(8)	1,267.7	(19)
1979	16.6	(1)	799.3	(11)	679.3	(9)	1,495.2	(21)
1980	16.6	(1)	799.3	(11)	735.2	(10)	1,551.1	(22)
1981	16.6	(1)	799.3	(11)	791.8	(11)	1,607.7	(23)
1982	16.6	(1)	909.3	(12)	791.8	(11)	1,717.7	(24)
1983	16.6	(1)	1,019.3	(13)	791.8	(11)	1,827.7	(25)
1984	16.6	(1)	1,071.7	(14)	967.8	(13)	2,056.1	(28)
1985	16.6	(1)	1,291.7	(16)	1,143.8	(15)	2,452.1	(32)
1986	16.6	(1)	1,291.7	(16)	1,259.8	(16)	2,568.1	(33)
1987	16.6	(1)	1,511.7	(18)	1,259.8	(16)	2,788.1	(35)
1988	16.6	(1)	1,593.7	(19)	1,259.8	(16)	2,870.1	(36)
1989	16.6	(1)	1,593.7	(19)	1,317.7	(17)	2,928.0	(37)
1990	16.6	(1)	1,813.7	(21)	1,317.7	(17)	3,148.0	(39)
1991	16.6	(1)	1,813.7	(21)	1,493.6	(19)	3,323.9	(41)
1992	16.6	(1)	1,813.7	(21)	1,611.6	(20)	3,441.9	(42)
1993	16.6	(1)	2,091.4	(24)	1,729.6	(21)	3,837.6	(46)
1994	16.6	(1)	2,201.4	(25)	1,818.6	(22)	4,036.6	(48)
1995	16.6	(1)	2,283.9	(26)	1,818.6	(22)	4,119.1	(49)
1996	16.6	(1)	2,419.5	(27)	1,818.6	(22)	4,254.7	(50)
1997	16.6	(1)	2,555.1	(28)	1,936.6	(23)	4,508.3	(52)
1998	-		2,555.1	(28)	1,936.6	(23)	4,491.7	(51)
1999	-		2,555.1	(28)	1,936.6	(23)	4,491.7	(51)
2000	-		2,555.1	(28)	1,936.6	(23)	4,491.7	(51)
2001	-		2,637.6	(29)	1,936.6	(23)	4,574.2	(52)
2002	-		2,637.6	(29)	1,936.6	(23)	4,574.2	(52)
2003	-		2,637.6	(29)	1,936.6	(23)	4,574.2	(52)
2004	-		2,775.6	(30)	1,936.6	(23)	4,712.2	(53)
2005	-		3,021.4	(32)	1,936.6	(23)	4,958.0	(55)
2006	-		3,010.1	(32)	1,936.6	(23)	4,946.7	(55)
2007	-		3,010.1	(32)	1,936.6	(23)	4,946.7	(55)
2008	-		2,856.9	(30)	1,936.6	(23)	4,793.5	(53)
2009	-		2,856.9	(30)	2,027.8	(24)	4,884.7	(54)
2010	-		2,868.2	(30)	2,027.8	(24)	4,896.0	(54)
2011	-		2,868.2	(30)	2,027.8	(24)	4,896.0	(54)
2012	-		2,587.0	(26)	2,027.8	(24)	4,614.8	(50)

Note 1: Output values are at the end of each fiscal year.
Numbers in parentheses are the numbers of units.

Ⅱ STATUS OF OPERATION OF NUCLEAR POWER PLANTS

II-1 General Situation

At the end of FY2012, the capacity factor of commercial nuclear power plants in Japan was 3.9% on average for all nuclear power stations in operation (50 plants with a total power generating capacity of 46,148,000 kW).

Table II-1-1: Capacity factor of commercial nuclear power plants in FY2012

	Boiling water reactor (BWR)	Pressurized water reactor (PWR)	Total
Number of plants	26	24	50
Power (10 MW)	2,587.0	2,027.8	4,614.8
Capacity factor (%)	0.0	9.0	3.9

[Note: Fukushima-Daiichi Units 1 to 4, which expired commercial operation on May 20, 2011 and decided decommissioning on April 19, 2012 due to the accident following the Tohoku District - off the Pacific Ocean Earthquake on March 11, 2011, are not included in the 50 operating plants as of the end of the fiscal year.]

Looking at the operational status of plants in Japan in FY2012, the total capacity factor was 3.9%, much lowered than the 23.7% of the previous year. This is due to the large decrease of electric power generation output compared with the previous year, which was the influence of the accident at Fukushima Daiichi NPP caused by the Tohoku District-off the Pacific Ocean Earthquake.

The capacity factor of BWRs was 0.0%, that is, all BWRs were shut down (14.5% in the previous year). The capacity factor of PWRs was 9.0%, much lowered than the 36.6% of the previous year. The main factor of capacity factor decrease in both PWR and BWR is no plant, once stopped by inspection, is approved to restart without approval of safety report. Considering the influence of the accident at Fukushima Daiichi NPP, the safety evaluation is based on the new procedure and rule, referring the stress test report evaluation introduced in EU countries. This is for the enhancement of nuclear plant safety and ensuring the trust in safety of people. When unit 3 of Tomari NPP was shut down in May, the capacity factor was reduced to zero after an internal of 42 years (all BWR and PWR plants were shut down). The capacity factor of PWRs was raised from zero by fractions of percentages when only Ohi Units 3 and 4 successfully went through the above evaluation procedure and were approved to resume operation in July.

After that, the Nuclear and Industrial Safety Agency (NISA) was disbanded and the Nuclear Regulation Authority was established on September 19 according to the Nuclear Regulation Authority Establishment Act. The Nuclear Regulation Authority then decided to inhibit restart until the safety evaluation is completed after the establishment of new regulatory standards. As a result, no plants were approved for restart following the two units at Ohi NPP within the fiscal year of 2012.

The capacity factor, operation factor, generated power, etc. of nuclear power stations in Japan are summarized in the following pages.

Please note that generated power is expressed by using the output at the generating end (gross).

Notes on the use of these tables are as follows; unless otherwise stated, commissioning before the start of commercial operation is not included.

(1) Capacity factor = $$\frac{\text{Generated power (MWh)}}{\text{Licensed power (MW)} \times \text{calendar time (h)}} \times 100\,(\%)$$

(Note) In case of constant rated thermal power operation, capacity factor may exceed 100%.

(2) Operation factor

① Operation factor of plant

Operation factor (%) = $$\frac{\text{Generation time (h)}}{\text{Calendar time (h)}} \times 100$$

② Operation factor (average Operation factor) by station, by power company, and total
Average operation factor is power divided proportionally.

Average Operation factor (%) = $$\frac{\sum_{n=1}^{N}[\text{licensed power (MW)} \times \text{generation time (h)}]}{\sum_{n=1}^{N}[\text{licensed power (MW)} \times \text{calendar time (h)}]} \times 100$$

N: Number of plants

(3) Reactor year = $$\frac{\text{Operating time of reactor (h)}}{\text{Calendar time of one year (h)}}$$

Operating time of reactor is the time between the startup and shutdown of the reactor.

(4) The electric power generation and generation time in the fiscal year and month of startup are counted from 00:00 am on the commercial operation starting date.

(5) The capacity factor and operation factor in the fiscal year and month of startup are counted according to calendar time from the commercial operation starting date.

(6) The total and subtotal by licensee and the sum total after startup are the summation of generated power (minimum plant is MWh) and time (minimum plant is hour before FY1995, and minute after FY1996) for each fiscal year and each plant.

(7) The Japan Atomic Power Company, Tokai Power Station finished commercial operation at the end of FY1997 and has been in the decommissioning stage.

(8) Chubu Electric Power Company, Hamaoka Nuclear Power Station, Units 1 and 2 were legally closed on January 30, 2009.

(9) Fukushima Daiichi 1-4 expired commercial operation on May 20, 2011 and decided decommissioning on April 19, 2012, due to the accident with the Tohoku District - off the Pacific Ocean Earthquake on March 11, 2011.
The operation for 19 days in April was included in the evaluation of the capacity factor in FY2012.

(10) The licensed power generation of The Japan Atomic Power Company, Tsuruga Power Station, Unit 1 was changed from 331 MW to 357 MW on December 15, 1970.

(11) The licensed power generation of Chubu Electric Power Company, Hamaoka Nuclear Power Station, Unit 5 was changed from 1,380 MW to 1,267 MW on March 13, 2007. and return to 1,380 MWe on February 23,2011.

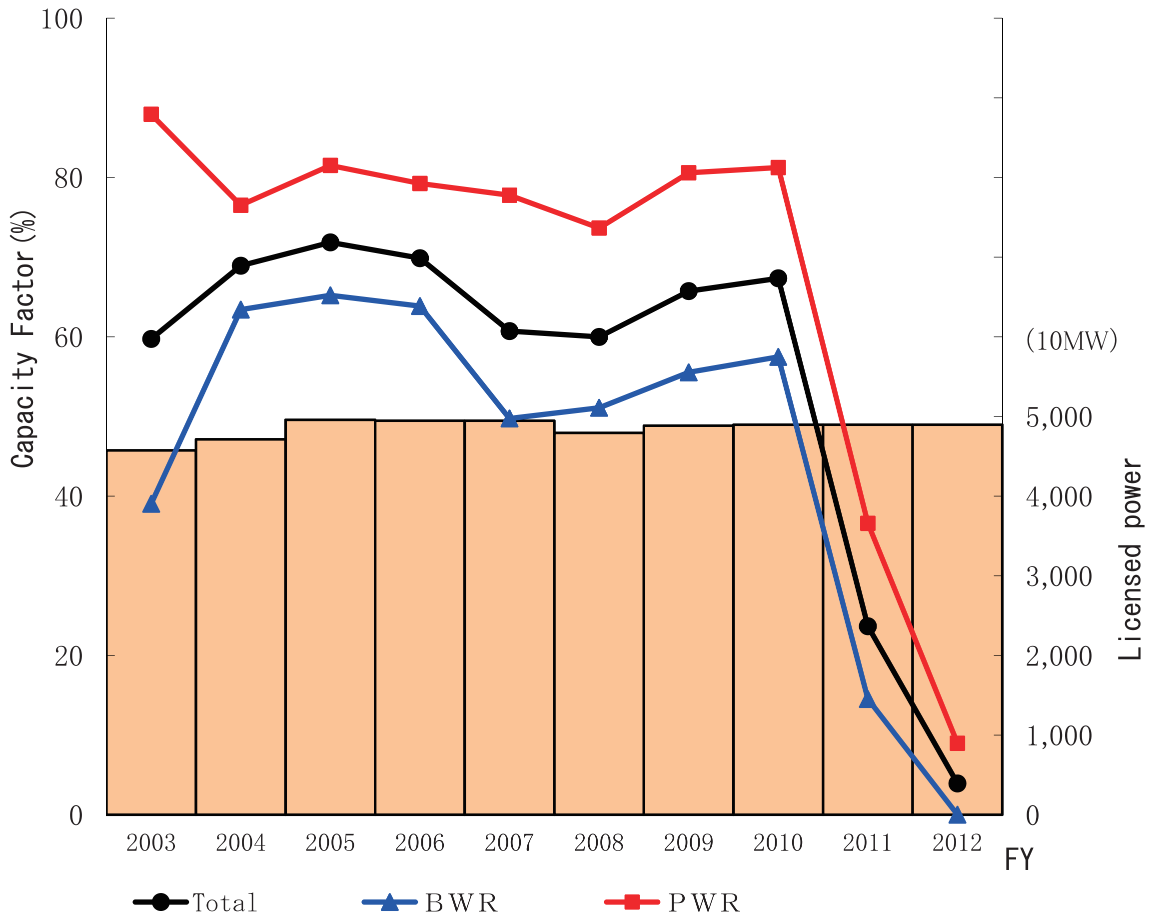
(12) The licensed power generation of Hokuriku Electric Power Company, Shika Nuclear Power Station, Unit 2 was changed from 1,358 MW to 1,206 MW on June 5, 2008.

(13) The following are the Total or Grand Total in table II-1, 7 to 10, 12 to 14, 16 to 18, 20 to 22, 24 as the Total from the commercial operation starting date. It is not indicate the total of numbers in the table.

Table II-1: Operational Information

FY	Capacity Factor (%)	Operation Factor (%)	Generated power (GWh)	Generation time (hr)	Reactor operation time (hr)
2003	59. 7	59. 0	240, 013	275, 388	277, 796
2004	68. 9	68. 4	277, 857	307, 308	310, 883
2005	71. 9	71. 4	299, 163	327, 921	331, 538
2006	69. 9	69. 3	303, 426	330, 082	333, 212
2007	60. 7	60. 3	263, 832	294, 513	297, 527
2008	60. 0	59. 4	258, 071	290, 077	292, 873
2009	65. 7	65. 0	277, 470	314, 102	317, 669
2010	67. 3	66. 5	288, 230	316, 096	319, 434
2011	23. 7	23. 2	101, 761	107, 715	107, 802
2012	3. 9	3. 9	15, 939	13, 424	13, 546
Total	67. 5	68. 0	7, 525, 500	9, 135, 044	9, 229, 508

Figure II-1: Trend in the Capacity Factor by Reactor Type



(Note) values of each FY.

II

Table II-2 Trends in Periodical Inspection Duration (Average Excluding Tokai Plant)

Fiscal Year when periodical inspection was completed	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Average number of days (number of months)	145 (4.8)	137 (4.6)	116 (3.9)	131 (4.4)	108 (3.6)	103 (3.4)	107 (3.6)	128 (4.3)	121 (4.0)	98 (3.3)

Fiscal Year when periodical inspection was completed	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Average number of days (number of months)	166 (5.5)	230 (7.7)	144 (4.8)	163 (5.4)	168 (5.6)	178 (5.9)	193 (6.4)	138 (4.6)	225 (7.5)	449 (15.0)

Notes: 1. Periodical inspection duration: Duration of periodical inspection (to verify overall load resistance performance) from the start to the completion

2. Data on the operation of Mihama Power Station Unit 2 is not included in the average number of days of FY1994. Data on the operation of Fukushima Daiichi Nuclear Power Station Unit 1 is not included in the average number of days at FY 2005. Data on the operation of Mihama Power Station Unit 3 is not included in the average number of days at FY 2006. Data on the operation of Kashiwazaki-Kariwa Nuclear Power Station Unit 6 is not included in the average number of days at FY 2009.
Data on the operation of Kashiwazaki-Kariwa Nuclear Power Station Unit 1 and 5 are not included in the average number of days at FY 2010

3. Number of months: 30 days are defined as one month.

4. Periodical inspection duration in FY2011-2012: All outage days were treated as periodical inspection once stopped by inspection because no plant has been approved to restart without stress test evaluation.

Table II-3 Trends in Operating Period (Average Excluding Tokai Plant)

Fiscal Year when periodical inspection was completed	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Average number of days (number of months)	353 (11.8)	339 (11.3)	364 (12.1)	367 (12.2)	376 (12.5)	378 (12.6)	371 (12.4)	381 (12.7)	386 (12.9)	345 (11.5)

Fiscal Year when periodical inspection was completed	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Average number of days (number of months)	366 (12.2)	355 (11.8)	343 (11.4)	346 (11.5)	319 (10.6)	358 (11.9)	346 (11.5)	339 (11.3)	328 (10.9)	263 (8.8)

Notes: 1. Operating period: Period from the completion of the periodical inspection (to verify overall load resistance performance) to the plant shutdown due to the start of the next inspection (excluding periods during which power generation stops for reasons other than periodical inspections).

2. The number of days spent to perform operations in the first cycle of a new plant is excluded.
3. Number of months: 30 days are defined as one month.

Table II-4 Breakdowns of Output Loss (%)

Fiscal Year		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Capacity factor		75.4	76.6	80.2	80.8	81.3	84.2	80.1	81.7	80.5	73.4
Output loss	Periodical Inspection	23.3	21.3	18.3	18.0	16.9	14.6	17.1	16.3	17.7	20.7
	Accidents and Breakdowns	1	1.6	1.3	0.7	1.5	0.9	2.6	1.9	0.7	2.2
	Others	0.3	0.5	0.2	0.5	0.2	0.2	0.3	0.1	1.2	4.3

Fiscal Year		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Capacity factor		59.7	68.9	71.9	69.9	60.7	60	65.7	67.3	23.7	3.9
Output loss	Periodical Inspection	39.4	28.3	25.4	24.8	34.4	36.4	27.7	27.8	53.9	84.0*
	Accidents and Breakdowns	0.5	0.7	0.6	2.6	0.4	2.0	2	1.7	13.3	9.7*
	Others	1.4	3.3	3.2	3.8	5.4	2.6	5.9	4.6	9.6	2.4*

*Estimated Value

Table II-5 Reactor Shutdowns in FY2012

			Number of shutdowns (number of times)	Frequency of shutdowns (number of times/ reactor year(Note))	Remarks
Unscheduled shutdowns	Automatic Shutdowns	Accidents, etc.	0	0.0	
		External factors, etc.	0	0.0	
		Subtotal	0	0.0	
	Manual shutdowns		0	0.0	
	Subtotal		0	0.0	
Scheduled shutdowns			1	0.6	
Total			1	0.6	

(Note) Reactor year = total operating hours of a reactor in one fiscal year / fiscal year calendar time (=13,546.0/8760=1.5)

Table II-6 Trends in the Frequency of Nuclear Reactor Shutdowns

Fiscal Year	Unscheduled shutdowns					Scheduled Shutdowns	Total
	Automatic shutdowns			Manual Shutdowns	Subtotal		
	Accidents, etc.	External factors,	Subtotal				
1993	1	–	1	(1) 10	(1) 11	32	(1) 43
1994	(1) 2	–	(1) 2	8	(1) 10	36	(1) 46
1995	1	–	1	(1) 8	(1) 9	39	(1) 48
1996	1	–	1	(1) 10	(1) 11	41	(1) 52
1997	2	–	2	(1) 10	(1) 12	39	(1) 51
1998	3	–	3	7	10	42	52
1999	3	3	6	6	12	39	51
2000	1	1	2	13	15	36	51
2001	1	1	2	5	7	42	49
2002	0	0	0	8	8	42	50
2003	0	2	2	6	8	32	40
2004	2	2	4	12	16	44	60
2005	1	5	6	17	23	29	52
2006	2	0	2	12	14	40	54
2007	0	3	3	4	7	46	53
2008	0	3	3	6	9	30	39
2009	0	2	2	6	8	38	46
2010	1	10	11	3	14	42	56
2011	1	0	1	0	1	25	26
2012	0	0	0	0	0	1	1

Note: The number in parentheses is the number of shutdowns that occurred during test operations and not included

Table II-7 Operational Information by Nuclear Power Station in FY2012

Name of nuclear power station	Licensed output (MW)	Capacity factor (%)		Operation factor (%)		Electric energy generated (GWh)		Generating time (hours)	
		FY2012	Grand total	FY2012	Grand total	FY2012	Grand total	FY2012	Grand total
Tokai No.2	1,100	0.0	68.5	0.0	69.3	0	226,973	0	208,572
Tsuruga	1,517	0.0	69.2	0.0	70.1	0	277,034	0	412,624
Tomari	2,070	4.3	77.3	4.2	76.9	784	199,775	839	332,228
Onagawa	2,174	0.0	62.0	0.0	62.0	0	211,393	0	314,449
Higashidori	1,100	0.0	58.2	0.0	58.4	0	41,030	0	37,431
Fukushima Daiichi	4,696	0.0	63.7	0.0	65.4	0	933,959	0	1,226,475
Fukushima Daini	4,400	0.0	68.0	0.0	68.3	0	743,666	0	679,951
Kashiwazaki-Kariwa	8,212	0.0	60.1	0.0	60.1	0	874,874	0	752,612
Hamaoka	3,617	0.0	61.3	0.0	62.1	0	560,848	0	618,149
Shika	1,746	0.0	50.8	0.0	51.1	0	86,684	0	132,588
Mihama	1,666	0.0	61.6	0.0	62.8	0	349,354	0	633,242
Takahama	3,392	0.0	72.5	0.0	72.5	0	707,556	0	835,950
Ohi	4,710	36.7	71.7	36.0	72.0	15,155	804,166	12,585	686,620
Shimane	1,280	0.0	72.2	0.0	72.7	0	238,735	0	395,528
Ikata	2,022	0.0	77.7	0.0	77.8	0	367,263	0	578,758
Genkai	3,478	0.0	75.8	0.0	75.9	0	530,469	0	689,145
Sendai	1,780	0.0	78.3	0.0	78.4	0	342,715	0	385,399

Table II-8 Operational Information by Plant in FY2012

Plant Name	Licensed Output	Capacity factor (%)		Operation factor (%)		Electric energy generated (GWh)		Generating time (hours)	
	(MW)	FY2012	Grand total	FY2012	Grand total	FY2012	Grand total	FY2012	Grand total
Tokai No. 2	1,100	0.0	68.5	0.0	69.3	0	226,973	0	208,572
Tsuruga Unit 1	357	0.0	63.0	0.0	65.4	0	84,735	0	246,733
Tsuruga Unit 2	1,160	0.0	72.4	0.0	72.5	0	192,299	0	165,891
Tomari Unit 1	579	0.0	78.7	0.0	78.6	0	94,918	0	163,735
Tomari Unit 2	579	0.0	77.8	0.0	77.5	0	86,720	0	149,187
Tomari Unit 3	912	9.8	69.3	9.6	67.3	784	18,137	839	19,306
Onagawa Unit 1	524	0.0	62.7	0.0	63.2	0	83,047	0	159,756
Onagawa Unit 2	825	0.0	64.8	0.0	64.9	0	82,886	0	100,518
Onagawa Unit 3	825	0.0	56.3	0.0	55.3	0	45,460	0	54,174
Higashidori Unit 1	1,100	0.0	58.2	0.0	58.4	0	41,030	0	37,431
Fukushima Daiichi Unit 1	460	0.0	52.5	0.0	54.9	0	86,910	0	197,531
Fukushima Daiichi Unit 2	784	0.0	60.1	0.0	62.8	0	155,866	0	207,916
Fukushima Daiichi Unit 3	784	0.0	64.1	0.0	65.9	0	158,965	0	208,493
Fukushima Daiichi Unit 4	784	0.0	68.3	0.0	69.9	0	157,430	0	205,540
Fukushima Daiichi Unit 5	784	0.0	67.5	0.0	68.9	0	162,209	0	211,215
Fukushima Daiichi Unit 6	1,100	0.0	65.9	0.0	66.8	0	212,579	0	195,780
Fukushima Daini Unit 1	1,100	0.0	71.5	0.0	72.0	0	213,468	0	195,209
Fukushima Daini Unit 2	1,100	0.0	69.7	0.0	70.1	0	196,023	0	179,096
Fukushima Daini Unit 3	1,100	0.0	62.9	0.0	63.3	0	168,572	0	154,142
Fukushima Daini Unit 4	1,100	0.0	67.1	0.0	67.5	0	165,603	0	151,504
Kashiwazaki-Kariwa Unit 1	1,100	0.0	62.2	0.0	62.4	0	165,023	0	150,646
Kashiwazaki-Kariwa Unit 2	1,100	0.0	56.2	0.0	56.3	0	121,922	0	111,061
Kashiwazaki-Kariwa Unit 3	1,100	0.0	53.6	0.0	53.7	0	101,590	0	92,442
Kashiwazaki-Kariwa Unit 4	1,100	0.0	51.9	0.0	52.0	0	93,327	0	84,958
Kashiwazaki-Kariwa Unit 5	1,100	0.0	63.5	0.0	63.6	0	140,752	0	128,159
Kashiwazaki-Kariwa Unit 6	1,356	0.0	68.8	0.0	68.2	0	134,161	0	98,039
Kashiwazaki-Kariwa Unit 7	1,356	0.0	63.1	0.0	63.2	0	118,099	0	87,308
Hamaoka Unit 3	1,100	0.0	71.6	0.0	71.9	0	176,590	0	161,197
Hamaoka Unit 4	1,137	0.0	72.2	0.0	72.7	0	140,953	0	124,708
Hamaoka Unit 5	1,380	0.0	37.8	0.0	37.2	0	35,989	0	26,733
Shika Unit 1	540	0.0	63.7	0.0	63.8	0	59,321	0	109,938
Shika Unit 2	1,206	0.0	35.3	0.0	36.7	0	27,363	0	22,650
Mihama Unit 1	340	0.0	50.6	0.0	52.7	0	63,801	0	195,612
Mihama Unit 2	500	0.0	60.3	0.0	61.7	0	107,529	0	220,174
Mihama Unit 3	826	0.0	67.7	0.0	68.3	0	178,024	0	217,456
Takahama Unit 1	826	0.0	66.2	0.0	66.6	0	183,869	0	224,209
Takahama Unit 2	826	0.0	67.2	0.0	67.7	0	181,928	0	221,971
Takahama Unit 3	870	0.0	80.3	0.0	79.6	0	172,672	0	196,670
Takahama Unit 4	870	0.0	79.7	0.0	79.2	0	169,087	0	193,100
Ohi Unit 1	1,175	0.0	63.3	0.0	64.2	0	221,731	0	191,396
Ohi Unit 2	1,175	0.0	70.2	0.0	70.7	0	240,795	0	206,496
Ohi Unit 3	1,180	75.6	77.4	74.0	77.3	7,813	170,420	6,485	144,305
Ohi Unit 4	1,180	71.0	82.1	69.6	81.7	7,342	171,220	6,101	144,423
Shimane Unit 1	460	0.0	67.5	0.0	68.2	0	106,192	0	233,121
Shimane Unit 2	820	0.0	76.4	0.0	76.8	0	132,543	0	162,406
Ikata Unit 1	566	0.0	75.3	0.0	76.1	0	132,595	0	236,729
Ikata Unit 2	566	0.0	79.4	0.0	79.9	0	122,210	0	217,388
Ikata Unit 3	890	0.0	78.8	0.0	77.7	0	112,458	0	124,641
Genkai Unit 1	559	0.0	72.3	0.0	72.9	0	132,718	0	239,506
Genkai Unit 2	559	0.0	76.3	0.0	76.4	0	119,674	0	214,453
Genkai Unit 3	1,180	0.0	75.8	0.0	75.5	0	149,214	0	126,054
Genkai Unit 4	1,180	0.0	79.4	0.0	79.4	0	128,864	0	109,132
Sendai Unit 1	890	0.0	77.4	0.0	77.3	0	173,535	0	194,829
Sendai Unit 2	890	0.0	79.3	0.0	79.5	0	169,180	0	190,570

Ⅱ－2 Capacity Factor

Table Ⅱ－9 Trends in Capacity Factor

(Unit:%)

Reactor Type / Fiscal Year	BWR	PWR	GCR	Overall average
1973	62.0	43.2	70.5	54.1
1974	55.2	52.2	67.9	54.8
1975	35.4	46.6	68.4	42.2
1976	55.6	49.1	69.5	52.8
1977	29.0	51.2	67.8	41.8
1978	58.5	54.1	69.8	56.7
1979	64.2	42.6	63.5	54.6
1980	65.0	55.7	67.3	60.8
1981	62.4	60.7	75.2	61.7
1982	67.2	68.2	66.7	67.6
1983	70.6	72.6	67.8	71.5
1984	72.2	76.2	63.4	73.9
1985	74.1	78.4	62.6	76.0
1986	75.9	75.8	63.4	75.7
1987	77.2	77.3	54.1	77.1
1988	72.9	69.9	57.9	71.4
1989	66.5	74.6	52.8	70.0
1990	72.9	72.6	65.3	72.7
1991	75.0	72.4	61.3	73.8
1992	74.1	74.4	74.2	74.2
1993	76.7	74.7	0.0	75.4
1994	77.8	75.2	67.3	76.6
1995	82.5	77.6	60.4	80.2
1996	83.5	77.5	72.3	80.8
1997	79.7	83.4	82.4	81.3
1998	84.6	83.7	—	84.2
1999	79.5	80.9	—	80.1
2000	79.9	84.1	—	81.7
2001	78.6	82.9	—	80.5
2002	61.9	89.1	—	73.4
2003	39.0	87.9	—	59.7
2004	63.4	76.5	—	68.9
2005	65.2	81.5	—	71.9
2006	63.9	79.2	—	69.9
2007	49.7	77.8	—	60.7
2008	51.1	73.7	—	60.0
2009	55.5	80.6	—	65.7
2010	57.5	81.3	—	67.3
2011	14.5	36.6	—	23.7
2012	0.0	9.0	—	3.9
Total	63.4	72.8	62.9	67.5

Table Ⅱ－10 Trends in the Capacity Factor of Each Electric Power Company

(Unit:%)

Fiscal Year / Electric power Company	The Japan Atomic Power Company	Hokkaido	Tohoku	Tokyo	Chubu	Hokuriku	Kansai	Chugoku	Shikoku	Kyushu	Overall Average
1973	76.3			48.5			43.2	100.0			54.1
1974	54.9			48.2			52.2	75.6			54.8
1975	52.1			17.1	79.6		41.3	76.1		87.2	42.2
1976	68.8			52.2	53.0		44.2	63.3		73.5	52.8
1977	47.0			19.0	37.4		43.1	56.2	94.7	76.7	41.8
1978	73.2			56.3	46.5		48.2	70.1	62.2	81.1	56.7
1979	62.0			65.6	58.5		38.9	75.7	61.3	56.1	54.6
1980	70.8			62.3	66.9		53.2	66.6	60.3	76.8	60.8
1981	57.5			62.2	67.3		57.3	72.1	75.8	70.4	61.7
1982	58.1			69.2	71.2		63.1	61.7	81.0	80.9	67.6
1983	71.1			70.4	70.8		69.0	70.1	85.2	77.7	71.5
1984	68.2		98.9	71.2	70.6		72.6	77.8	84.1	83.1	73.9
1985	77.1		75.2	73.6	70.4		77.1	76.2	78.4	82.5	76.0
1986	80.1		77.2	75.2	74.8		73.3	77.7	80.0	79.3	75.7
1987	75.3		73.2	76.4	83.1		74.1	78.6	88.7	81.0	77.1
1988	78.6		78.5	76.3	64.2		61.3	68.6	86.0	73.5	71.4
1989	74.0	100.0	69.7	63.2	71.9		71.4	71.6	78.1	76.8	70.0
1990	83.4	80.0	65.7	71.3	62.4		67.7	86.9	80.3	80.5	72.7
1991	75.9	77.7	77.2	74.1	72.7		67.8	85.4	81.9	77.0	73.8
1992	79.7	75.7	72.1	75.3	73.7		68.8	74.7	84.5	76.8	74.2
1993	75.8	80.8	75.7	76.3	73.9	99.8	71.3	76.8	75.1	81.0	75.4
1994	82.7	89.7	79.4	76.6	77.4	75.1	71.2	82.7	84.5	75.9	76.6
1995	75.8	90.4	75.6	83.2	85.9	79.1	71.1	81.5	84.0	85.6	80.2
1996	83.0	79.7	84.6	84.1	85.4	77.9	73.8	77.9	85.0	78.3	80.8
1997	73.1	81.0	80.1	79.5	83.2	80.1	84.2	82.8	80.1	85.9	81.3
1998	90.5	92.1	90.6	83.1	80.1	100.0	84.3	95.4	83.7	79.8	84.2
1999	26.4	90.2	83.4	84.4	78.9	75.5	82.0	89.5	82.5	84.0	80.1
2000	82.3	85.8	90.3	79.4	87.0	84.9	81.8	60.3	83.6	85.8	81.7
2001	80.1	84.8	75.4	80.1	69.5	83.5	84.5	91.6	79.1	79.7	80.5
2002	81.0	92.9	81.6	60.7	33.7	96.7	90.5	95.7	87.9	85.9	73.4
2003	84.8	80.2	71.1	26.3	53.2	35.3	89.1	68.5	84.9	88.9	59.7
2004	87.1	80.4	73.3	61.7	51.9	79.8	70.2	65.4	77.4	86.2	68.9
2005	77.5	87.5	47.3	66.4	63.1	88.7	75.4	82.9	85.9	86.8	71.9
2006	71.1	93.0	49.7	74.2	41.5	38.3	77.0	70.8	83.0	82.1	69.9
2007	62.2	89.7	66.3	44.9	58.7	0.0	75.0	75.5	86.8	85.8	60.7
2008	48.1	66.2	65.7	43.8	56.1	59.6	72.4	63.6	84.5	84.6	60.0
2009	59.5	81.9	71.1	53.3	46.0	63.2	77.0	85.5	79.6	84.8	65.7
2010	74.0	89.7	72.1	55.3	49.7	81.4	78.2	20.3	90.9	81.1	67.3
2011	4.6	58.6	0.0	18.5	8.2	0.0	37.6	52.6	37.7	31.4	23.7
2012	0.0	4.3	0.0	0.0	0.0	0.0	17.7	0.0	0.0	0.0	3.9
Total	68.6	77.3	61.3	63.6	61.3	50.8	69.8	72.2	77.7	76.8	67.5

Table II-11 Capacity Factor by Plant (by Month in FY2012)

(Unit : %)

Establisher	Plant Name	Licensed output (MW)	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Fiscal Year Total
B W R															
The Japan Atomic Power Company	Tokai No. 2	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tsuruga Unit 1	357	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	524	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Onagawa Unit 2	825	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Onagawa Unit 3	825	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Higashidori Unit 1	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	460	0.0												0.0
	Fukushima Daiichi Unit 2	784	0.0												0.0
	Fukushima Daiichi Unit 3	784	0.0												0.0
	Fukushima Daiichi Unit 4	784	0.0												0.0
	Fukushima Daiichi Unit 5	784	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daiichi Unit 6	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daini Unit 1	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daini Unit 2	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daini Unit 3	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daini Unit 4	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 1	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 2	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 3	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 4	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 5	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 6	1,356	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 7	1,356	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chubu Electric Power Co., Inc.	Hamaoka Unit 3	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hamaoka Unit 4	1,137	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hamaoka Unit 5	1,380	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hokuriku Electric Power Co.	Shika Unit 1	540	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shika Unit 2	1,206	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	460	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shimane Unit 2	820	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal		28,682	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: There are cases in which the capacity factor exceeds 100% during operation at rated thermal output.

Table II-11 Capacity Factor by Plant (by Month in FY2012) (cont'd)

(Unit : %)

Establisher	Plant Name	Licensed output (MW)	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Fiscal Year Total
P W R															
The Japan Atomic Power Company	Tsuruga Unit 2	1,160	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	579	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tomari Unit 2	579	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tomari Unit 3	912	103.5	15.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8
The Kansai Electric Power Co., Inc.	Mihama Unit 1	340	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mihama Unit 2	500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mihama Unit 3	826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Takahama Unit 1	826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Takahama Unit 2	826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Takahama Unit 3	870	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Takahama Unit 4	870	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ohi Unit 1	1,175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ohi Unit 2	1,175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ohi Unit 3	1,180	0.0	0.0	0.0	83.4	100.5	100.9	102.1	103.3	103.9	104.1	104.2	104.2	75.6
	Ohi Unit 4	1,180	0.0	0.0	0.0	31.1	100.8	100.9	102.0	103.2	103.6	103.8	103.7	103.8	71.0
Shikoku Electric Power Co., Inc	Ikata Unit 1	566	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ikata Unit 2	566	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ikata Unit 3	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kyushu Electric Power Co., Inc.	Genkai Unit 1	559	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Genkai Unit 2	559	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Genkai Unit 3	1,180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Genkai Unit 4	1,180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sendai Unit 1	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sendai Unit 2	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal		20,278	4.7	0.7	0.0	6.7	11.7	11.7	11.9	12.0	12.1	12.1	12.1	12.1	9.0
Total		48,960	2.0	0.3	0.0	2.9	5.1	5.2	5.2	5.3	5.3	5.3	5.3	5.3	3.9

Note: There are cases in which the capacity factor exceeds 100% during operation at rated thermal output.

Table II-12 Trends in the

Establisher	Plant Name	Licensed output (MW)	1993	1994	1995	1996	1997	1998	1999	2000
B W R										
The Japan Atomic Power Company	Tokai No. 2	1,100	86.0	90.0	73.8	81.1	72.8	97.9	3.3	93.1
	Tsuruga Unit 1	357	65.2	75.2	77.5	70.6	63.8	77.1	37.1	11.2
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	524	75.7	79.4	55.9	97.5	76.3	77.6	81.9	99.9
	Onagawa Unit 2	825			94.1	76.5	82.6	98.8	84.3	84.2
	Onagawa Unit 3	825								
	Higashidori Unit 1	1,100								
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	460	52.7	100.0	79.4	45.1	99.7	84.0	69.3	72.2
	Fukushima Daiichi Unit 2	784	84.4	34.9	76.0	88.4	81.9	36.0	72.8	78.4
	Fukushima Daiichi Unit 3	784	74.0	61.2	67.8	97.2	15.0	64.6	66.8	99.9
	Fukushima Daiichi Unit 4	784	59.5	90.1	92.3	74.4	50.7	95.8	92.9	66.4
	Fukushima Daiichi Unit 5	784	64.3	64.4	80.4	96.9	73.0	81.5	68.4	49.6
	Fukushima Daiichi Unit 6	1,100	57.1	99.9	73.8	65.9	86.6	81.3	85.6	68.7
	Fukushima Daini Unit 1	1,100	61.1	79.6	100.0	73.0	66.7	75.9	100.0	78.4
	Fukushima Daini Unit 2	1,100	97.6	76.1	73.2	87.7	92.1	80.2	88.7	75.9
	Fukushima Daini Unit 3	1,100	74.3	49.8	90.9	96.1	81.1	89.7	75.2	99.7
	Fukushima Daini Unit 4	1,100	83.0	89.4	84.0	73.6	87.2	100.0	87.8	71.9
	Kashiwazaki-Kariwa Unit 1	1,100	74.6	76.1	81.9	91.7	74.2	78.8	87.6	95.6
	Kashiwazaki-Kariwa Unit 2	1,100	94.7	79.1	83.5	74.3	100.0	88.4	89.2	70.6
	Kashiwazaki-Kariwa Unit 3	1,100	99.8	79.1	85.5	100.0	86.8	73.1	83.4	100.0
	Kashiwazaki-Kariwa Unit 4	1,100		63.0	90.5	87.1	81.5	88.1	100.0	66.4
	Kashiwazaki-Kariwa Unit 5	1,100	78.7	98.7	81.5	85.6	76.3	100.0	84.3	75.8
	Kashiwazaki-Kariwa Unit 6	1,356				100.0	83.0	93.5	90.1	81.7
	Kashiwazaki-Kariwa Unit 7	1,356					100.0	84.5	73.9	86.1
Chubu Electric Power Co., Inc.	Hamaoka Unit 1	540	42.3	61.3	78.1	73.5	80.4	96.5	67.9	54.5
	Hamaoka Unit 2	840	75.3	61.7	92.3	87.2	79.0	73.2	48.8	94.8
	Hamaoka Unit 3	1,100	72.8	100.0	84.1	74.7	88.4	82.8	100.0	83.5
	Hamaoka Unit 4	1,137	99.9	74.7	86.7	100.0	82.6	74.9	86.0	100.0
	Hamaoka Unit 5	1,380								
Hokuriku Electric Power Co.	Shika Unit 1	540	99.8	75.1	79.1	77.9	80.1	100.0	75.5	84.9
	Shika Unit 2	1,206								
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	460	70.8	54.7	85.4	72.7	76.2	87.4	100.0	11.0
	Shimane Unit 2	820	80.2	98.4	79.3	80.8	86.5	100.0	83.6	88.0
	Subtotal	30,062	76.7	77.8	82.5	83.5	79.7	84.6	79.5	79.9

Note: Capacity factor will exceed 100% in the case of operation at rated thermal power.

Capacity Factor of Each Plant

(Unit:%)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand Total
67.3	67.7	83.4	94.2	56.6	74.2	91.0	74.5	35.1	74.6	0.0	0.0	68.5
90.5	92.8	82.9	85.4	85.1	83.3	54.8	48.4	30.5	68.3	0.0	0.0	63.0
78.4	43.8	67.7	54.2	33.6	0.0	62.0	0.5	86.2	66.3	0.0	0.0	62.7
69.4	97.2	47.7	82.0	41.4	37.2	70.1	99.4	51.4	60.3	0.0	0.0	64.8
100.0	90.1	96.7	76.6	40.1	57.7	38.2	67.7	74.5	70.3	0.0	0.0	56.3
				100.0	76.7	86.5	70.0	76.0	85.1	0.0	0.0	58.2
37.5	56.9	0.0	0.0	47.4	72.5	40.8	54.5	91.7	51.5	0.0	0.0	52.5
69.0	99.7	0.0	64.6	63.9	45.8	91.7	86.0	73.4	67.9	0.0	0.0	60.1
85.5	29.3	62.5	36.7	89.7	72.7	65.5	90.5	71.2	68.1	0.0	0.0	64.1
88.3	46.0	2.4	69.0	30.5	76.2	86.3	70.2	82.6	66.5	0.0	0.0	68.3
89.5	86.3	55.0	58.1	67.1	59.7	73.1	80.5	86.5	63.8	0.0	0.0	67.5
95.2	67.4	25.0	24.9	72.8	82.1	62.8	95.2	80.0	38.5	0.0	0.0	65.9
74.8	76.9	57.5	49.2	86.4	74.6	75.1	89.1	93.6	66.6	0.0	0.0	71.5
92.2	25.5	0.0	59.2	66.0	100.6	52.4	81.6	93.4	77.3	0.0	0.0	69.7
31.6	46.1	6.9	67.5	28.9	87.8	76.7	73.1	82.1	94.7	0.0	0.0	62.9
86.3	53.6	0.0	37.4	58.0	41.1	76.7	93.4	71.5	72.8	0.0	0.0	67.1
74.1	42.4	0.0	85.2	19.5	93.4	9.2	0.0	0.0	82.6	35.4	0.0	62.2
99.1	40.0	0.0	75.6	69.3	89.7	6.5	0.0	0.0	0.0	0.0	0.0	56.2
75.7	35.7	0.0	75.6	85.9	79.7	29.5	0.0	0.0	0.0	0.0	0.0	53.6
69.2	76.7	69.1	37.1	100.8	31.5	29.6	0.0	0.0	0.0	0.0	0.0	51.9
88.3	92.2	0.0	91.7	74.4	65.9	0.0	0.0	0.0	33.9	82.7	0.0	63.5
80.7	82.4	91.3	75.3	71.2	98.9	7.3	0.0	55.1	77.6	101.0	0.0	68.8
99.0	70.0	45.9	90.6	78.4	71.2	29.9	0.0	72.3	78.5	38.8	0.0	63.1
60.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	—	—	—	—	48.2
47.7	25.4	88.0	0.0	0.0	0.0	0.0	0.0	—	—	—	—	59.5
67.5	47.3	41.4	79.6	84.3	69.3	78.9	95.4	69.8	66.6	0.0	0.0	71.6
91.9	42.8	64.0	75.9	93.0	75.4	81.4	87.4	60.3	68.3	11.6	0.0	72.2
			102.3	84.7	32.9	84.6	44.7	12.6	18.7	12.0	0.0	37.8
83.5	96.7	35.3	79.8	87.4	69.3	0.0	0.0	98.5	63.5	0.0	0.0	63.7
				100.0	26.0	0.0	85.7	47.5	89.4	0.0	0.0	35.3
98.6	88.2	72.1	90.7	73.2	50.1	69.0	96.4	65.6	0.0	0.0	0.0	67.5
87.6	100.0	66.5	51.2	88.4	82.4	79.1	45.2	96.6	31.8	82.2	0.0	76.4
78.6	61.9	39.0	63.4	65.2	63.9	49.7	51.1	55.5	57.5	14.5	0.0	63.4

Table II-12 Trends in the

Establisher	Plant Name	Licensed output (MW)	1993	1994	1995	1996	1997	1998	1999	2000
P W R										
The Japan Atomic Power Company	Tsuruga Unit 2	1,160	80.2	80.3	79.5	90.1	74.9	87.7	44.9	93.9
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	579	81.4	100.0	80.7	78.0	83.6	100.0	80.4	86.5
	Tomari Unit 2	579	80.1	79.5	100.0	81.5	78.5	84.2	100.0	85.1
	Tomari Unit 3	912								
The Kansai Electric Power Co., Inc.	Mihama Unit 1	340	47.7	0.0	4.7	99.9	80.8	82.6	74.9	99.8
	Mihama Unit 2	500	0.0	53.7	71.3	84.0	88.5	82.0	66.4	70.8
	Mihama Unit 3	826	65.2	87.7	60.0	56.6	88.4	98.8	84.5	69.6
	Takahama Unit 1	826	50.3	54.8	76.5	72.2	68.1	84.3	98.9	87.4
	Takahama Unit 2	826	76.5	68.4	67.0	84.7	87.6	87.0	87.3	85.6
	Takahama Unit 3	870	79.0	78.7	97.0	75.5	81.9	87.0	86.6	92.3
	Takahama Unit 4	870	76.2	100.0	76.8	76.6	87.8	100.0	74.7	82.5
	Ohi Unit 1	1,175	50.8	45.4	90.5	71.1	75.8	88.7	81.3	63.6
	Ohi Unit 2	1,175	89.3	68.7	43.1	82.5	69.3	41.1	61.0	87.9
	Ohi Unit 3	1,180	100.0	82.2	77.9	83.9	95.6	93.7	89.6	89.1
	Ohi Unit 4	1,180	88.3	91.1	75.7	47.9	100.0	89.0	89.6	80.2
Shikoku Electric Power Co., Inc	Ikata Unit 1	566	73.8	82.0	76.6	75.9	80.6	88.1	80.5	62.9
	Ikata Unit 2	566	76.4	79.8	99.2	77.7	76.8	79.6	99.8	78.3
	Ikata Unit 3	890		100.0	78.9	95.3	81.9	83.5	72.8	100.0
Kyushu Electric Power Co., Inc.	Genkai Unit 1	559	74.7	54.6	77.8	96.0	82.7	73.7	73.2	92.8
	Genkai Unit 2	559	79.9	67.6	94.1	84.0	74.1	73.1	87.8	82.3
	Genkai Unit 3	1,180	100.0	73.0	98.8	74.8	83.3	77.9	100.0	81.5
	Genkai Unit 4	1,180					100.0	76.8	79.8	100.0
	Sendai Unit 1	890	65.7	100.0	77.4	69.1	71.7	95.4	80.9	75.2
	Sendai Unit 2	890	100.0	74.4	75.6	77.5	100.0	78.8	75.6	81.0
	Subtotal	20,278	74.7	75.2	77.6	77.5	83.4	83.7	80.9	84.1
G C R										
The Japan Atomic Power Company	Tokai	166	0.0	67.3	60.4	72.3	82.4	—	—	—
	Subtotal	166	0.0	67.3	60.4	72.3	82.4	—	—	—
	Total	50,506	75.4	76.6	80.2	80.8	81.3	84.2	80.1	81.7

Note: Capacity factor will exceed 100% in the case of operation at rated thermal power.

Capacity Factor of Each Plant (cont'd)

(Unit: %)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand Total
89.0	90.0	86.6	80.9	95.1	64.5	37.1	23.0	91.6	75.2	10.5	0.0	72.4
86.9	100.0	80.2	78.5	86.9	101.5	82.5	64.5	83.2	102.3	5.8	0.0	78.7
82.6	85.7	80.3	82.4	88.2	84.5	96.8	68.0	71.3	84.1	40.9	0.0	77.8
								103.3	85.2	103.4	9.8	69.3
74.9	78.0	88.3	65.4	53.9	58.4	54.1	77.2	73.7	64.3	0.0	0.0	50.6
92.0	87.7	82.2	55.4	92.3	83.3	30.2	66.5	72.8	60.4	68.0	0.0	60.3
81.1	95.8	90.4	36.7	0.0	23.1	76.2	83.0	75.2	104.5	12.4	0.0	67.7
87.7	76.2	104.5	80.3	90.6	76.0	100.6	75.2	85.6	81.4	0.0	0.0	66.2
100.0	90.1	79.6	78.4	104.9	82.2	39.6	74.7	93.2	71.8	68.3	0.0	67.2
83.8	89.0	80.4	95.6	78.1	77.7	67.1	67.8	78.5	84.4	94.4	0.0	80.3
83.5	100.0	89.1	80.9	76.2	103.4	78.7	67.3	87.6	89.3	32.4	0.0	79.7
74.6	99.8	82.3	75.6	76.0	72.2	90.9	83.6	53.9	61.1	29.3	0.0	63.3
72.4	84.3	88.8	92.9	74.9	70.7	77.6	87.1	67.5	63.2	72.3	0.0	70.2
85.4	86.0	101.8	20.5	88.6	80.8	85.2	39.7	77.4	86.4	0.0	75.6	77.4
95.9	97.5	88.2	83.2	80.2	101.9	80.4	76.6	86.8	84.9	31.2	71.0	82.1
85.7	90.0	79.3	58.8	86.5	87.7	83.3	77.9	72.0	84.1	42.8	0.0	75.3
66.3	83.6	101.0	75.3	59.0	80.2	82.7	90.3	76.1	79.1	79.2	0.0	79.4
83.0	89.2	78.2	90.6	102.6	81.9	91.6	85.1	86.7	102.8	8.1	0.0	78.8
61.2	82.9	78.2	90.4	83.2	80.2	77.3	101.8	83.8	82.3	69.3	0.0	72.3
52.0	82.7	98.2	87.4	81.3	64.0	96.1	72.4	77.3	85.4	0.0	0.0	76.3
82.8	82.1	102.1	81.6	87.2	76.6	101.9	82.9	81.2	70.7	0.0	0.0	75.8
81.5	82.8	83.1	97.8	86.2	77.8	78.9	99.1	83.8	84.0	65.6	0.0	79.4
82.1	100.9	83.9	80.8	78.5	103.7	78.5	75.2	79.9	91.0	11.3	0.0	77.4
100.0	83.9	84.8	78.6	101.2	86.2	79.9	73.8	101.5	77.9	43.4	0.0	79.3
82.9	89.1	87.9	76.5	81.5	79.2	77.8	73.7	80.6	81.3	36.6	9.0	72.8
—	—	—	—	—	—	—	—	—	—	—	—	62.9
—	—	—	—	—	—	—	—	—	—	—	—	62.9
80.5	73.4	59.7	68.9	71.9	69.9	60.7	60.0	65.7	67.3	23.7	3.9	67.5

Ⅱ－3　Operation Factor

Table Ⅱ-13　Trends in Operation Factor

(Unit:%)

Fiscal Year \ Reactor Type	BWR	PWR	GCR	Overall average
1973	70.6	53.0	88.2	64.1
1974	62.0	54.6	85.3	60.5
1975	39.9	52.6	87.8	48.0
1976	64.7	57.3	87.5	61.7
1977	33.8	54.3	83.7	45.9
1978	67.9	58.3	86.6	63.8
1979	71.6	44.8	77.5	59.8
1980	70.3	58.3	82.1	65.0
1981	67.0	62.5	93.5	65.1
1982	70.2	69.9	83.3	70.2
1983	72.8	73.6	83.3	73.2
1984	73.7	77.2	77.6	75.3
1985	75.0	79.7	77.3	77.2
1986	76.9	76.9	77.9	76.9
1987	78.2	78.3	65.9	78.2
1988	74.0	70.8	70.2	72.6
1989	67.4	75.6	64.5	71.1
1990	73.8	73.4	80.6	73.6
1991	75.8	73.5	75.0	74.8
1992	74.8	75.3	90.8	75.1
1993	77.3	75.5	0.0	76.1
1994	78.3	75.9	81.3	77.2
1995	82.9	78.6	72.9	81.0
1996	83.9	78.2	85.1	81.4
1997	80.2	83.9	99.9	81.8
1998	85.0	84.3	—	84.7
1999	79.9	81.5	—	80.6
2000	80.3	84.6	—	82.1
2001	79.1	83.4	—	80.9
2002	61.9	88.5	—	73.2
2003	38.9	86.4	—	59.0
2004	63.2	75.5	—	68.4
2005	65.2	80.4	—	71.4
2006	63.7	78.0	—	69.3
2007	49.8	76.7	—	60.3
2008	50.9	72.5	—	59.4
2009	55.5	78.9	—	65.0
2010	57.2	79.4	—	66.5
2011	14.4	35.6	—	23.2
2012	0.0	8.8	—	3.9
Total	64.2	73.0	77.5	68.0

Table Ⅱ-14 Trends in Operation Factor of Each Electric Power Company

(Unit:%)

Fiscal Year \ Electric power Company	The Japan Atomic Power Company	Hokkaido	Tohoku	Tokyo	Chubu	Hokuriku	Kansai	Chugoku	Shikoku	Kyushu	Overall Average
1973	86.4			58.7			53.0	100.0			64.1
1974	65.2			56.3			54.6	79.2			60.5
1975	61.4			21.9	97.8		47.3	79.2		93.2	48.0
1976	79.9			63.3	61.1		53.4	66.5		76.6	61.7
1977	54.6			24.2	44.0		46.4	58.4	97.9	78.9	45.9
1978	82.3			68.1	52.3		52.6	73.0	66.6	83.7	63.8
1979	68.0			74.3	65.6		41.2	79.8	63.0	58.2	59.8
1980	75.6			68.1	73.2		55.8	69.2	63.6	78.0	65.0
1981	62.0			67.4	72.1		59.3	74.4	76.9	71.2	65.1
1982	61.8			72.5	74.2		65.0	62.8	81.8	82.6	70.2
1983	75.0			72.4	73.3		70.0	71.6	86.1	78.9	73.2
1984	71.1		100.0	72.8	72.1		73.4	78.6	85.3	84.4	75.3
1985	79.4		76.3	74.5	71.5		78.3	77.1	79.7	83.9	77.2
1986	82.6		78.4	76.1	76.4		74.4	78.3	80.9	80.7	76.9
1987	77.2		74.3	77.2	84.3		75.3	79.2	89.2	81.8	78.2
1988	80.1		79.1	77.4	65.3		62.2	68.9	87.4	74.7	72.6
1989	75.5	100.0	70.5	64.3	73.1		72.2	72.1	79.4	78.2	71.1
1990	85.2	81.0	67.4	72.2	63.3		68.3	87.6	81.1	81.4	73.6
1991	77.4	78.6	79.4	75.0	73.3		68.8	86.0	83.5	78.0	74.8
1992	81.1	77.0	72.5	76.0	74.8		69.6	75.5	85.4	78.0	75.1
1993	76.2	81.6	76.3	76.9	74.3	100.0	72.0	77.4	76.3	81.9	76.1
1994	83.9	90.2	79.7	77.1	77.9	76.0	72.0	83.1	85.1	76.5	77.2
1995	77.3	91.0	76.4	83.5	86.4	79.7	72.4	81.9	84.5	86.4	81.0
1996	84.2	80.5	85.1	84.5	85.6	78.7	74.3	78.5	86.1	79.3	81.4
1997	74.6	81.7	80.5	79.9	84.0	80.4	84.6	83.1	80.8	86.3	81.8
1998	91.1	92.4	90.9	83.6	80.5	100.0	84.7	95.5	84.5	80.7	84.7
1999	26.9	90.5	83.8	84.8	79.2	75.9	82.7	89.6	83.1	84.7	80.6
2000	82.5	86.3	90.7	79.9	87.2	85.3	82.5	60.6	84.1	86.3	82.1
2001	81.1	85.3	75.7	80.6	69.8	83.9	84.9	91.8	79.7	80.3	80.9
2002	80.9	92.9	81.9	60.6	33.8	96.9	90.0	95.8	86.1	85.6	73.2
2003	84.2	79.0	70.1	26.2	53.4	34.9	87.3	68.4	83.2	87.8	59.0
2004	86.3	79.0	72.2	61.7	51.6	79.6	69.1	65.1	76.0	85.3	68.4
2005	76.8	86.0	47.5	66.3	63.6	87.9	74.4	82.7	84.7	85.9	71.4
2006	71.5	91.6	49.4	73.9	41.6	38.3	75.7	70.7	82.0	80.9	69.3
2007	63.2	88.1	66.2	45.2	58.4	0.0	73.5	75.5	85.7	84.6	60.3
2008	47.9	65.1	65.3	43.5	56.0	60.9	71.0	63.4	83.5	83.4	59.4
2009	58.4	80.1	70.7	53.3	45.9	64.2	75.3	84.8	78.5	83.3	65.0
2010	72.3	87.7	71.6	55.2	49.4	81.6	76.4	20.3	89.4	79.4	66.5
2011	4.4	56.9	0.0	18.2	8.2	0.0	36.5	52.7	37.4	30.7	23.2
2012	0.0	4.2	0.0	0.0	0.0	0.0	17.4	0.0	0.0	0.0	3.9
Total	70.2	76.9	61.4	64.3	62.1	51.1	70.2	72.7	77.8	76.9	68.0

Table II-15 Operation Factor by Plant (by Month in FY2012)

(Unit : %)

Establisher	Plant Name	Licensed output (MW)	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Fiscal Year Total
B W R															
The Japan Atomic Power Company	Tokai No. 2	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tsuruga Unit 1	357	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	524	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Onagawa Unit 2	825	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Onagawa Unit 3	825	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Higashidori Unit 1	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	460	0.0												0.0
	Fukushima Daiichi Unit 2	784	0.0												0.0
	Fukushima Daiichi Unit 3	784	0.0												0.0
	Fukushima Daiichi Unit 4	784	0.0												0.0
	Fukushima Daiichi Unit 5	784	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daiichi Unit 6	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daini Unit 1	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daini Unit 2	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daini Unit 3	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fukushima Daini Unit 4	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 1	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 2	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 3	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 4	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 5	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 6	1,356	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kashiwazaki-Kariwa Unit 7	1,356	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chubu Electric Power Co., Inc.	Hamaoka Unit 3	1,100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hamaoka Unit 4	1,137	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hamaoka Unit 5	1,380	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hokuriku Electric Power Co.	Shika Unit 1	540	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shika Unit 2	1,206	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	460	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shimane Unit 2	820	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal		28,682	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table II-15 Operation Factor by Plant (by Month in FY2012) (cont'd)

(Unit : %)

Establisher	Plant Name	Licensed output (MW)	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Fiscal Year Total
P W R															
The Japan Atomic Power Company	Tsuruga Unit 2	1,160	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	579	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tomari Unit 2	579	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Tomari Unit 3	912	100.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6
The Kansai Electric Power Co., Inc.	Mihama Unit 1	340	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mihama Unit 2	500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mihama Unit 3	826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Takahama Unit 1	826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Takahama Unit 2	826	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Takahama Unit 3	870	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Takahama Unit 4	870	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ohi Unit 1	1,175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ohi Unit 2	1,175	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ohi Unit 3	1,180	0.0	0.0	0.0	87.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	74.0
	Ohi Unit 4	1,180	0.0	0.0	0.0	36.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	69.6
Shikoku Electric Power Co., Inc	Ikata Unit 1	566	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ikata Unit 2	566	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ikata Unit 3	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kyushu Electric Power Co., Inc.	Genkai Unit 1	559	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Genkai Unit 2	559	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Genkai Unit 3	1,180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Genkai Unit 4	1,180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sendai Unit 1	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sendai Unit 2	890	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal		20,278	4.5	0.7	0.0	7.2	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	8.8
Total		48,960	1.9	0.3	0.0	3.2	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	3.9

Table II-16 Trends in the

Establisher	Plant Name	Licensed output (MW)	1993	1994	1995	1996	1997	1998	1999	2000
B W R										
The Japan Atomic Power Company	Tokai No. 2	1,100	86.3	90.3	74.1	81.6	73.2	98.6	3.7	93.4
	Tsuruga Unit 1	357	65.6	75.8	80.3	71.3	64.1	77.4	38.5	11.5
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	524	76.3	79.7	57.0	97.7	76.6	78.1	82.5	100.0
	Onagawa Unit 2	825			94.5	77.0	83.0	99.1	84.6	84.8
	Onagawa Unit 3	825								
	Higashidori Unit 1	1,100								
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	460	53.9	100.0	79.7	45.8	100.0	84.6	69.7	72.3
	Fukushima Daiichi Unit 2	784	85.1	35.8	76.4	88.5	82.4	36.4	73.5	78.7
	Fukushima Daiichi Unit 3	784	75.0	62.8	68.6	97.8	15.1	66.0	67.4	100.0
	Fukushima Daiichi Unit 4	784	60.8	90.7	93.1	74.9	51.3	96.4	93.3	67.0
	Fukushima Daiichi Unit 5	784	65.1	65.1	81.3	97.0	73.4	82.4	68.6	49.9
	Fukushima Daiichi Unit 6	1,100	58.1	100.0	74.5	66.7	86.8	81.9	86.5	70.0
	Fukushima Daini Unit 1	1,100	61.8	79.9	100.0	73.3	67.5	76.2	100.0	78.9
	Fukushima Daini Unit 2	1,100	98.0	76.4	73.5	88.0	92.4	81.1	89.2	76.4
	Fukushima Daini Unit 3	1,100	74.7	51.0	91.0	96.3	81.4	90.2	75.8	100.0
	Fukushima Daini Unit 4	1,100	84.1	89.9	84.3	74.2	87.6	100.0	88.2	72.2
	Kashiwazaki-Kariwa Unit 1	1,100	75.1	77.0	82.0	91.9	74.9	79.0	88.0	95.8
	Kashiwazaki-Kariwa Unit 2	1,100	95.1	79.5	83.7	75.1	100.0	88.7	89.5	71.1
	Kashiwazaki-Kariwa Unit 3	1,100	100.0	79.5	85.7	100.0	87.0	73.8	83.8	100.0
	Kashiwazaki-Kariwa Unit 4	1,100		63.2	90.7	87.3	82.6	88.4	100.0	67.0
	Kashiwazaki-Kariwa Unit 5	1,100	78.9	99.0	82.0	85.9	76.6	100.0	84.6	76.6
	Kashiwazaki-Kariwa Unit 6	1,356				100.0	83.4	93.7	91.0	81.9
	Kashiwazaki-Kariwa Unit 7	1,356					100.0	85.0	74.7	86.5
Chubu Electric Power Co., Inc.	Hamaoka Unit 1	540	42.8	61.9	78.7	73.7	80.7	96.5	68.1	54.9
	Hamaoka Unit 2	840	76.0	62.5	92.4	87.6	79.3	73.8	49.4	95.2
	Hamaoka Unit 3	1,100	73.1	100.0	84.9	75.2	89.8	83.1	100.0	83.7
	Hamaoka Unit 4	1,137	100.0	75.5	87.0	100.0	83.4	75.4	86.6	100.0
	Hamaoka Unit 5	1,380								
Hokuriku Electric Power Co.	Shika Unit 1	540	100.0	76.0	79.7	78.7	80.4	100.0	75.9	85.3
	Shika Unit 2	1,206								
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	460	71.1	55.2	85.6	73.0	76.6	87.6	100.0	11.0
	Shimane Unit 2	820	81.0	98.8	79.9	81.5	86.8	100.0	83.8	88.4
Subtotal		30,062	77.3	78.3	82.9	83.9	80.2	85.0	79.9	80.3

Operation Factor of Each Plant

(Unit: %)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand Total
69.1	68.5	83.6	93.2	56.1	74.5	90.1	72.8	34.9	72.9	0.0	0.0	69.3
90.7	93.1	82.8	85.3	86.4	85.7	55.1	51.5	30.6	68.6	0.0	0.0	65.4
78.7	43.8	67.5	54.0	33.2	0.0	61.6	2.5	86.6	65.5	0.0	0.0	63.2
69.7	97.7	47.7	81.1	41.6	37.2	69.7	98.4	51.1	60.0	0.0	0.0	64.9
100.0	90.2	94.1	74.8	40.7	56.2	38.2	65.5	72.6	69.1	0.0	0.0	55.3
				100.0	77.0	86.8	70.3	76.4	85.2	0.0	0.0	58.4
37.7	57.0	0.0	0.0	48.1	74.2	40.9	54.9	93.5	52.0	0.0	0.0	54.9
69.7	99.7	0.0	67.0	66.9	46.4	92.1	86.3	75.3	68.5	0.0	0.0	62.8
85.9	29.6	62.7	39.2	89.6	73.3	66.8	90.1	71.3	68.3	0.0	0.0	65.9
89.0	46.0	2.8	69.1	32.8	77.6	90.6	70.6	82.9	66.6	0.0	0.0	69.9
90.0	86.6	55.3	58.5	67.8	60.4	73.5	77.7	83.1	61.5	0.0	0.0	68.9
95.5	67.8	25.3	25.5	72.3	81.8	64.6	94.2	77.6	37.0	0.0	0.0	66.8
75.2	77.0	58.4	49.6	86.1	73.9	74.8	88.2	92.8	66.4	0.0	0.0	72.0
92.6	25.8	0.0	58.9	66.0	100.0	52.6	81.4	92.9	77.2	0.0	0.0	70.1
32.2	46.0	7.1	67.1	29.1	87.5	76.6	73.1	82.0	94.4	0.0	0.0	63.3
86.8	53.4	0.0	37.5	57.6	41.2	76.3	92.9	73.0	72.8	0.0	0.0	67.5
74.6	42.5	0.0	85.7	20.3	92.0	9.0	0.0	0.0	82.0	34.7	0.0	62.4
99.2	39.5	0.0	74.9	68.9	88.8	6.9	0.0	0.0	0.0	0.0	0.0	56.3
76.0	35.9	0.0	75.3	85.9	79.0	29.1	0.0	0.0	0.0	0.0	0.0	53.7
69.5	77.0	68.5	37.0	100.0	31.6	29.1	0.0	0.0	0.0	0.0	0.0	52.0
88.6	91.5	0.0	91.9	73.6	64.9	0.0	0.0	0.0	34.8	81.7	0.0	63.6
81.3	82.5	89.5	73.3	69.3	96.6	7.1	0.0	54.7	76.0	98.4	0.0	68.2
100.0	69.0	45.8	89.0	77.1	71.3	29.1	0.0	74.2	80.4	39.3	0.0	63.2
60.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	—	—	—	—	50.2
48.3	25.7	89.1	0.0	0.0	0.0	0.0	0.0	—	—	—	—	60.9
67.8	47.4	41.3	79.0	83.5	69.4	80.1	95.3	69.5	66.4	0.0	0.0	71.9
92.1	42.8	64.2	75.9	97.6	75.5	81.3	87.4	60.7	68.4	11.6	0.0	72.7
			100.0	83.4	33.2	82.4	44.4	12.3	17.3	11.9	0.0	37.2
83.9	96.9	34.9	79.6	86.5	69.0	0.0	0.0	97.3	63.3	0.0	0.0	63.8
				100.0	26.1	0.0	88.7	49.3	89.8	0.0	0.0	36.7
98.8	88.4	71.6	89.1	72.0	49.4	68.0	94.8	64.6	0.0	0.0	0.0	68.2
87.8	100.0	66.6	51.6	88.7	82.6	79.6	45.8	96.2	31.7	82.3	0.0	76.8
79.1	61.9	38.9	63.2	65.2	63.7	49.8	50.9	55.5	57.2	14.4	0.0	64.2

Table II-16 Trends in the

Establisher	Plant Name	Licensed output (MW)	1993	1994	1995	1996	1997	1998	1999	2000
P W R										
The Japan Atomic Power Company	Tsuruga Unit 2	1,160	80.9	80.8	80.1	90.5	75.4	88.2	45.3	94.0
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	579	82.3	100.0	82.0	78.7	84.2	100.0	81.0	87.0
	Tomari Unit 2	579	81.0	80.4	100.0	82.3	79.3	84.7	100.0	85.6
	Tomari Unit 3	912								
The Kansai Electric Power Co., Inc.	Mihama Unit 1	340	49.1	0.0	6.7	100.0	81.5	83.4	76.6	100.0
	Mihama Unit 2	500	0.0	55.7	72.9	84.1	89.4	82.5	67.3	71.4
	Mihama Unit 3	826	67.9	88.2	61.9	57.5	88.9	100.0	85.0	70.3
	Takahama Unit 1	826	52.4	55.6	76.6	72.9	68.7	84.7	99.1	88.2
	Takahama Unit 2	826	76.6	70.3	68.7	85.0	88.1	87.4	88.5	86.8
	Takahama Unit 3	870	79.7	78.7	97.7	76.0	82.5	87.4	86.9	92.6
	Takahama Unit 4	870	76.9	100.0	77.5	77.2	88.2	100.0	75.3	82.8
	Ohi Unit 1	1,175	51.8	46.1	93.3	71.7	76.2	88.8	81.8	65.1
	Ohi Unit 2	1,175	89.4	69.5	44.6	83.1	69.8	41.5	62.1	88.6
	Ohi Unit 3	1,180	100.0	82.9	78.7	84.5	95.6	94.2	90.4	89.5
	Ohi Unit 4	1,180	88.3	92.4	76.5	48.5	100.0	89.4	90.4	80.6
Shikoku Electric Power Co., Inc	Ikata Unit 1	566	75.0	83.3	77.9	77.0	80.8	89.1	81.4	63.9
	Ikata Unit 2	566	77.6	80.1	100.0	78.9	78.0	80.4	100.0	79.2
	Ikata Unit 3	890		100.0	79.0	96.4	82.7	84.2	73.4	100.0
Kyushu Electric Power Co., Inc.	Genkai Unit 1	559	76.6	55.8	78.7	96.6	83.4	75.0	75.2	93.1
	Genkai Unit 2	559	81.0	68.8	94.2	85.4	74.9	73.8	87.9	83.1
	Genkai Unit 3	1,180	100.0	73.1	99.9	75.8	84.3	78.7	100.0	82.3
	Genkai Unit 4	1,180					100.0	77.4	80.4	100.0
	Sendai Unit 1	890	66.7	100.0	78.4	70.0	71.8	96.7	82.1	76.0
	Sendai Unit 2	890	100.0	75.4	76.7	78.5	100.0	79.6	76.5	81.8
	Subtotal	20,278	75.5	75.9	78.6	78.2	83.9	84.3	81.5	84.6
G C R										
The Japan Atomic Power Company	Tokai	166	0.0	81.3	72.9	85.1	99.9	—	—	—
	Subtotal	166	0.0	81.3	72.9	85.1	99.9	—	—	—
	Total	50,506	76.1	77.2	81.0	81.4	81.8	84.7	80.6	82.1

Operation Factor of Each Plant (cont'd)

(Unit:%)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand Total
89.5	89.0	85.3	80.1	93.5	64.3	40.2	23.2	89.3	72.9	10.0	0.0	72.5
87.5	100.0	79.5	77.3	85.6	100.0	81.3	63.4	81.7	100.0	5.7	0.0	78.6
83.1	85.9	78.5	80.7	86.4	83.1	94.8	66.7	70.0	82.6	40.2	0.0	77.5
								100.0	83.1	100.0	9.6	67.3
75.4	77.6	86.8	66.4	54.9	58.7	54.1	76.4	72.9	65.1	0.0	0.0	52.7
93.2	87.7	82.7	55.8	92.1	84.1	30.2	66.6	73.0	61.5	68.6	0.0	61.7
81.5	96.1	88.3	35.8	0.0	23.8	73.7	80.2	72.8	100.0	11.9	0.0	68.3
88.6	76.0	100.0	77.8	87.4	73.6	96.7	72.4	82.1	77.9	0.0	0.0	66.6
100.0	87.4	77.0	76.9	100.0	78.7	37.8	71.7	89.1	68.7	65.3	0.0	67.7
84.1	87.7	77.8	93.1	76.0	75.4	64.6	65.8	74.5	80.0	89.1	0.0	79.6
83.8	100.0	86.3	78.5	74.3	100.0	76.4	66.2	84.8	85.2	30.6	0.0	79.2
75.1	100.0	82.3	75.9	76.7	72.7	90.8	83.6	54.2	61.9	29.2	0.0	64.2
72.7	83.9	87.9	91.7	74.5	69.5	77.3	85.3	66.8	62.1	70.9	0.0	70.7
85.7	86.3	100.0	20.8	88.6	79.9	84.0	39.5	76.9	85.8	0.0	74.0	77.3
95.9	95.9	86.7	82.3	79.7	100.0	79.2	75.7	85.6	84.1	30.9	69.6	81.7
85.8	89.3	78.8	58.4	86.3	87.5	82.9	77.9	71.7	83.7	42.6	0.0	76.1
67.6	82.5	100.0	76.0	59.1	80.0	82.9	90.1	75.8	78.3	78.7	0.0	79.9
83.6	86.5	75.4	87.2	100.0	79.8	89.2	82.9	84.6	100.0	7.9	0.0	77.7
61.8	81.7	77.1	88.4	82.1	78.7	75.8	98.6	81.2	79.8	66.9	0.0	72.9
52.6	81.2	95.3	85.6	79.4	62.2	94.0	71.2	75.7	83.2	0.0	0.0	76.4
83.5	82.5	100.0	80.4	85.9	75.7	100.0	82.0	80.4	69.6	0.0	0.0	75.5
82.3	83.0	82.6	96.8	85.6	77.8	78.8	98.6	83.7	84.0	65.5	0.0	79.4
82.9	100.0	84.0	81.0	78.5	100.0	76.1	72.7	76.2	87.4	10.7	0.0	77.3
100.0	83.7	84.3	78.6	100.0	86.2	79.9	73.8	100.0	75.7	41.8	0.0	79.5
83.4	88.5	86.4	75.5	80.4	78.0	76.7	72.5	78.9	79.4	35.6	8.8	73.0
—	—	—	—	—	—	—	—	—	—	—	—	77.5
—	—	—	—	—	—	—	—	—	—	—	—	77.5
80.9	73.2	59.0	68.4	71.4	69.3	60.3	59.4	65.0	66.5	23.2	3.9	68.0

Ⅱ-4 Electric Energy Generated

Table Ⅱ-17 Trends in Electric Energy Generated

(Unit: GWh)

Fiscal Year \ Reactor Type	BWR	PWR	GCR	Total
1973	4, 455	3, 180	1, 025	8, 660
1974	8, 845	5, 265	987	15, 097
1975	6, 514	9, 163	997	16, 674
1976	16, 478	14, 314	1, 011	31, 803
1977	8, 586	18, 648	987	28, 221
1978	26, 427	21, 141	1, 015	48, 583
1979	41, 563	22, 439	926	64, 928
1980	45, 478	33, 173	979	79, 631
1981	43, 694	39, 211	1, 094	83, 999
1982	53, 170	47, 308	971	101, 449
1983	57, 487	50, 474	988	108, 949
1984	67, 265	58, 447	922	126, 634
1985	78, 897	73, 467	911	153, 274
1986	85, 853	76, 841	921	163, 615
1987	96, 561	85, 516	790	182, 867
1988	97, 243	77, 103	841	175, 187
1989	92, 770	85, 318	767	178, 855
1990	112, 194	83, 824	949	196, 967
1991	119, 419	89, 574	894	209, 887
1992	117, 690	98, 589	1, 079	217, 359
1993	133, 364	105, 685	0	239, 048
1994	147, 240	115, 589	979	263, 807
1995	163, 578	123, 888	881	288, 347
1996	171, 008	123, 404	1, 052	295, 464
1997	176, 027	138, 813	1, 199	316, 039
1998	189, 433	141, 914	—	331, 347
1999	178, 342	137, 572	—	315, 914
2000	178, 744	142, 593	—	321, 337
2001	176, 841	140, 698	—	317, 539
2002	142, 928	151, 145	—	294, 073
2003	90, 433	149, 580	—	240, 013
2004	148, 044	129, 812	—	277, 857
2005	160, 876	138, 287	—	299, 163
2006	168, 986	134, 440	—	303, 426
2007	131, 532	132, 301	—	263, 832
2008	133, 118	124, 953	—	258, 071
2009	138, 989	138, 481	—	277, 470
2010	143, 901	144, 329	—	288, 230
2011	36, 602	65, 159	—	101, 761
2012	0	15, 939	—	15, 939
Grand total	4, 002, 896	3, 493, 597	29, 007	7, 525, 500

Table II-18 Trends in the Electric Energy Generated by Each Electric Power Company

(Unit: GWh)

Fiscal Year \ Electric power Company	The Japan Atomic Power Company	Hokkaido	Tohoku	Tokyo	Chubu	Hokuriku	Kansai	Chugoku	Shikoku	Kyushu	Total
1973	3,494			1,954			3,180	33			8,660
1974	2,514			4,269			5,265	3,048			15,097
1975	2,392			1,890	155		7,187	3,074		1,976	16,674
1976	3,154			9,276	2,508		10,714	2,551		3,600	31,803
1977	2,155			3,384	1,768		12,540	2,265	2,353	3,755	28,221
1978	5,753			15,514	3,350		14,089	2,825	3,082	3,971	48,583
1979	8,845			23,498	7,086		16,638	3,060	3,047	2,754	64,928
1980	10,059			25,629	8,083		26,401	2,686	2,992	3,780	79,631
1981	8,178			25,575	8,130		28,428	2,905	3,892	6,892	83,999
1982	8,264			34,783	8,606		31,349	2,487	8,034	7,926	101,449
1983	10,135			36,921	8,586		34,371	2,833	8,473	7,630	108,949
1984	9,696		3,779	43,039	8,536		37,152	3,135	8,343	12,952	126,634
1985	10,966		3,453	53,803	8,515		49,001	3,069	7,777	16,688	153,274
1986	12,349		3,545	59,897	9,041		47,585	3,131	7,932	20,136	163,615
1987	18,396		3,370	65,445	14,828		48,216	3,175	8,821	20,618	182,867
1988	19,153		3,603	68,105	13,944		39,762	3,440	8,530	18,651	175,187
1989	18,046	3,932	3,197	56,484	15,616		46,309	8,023	7,741	19,507	178,855
1990	20,340	4,056	3,017	73,887	13,560		43,964	9,747	7,959	20,438	196,967
1991	18,564	7,787	3,552	80,673	15,845		46,124	9,605	8,147	19,590	209,887
1992	19,441	7,676	3,311	81,786	16,019		52,877	8,372	8,384	19,492	217,359
1993	18,474	8,192	3,473	87,501	20,277	3,170	61,015	8,616	7,447	20,883	239,048
1994	20,157	9,104	3,643	95,241	24,512	3,551	60,898	9,269	10,308	27,124	263,807
1995	18,534	9,191	7,195	106,617	27,294	3,754	61,034	9,161	14,915	30,652	288,347
1996	20,227	8,089	10,003	111,509	27,049	3,685	63,138	8,738	15,048	27,978	295,464
1997	17,824	8,221	9,469	118,122	26,357	3,787	72,023	9,282	14,191	36,764	316,039
1998	20,755	9,344	10,702	126,059	25,393	4,729	72,091	10,702	14,824	36,748	331,347
1999	6,061	9,175	9,880	128,265	25,070	3,581	70,388	10,059	14,661	38,774	315,914
2000	18,863	8,702	10,673	120,415	27,556	4,014	70,036	6,765	14,799	39,513	321,337
2001	18,358	8,600	9,823	121,468	22,021	3,950	72,319	10,267	14,006	36,725	317,539
2002	18,569	9,420	15,547	91,961	10,684	4,572	77,459	10,736	15,564	39,561	294,073
2003	19,485	8,161	13,578	39,924	16,889	1,676	76,468	7,705	15,076	41,052	240,013
2004	19,965	8,159	13,953	93,527	17,708	3,777	60,034	7,333	13,713	39,687	277,857
2005	17,776	8,880	10,441	100,711	27,625	4,688	64,544	9,297	15,210	39,991	299,163
2006	16,304	9,437	14,245	112,537	18,145	6,370	65,911	7,937	14,704	37,836	303,426
2007	14,294	9,122	19,062	68,307	25,168	0	64,339	8,485	15,415	39,641	263,832
2008	11,031	6,720	18,839	66,339	22,858	9,261	61,954	7,131	14,970	38,968	258,071
2009	13,639	10,101	20,380	80,886	14,129	9,673	65,894	9,585	14,102	39,079	277,470
2010	16,961	16,258	20,690	83,845	15,318	12,445	66,954	2,281	16,104	37,375	288,230
2011	1,065	10,663	0	28,067	2,616	0	32,252	5,919	6,698	14,481	101,761
2012	0	784	0	0	0	0	15,155	0	0	0	15,939
Total	533,014	199,775	252,423	2,552,499	560,848	86,684	1,861,076	238,735	367,263	873,184	7,525,500

Table II-19 Electric Energy Generated by Plant (by Month in FY2012)

(Unit: GWh)

Establisher	Plant Name	Licensed output (MW)	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Fiscal Year Total
B W R															
The Japan Atomic Power Company	Tokai No. 2	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tsuruga Unit 1	357	0	0	0	0	0	0	0	0	0	0	0	0	0
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	524	0	0	0	0	0	0	0	0	0	0	0	0	0
	Onagawa Unit 2	825	0	0	0	0	0	0	0	0	0	0	0	0	0
	Onagawa Unit 3	825	0	0	0	0	0	0	0	0	0	0	0	0	0
	Higashidori Unit 1	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	460	0												0
	Fukushima Daiichi Unit 2	784	0												0
	Fukushima Daiichi Unit 3	784	0												0
	Fukushima Daiichi Unit 4	784	0												0
	Fukushima Daiichi Unit 5	784	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daiichi Unit 6	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daini Unit 1	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daini Unit 2	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daini Unit 3	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daini Unit 4	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 1	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 2	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 3	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 4	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 5	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 6	1,356	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 7	1,356	0	0	0	0	0	0	0	0	0	0	0	0	0
Chubu Electric Power Co., Inc.	Hamaoka Unit 3	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hamaoka Unit 4	1,137	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hamaoka Unit 5	1,380	0	0	0	0	0	0	0	0	0	0	0	0	0
Hokuriku Electric Power Co.	Shika Unit 1	540	0	0	0	0	0	0	0	0	0	0	0	0	0
	Shika Unit 2	1,206	0	0	0	0	0	0	0	0	0	0	0	0	0
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	460	0	0	0	0	0	0	0	0	0	0	0	0	0
	Shimane Unit 2	820	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal		28,682	0	0	0	0	0	0	0	0	0	0	0	0	0

Table II-19 Electric Energy Generated by Unit Plant (by Month in FY2012) (cont'd)

(Unit: GWh)

Establisher	Plant Name	Licensed output (MW)	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Fiscal Year Total
P W R															
The Japan Atomic Power Company	Tsuruga Unit 2	1,160	0	0	0	0	0	0	0	0	0	0	0	0	0
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	579	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tomari Unit 2	579	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tomari Unit 3	912	680	105	0	0	0	0	0	0	0	0	0	0	784
The Kansai Electric Power Co., Inc.	Mihama Unit 1	340	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mihama Unit 2	500	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mihama Unit 3	826	0	0	0	0	0	0	0	0	0	0	0	0	0
	Takahama Unit 1	826	0	0	0	0	0	0	0	0	0	0	0	0	0
	Takahama Unit 2	826	0	0	0	0	0	0	0	0	0	0	0	0	0
	Takahama Unit 3	870	0	0	0	0	0	0	0	0	0	0	0	0	0
	Takahama Unit 4	870	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ohi Unit 1	1,175	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ohi Unit 2	1,175	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ohi Unit 3	1,180	0	0	0	732	883	857	896	877	912	914	826	915	7,813
	Ohi Unit 4	1,180	0	0	0	273	885	858	896	877	910	911	823	911	7,342
Shikoku Electric Power Co., Inc	Ikata Unit 1	566	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ikata Unit 2	566	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ikata Unit 3	890	0	0	0	0	0	0	0	0	0	0	0	0	0
Kyushu Electric Power Co., Inc.	Genkai Unit 1	559	0	0	0	0	0	0	0	0	0	0	0	0	0
	Genkai Unit 2	559	0	0	0	0	0	0	0	0	0	0	0	0	0
	Genkai Unit 3	1,180	0	0	0	0	0	0	0	0	0	0	0	0	0
	Genkai Unit 4	1,180	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sendai Unit 1	890	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sendai Unit 2	890	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal		20,278	680	105	0	1,005	1,768	1,715	1,792	1,754	1,822	1,825	1,649	1,826	15,939
Total		48,960	680	105	0	1,005	1,768	1,715	1,792	1,754	1,822	1,825	1,649	1,826	15,939

Table II-20 Trends in the

Establisher	Plant Name	Licensed output (MW)	1993	1994	1995	1996	1997	1998	1999	2000
B W R										
The Japan Atomic Power Company	Tokai No. 2	1, 100	8, 288	8, 670	7, 127	7, 817	7, 015	9, 437	323	8, 968
	Tsuruga Unit 1	357	2, 039	2, 352	2, 430	2, 207	1, 996	2, 411	1, 165	351
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	524	3, 473	3, 643	2, 574	4, 477	3, 501	3, 561	3, 769	4, 586
	Onagawa Unit 2	825			4, 621	5, 525	5, 968	7, 140	6, 110	6, 087
	Onagawa Unit 3	825								
	Higashidori Unit 1	1, 100								
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	460	2, 123	4, 029	3, 208	1, 818	4, 019	3, 386	2, 801	2, 911
	Fukushima Daiichi Unit 2	784	5, 794	2, 396	5, 234	6, 073	5, 622	2, 473	5, 015	5, 384
	Fukushima Daiichi Unit 3	784	5, 085	4, 203	4, 666	6, 675	1, 031	4, 439	4, 598	6, 859
	Fukushima Daiichi Unit 4	784	4, 087	6, 188	6, 354	5, 111	3, 483	6, 580	6, 398	4, 560
	Fukushima Daiichi Unit 5	784	4, 415	4, 425	5, 539	6, 653	5, 010	5, 597	4, 710	3, 405
	Fukushima Daiichi Unit 6	1, 100	5, 500	9, 626	7, 126	6, 353	8, 344	7, 834	8, 268	6, 622
	Fukushima Daini Unit 1	1, 100	5, 888	7, 672	9, 662	7, 037	6, 425	7, 312	9, 662	7, 552
	Fukushima Daini Unit 2	1, 100	9, 407	7, 330	7, 069	8, 449	8, 877	7, 731	8, 568	7, 314
	Fukushima Daini Unit 3	1, 100	7, 161	4, 798	8, 786	9, 256	7, 815	8, 644	7, 270	9, 608
	Fukushima Daini Unit 4	1, 100	7, 994	8, 619	8, 113	7, 091	8, 399	9, 632	8, 486	6, 924
	Kashiwazaki-Kariwa Unit 1	1, 100	7, 191	7, 335	7, 915	8, 837	7, 153	7, 595	8, 466	9, 210
	Kashiwazaki-Kariwa Unit 2	1, 100	9, 128	7, 618	8, 066	7, 163	9, 636	8, 522	8, 617	6, 803
	Kashiwazaki-Kariwa Unit 3	1, 100	6, 139	7, 617	8, 259	9, 636	8, 361	7, 044	8, 063	9, 635
	Kashiwazaki-Kariwa Unit 4	1, 100		3, 878	8, 742	8, 389	7, 856	8, 489	9, 661	6, 397
	Kashiwazaki-Kariwa Unit 5	1, 100	7, 588	9, 506	7, 878	8, 249	7, 350	9, 636	8, 147	7, 307
	Kashiwazaki-Kariwa Unit 6	1, 356				4, 719	9, 855	11, 104	10, 731	9, 699
	Kashiwazaki-Kariwa Unit 7	1, 356					8, 885	10, 040	8, 802	10, 223
Chubu Electric Power Co., Inc.	Hamaoka Unit 1	540	1, 999	2, 898	3, 703	3, 476	3, 802	4, 563	3, 220	2, 576
	Hamaoka Unit 2	840	5, 544	4, 539	6, 808	6, 419	5, 810	5, 387	3, 603	6, 972
	Hamaoka Unit 3	1, 100	7, 011	9, 634	8, 125	7, 195	8, 515	7, 980	9, 662	8, 048
	Hamaoka Unit 4	1, 137	5, 722	7, 442	8, 658	9, 960	8, 230	7, 463	8, 585	9, 960
	Hamaoka Unit 5	1, 380								
Hokuriku Electric Power Co.	Shika Unit 1	540	3, 170	3, 551	3, 754	3, 685	3, 787	4, 729	3, 581	4, 014
	Shika Unit 2	1, 206								
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	460	2, 853	2, 204	3, 451	2, 931	3, 070	3, 522	4, 041	443
	Shimane Unit 2	820	5, 764	7, 065	5, 710	5, 807	6, 212	7, 180	6, 019	6, 323
	Subtotal	30, 062	133, 364	147, 240	163, 578	171, 008	176, 027	189, 433	178, 342	178, 744

Electric Energy Generated by Each Plant

(Unit: GWh)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand Total
6,482	6,527	8,063	9,075	5,450	7,147	8,790	7,177	3,382	7,187	0	0	226,973
2,829	2,901	2,599	2,671	2,663	2,605	1,719	1,514	953	2,135	0	0	84,735
3,598	2,011	3,116	2,490	1,544	0	2,852	21	3,959	3,044	0	0	83,047
5,018	7,025	3,456	5,924	2,989	2,686	5,083	7,181	3,713	4,360	0	0	82,886
1,208	6,511	7,006	5,539	2,899	4,171	2,770	4,891	5,383	5,083	0	0	45,460
				3,010	7,388	8,357	6,746	7,325	8,204	0	0	41,030
1,511	2,295	0	0	1,909	2,921	1,647	2,198	3,697	2,075	0	0	86,910
4,739	6,845	0	4,435	4,386	3,145	6,316	5,903	5,043	4,666	0	0	155,866
5,873	2,014	4,306	2,523	6,163	4,995	4,513	6,218	4,888	4,677	0	0	158,965
6,065	3,156	168	4,741	2,091	5,236	5,943	4,823	5,673	4,566	0	0	157,430
6,149	5,928	3,789	3,992	4,611	4,100	5,032	5,528	5,944	4,380	0	0	162,209
9,177	6,493	2,416	2,395	7,011	7,911	6,068	9,178	7,705	3,710	0	0	212,579
7,211	7,408	5,554	4,737	8,322	7,186	7,258	8,588	9,015	6,417	0	0	213,468
8,885	2,456	0	5,708	6,357	9,696	5,058	7,864	8,997	7,451	0	0	196,023
3,044	4,442	667	6,504	2,787	8,463	7,411	7,040	7,909	9,127	0	0	168,572
8,318	5,163	0	3,603	5,588	3,961	7,410	9,000	6,892	7,013	0	0	165,603
7,138	4,086	0	8,209	1,883	9,002	886	0	0	7,956	3,421	0	165,023
9,550	3,854	0	7,288	6,680	8,643	631	0	0	0	0	0	121,922
7,295	3,440	0	7,289	8,273	7,684	2,854	0	0	0	0	0	101,590
6,664	7,396	6,681	3,571	9,709	3,038	2,857	0	0	0	0	0	93,327
8,506	8,883	0	8,835	7,173	6,348	0	0	0	3,263	7,995	0	140,752
9,586	9,787	10,877	8,939	8,454	11,748	865	0	6,540	9,223	12,035	0	134,161
11,757	8,316	5,464	10,760	9,312	8,461	3,556	0	8,584	9,323	4,617	0	118,099
2,862	0	0	0	0	0	0	0	—	—	—	—	75,056
3,511	1,866	6,496	0	0	0	0	0	—	—	—	—	132,259
6,500	4,560	4,001	7,672	8,125	6,682	7,622	9,195	6,728	6,420	0	0	176,590
9,149	4,258	6,392	7,562	9,264	7,509	8,126	8,702	6,008	6,801	1,163	0	140,953
			2,473	10,236	3,955	9,420	4,961	1,394	2,097	1,453	0	35,989
3,950	4,572	1,676	3,777	4,134	3,276	0	0	4,659	3,004	0	0	59,321
				554	3,093	0	9,261	5,014	9,441	0	0	27,363
3,975	3,556	2,912	3,654	2,949	2,018	2,790	3,883	2,643	0	0	0	106,192
6,292	7,180	4,793	3,679	6,348	5,919	5,695	3,248	6,941	2,281	5,919	0	132,543
176,841	142,928	90,433	148,044	160,876	168,986	131,532	133,118	138,989	143,901	36,602	0	4,002,896

Table II-20 Trends in the

Establisher	Plant Name	Licensed output (MW)	1993	1994	1995	1996	1997	1998	1999	2000
P W R										
The Japan Atomic Power Company	Tsuruga Unit 2	1,160	8,147	8,155	8,096	9,151	7,615	8,907	4,574	9,543
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	579	4,130	5,071	4,106	3,954	4,239	5,071	4,089	4,386
	Tomari Unit 2	579	4,062	4,033	5,085	4,135	3,982	4,273	5,086	4,316
	Tomari Unit 3	912								
The Kansai Electric Power Co., Inc.	Mihama Unit 1	340	1,420	0	142	2,975	2,408	2,460	2,236	2,973
	Mihama Unit 2	500	0	2,353	3,132	3,677	3,878	3,593	2,918	3,102
	Mihama Unit 3	826	4,716	6,348	4,352	4,098	6,394	7,151	6,132	5,033
	Takahama Unit 1	826	3,639	3,964	5,553	5,226	4,930	6,101	7,177	6,326
	Takahama Unit 2	826	5,534	4,951	4,864	6,132	6,335	6,294	6,333	6,192
	Takahama Unit 3	870	6,020	5,997	7,416	5,754	6,243	6,630	6,620	7,031
	Takahama Unit 4	870	5,808	7,621	5,871	5,841	6,692	7,620	5,711	6,290
	Ohi Unit 1	1,175	5,225	4,674	9,336	7,318	7,803	9,126	8,394	6,547
	Ohi Unit 2	1,175	9,197	7,074	4,443	8,494	7,128	4,228	6,293	9,047
	Ohi Unit 3	1,180	10,333	8,498	8,076	8,673	9,878	9,691	9,286	9,205
	Ohi Unit 4	1,180	9,124	9,418	7,850	4,949	10,336	9,198	9,287	8,288
Shikoku Electric Power Co., Inc	Ikata Unit 1	566	3,658	4,067	3,810	3,763	3,995	4,370	4,004	3,119
	Ikata Unit 2	566	3,790	3,956	4,934	3,853	3,810	3,946	4,962	3,884
	Ikata Unit 3	890		2,285	6,171	7,432	6,386	6,508	5,695	7,796
Kyushu Electric Power Co., Inc.	Genkai Unit 1	559	3,656	2,674	3,822	4,702	4,052	3,610	3,594	4,542
	Genkai Unit 2	559	3,915	3,311	4,621	4,111	3,630	3,578	4,313	4,033
	Genkai Unit 3	1,180	396	7,548	10,246	7,736	8,614	8,048	10,364	8,428
	Genkai Unit 4	1,180					7,079	7,937	8,267	10,335
	Sendai Unit 1	890	5,121	7,795	6,050	5,384	5,594	7,435	6,328	5,863
	Sendai Unit 2	890	7,795	5,797	5,912	6,046	7,795	6,141	5,909	6,311
	Subtotal	20,278	105,685	115,589	123,888	123,404	138,813	141,914	137,572	142,593
G C R										
Japan Atomic Power Company	Tokai	166	0	979	881	1,052	1,199	—	—	—
	Subtotal	166	0	979	881	1,052	1,199	—	—	—
	Total	50,506	239,048	263,807	288,347	295,464	316,039	331,347	315,914	321,337

Electric Energy Generated by Each Plant (cont'd)

(Unit: GWh)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand Total
9,048	9,141	8,823	8,219	9,662	6,552	3,784	2,340	9,304	7,639	1,065	0	192,299
4,410	5,072	4,079	3,981	4,406	5,149	4,197	3,273	4,222	5,187	297	0	94,918
4,190	4,349	4,082	4,178	4,473	4,288	4,925	3,447	3,619	4,264	2,082	0	86,720
								2,260	6,808	8,284	784	18,137
2,232	2,322	2,636	1,947	1,604	1,739	1,615	2,298	2,195	1,914	0	0	63,801
4,031	3,843	3,609	2,428	4,041	3,646	1,325	2,914	3,187	2,646	2,986	0	107,529
5,865	6,932	6,556	2,658	0	1,675	5,531	6,006	5,445	7,560	901	0	178,024
6,344	5,511	7,579	5,814	6,556	5,499	7,302	5,444	6,190	5,893	0	0	183,869
7,235	6,520	5,775	5,675	7,591	5,950	2,876	5,408	6,746	5,198	4,956	0	181,928
6,385	6,782	6,146	7,282	5,950	5,920	5,129	5,168	5,981	6,436	7,216	0	172,672
6,365	7,620	6,811	6,166	5,806	7,882	6,015	5,127	6,676	6,809	2,473	0	169,087
7,675	10,274	8,492	7,783	7,827	7,435	9,377	8,606	5,553	6,286	3,025	0	221,731
7,450	8,682	9,169	9,562	7,714	7,279	8,005	8,966	6,943	6,510	7,457	0	240,795
8,827	8,894	10,550	2,122	9,164	8,351	8,835	4,102	8,002	8,931	0	7,813	170,420
9,911	10,078	9,145	8,599	8,291	10,534	8,328	7,915	8,976	8,771	3,238	7,342	171,220
4,249	4,463	3,942	2,914	4,291	4,347	4,140	3,862	3,568	4,169	2,130	0	132,595
3,288	4,147	5,022	3,732	2,923	3,974	4,110	4,475	3,773	3,923	3,935	0	122,210
6,469	6,954	6,112	7,067	7,996	6,384	7,165	6,633	6,762	8,012	633	0	112,458
2,998	4,060	3,839	4,426	4,075	3,929	3,797	4,983	4,104	4,032	3,403	0	132,718
2,547	4,048	4,823	4,279	3,980	3,133	4,716	3,547	3,783	4,184	0	0	119,674
8,556	8,491	10,586	8,434	9,015	7,918	10,559	8,572	8,392	7,309	0	0	149,214
8,429	8,556	8,615	10,112	8,911	8,047	8,181	10,246	8,662	8,687	6,800	0	128,864
6,400	7,868	6,557	6,303	6,117	8,088	6,140	5,865	6,228	7,093	883	0	173,535
7,795	6,538	6,631	6,132	7,893	6,722	6,248	5,755	7,910	6,070	3,395	0	169,180
140,698	151,145	149,580	129,812	138,287	134,440	132,301	124,953	138,481	144,329	65,159	15,939	3,493,597
—	—	—	—	—	—	—	—	—	—	—	—	29,007
—	—	—	—	—	—	—	—	—	—	—	—	29,007
317,539	294,073	240,013	277,857	299,163	303,426	263,832	258,071	277,470	288,230	101,761	15,939	7,525,500

Ⅱ－5 Generating Time

Table Ⅱ-21 Trends in Generating Time

(Unit: Hours)

Fiscal Year \ Reactor Type	BWR	PWR	GCR	Total
1973	12,714	9,124	7,723	29,561
1974	19,506	9,578	7,470	36,554
1975	15,491	14,852	7,712	38,055
1976	33,294	24,275	7,669	65,238
1977	18,392	29,410	7,330	55,132
1978	46,532	35,428	7,587	89,547
1979	65,138	30,459	6,808	102,405
1980	67,747	47,606	7,196	122,549
1981	61,574	55,179	8,189	124,942
1982	71,589	64,838	7,295	143,722
1983	76,885	70,730	7,321	154,936
1984	90,357	80,651	6,801	177,809
1985	99,175	100,199	6,769	206,143
1986	107,389	102,192	6,826	216,407
1987	115,788	110,914	5,786	232,488
1988	115,903	101,338	6,147	223,388
1989	111,976	112,596	5,652	230,224
1990	129,481	108,248	7,061	244,790
1991	137,677	116,356	6,589	260,622
1992	136,912	123,083	7,951	267,946
1993	151,227	127,634	0	278,861
1994	166,653	137,228	7,118	310,999
1995	185,347	149,483	6,405	341,235
1996	190,945	153,357	7,459	351,760
1997	191,923	165,750	8,751	366,424
1998	207,891	170,568	—	378,459
1999	192,952	165,719	—	358,671
2000	188,582	170,106	—	358,688
2001	193,427	166,114	—	359,541
2002	159,545	177,277	—	336,822
2003	101,787	173,601	—	275,388
2004	156,185	151,123	—	307,308
2005	167,918	160,003	—	327,921
2006	173,138	156,944	—	330,082
2007	141,598	152,915	—	294,513
2008	142,497	147,581	—	290,077
2009	153,764	160,338	—	314,102
2010	148,559	167,537	—	316,096
2011	31,605	76,110	—	107,715
2012	0	13,424	—	13,424
Grand total	4,612,488	4,307,233	215,324	9,135,044

Table II-22 Trends in the Generating Time by Each Electric Power Company

(Unit: Hours)

Fiscal Year \ Electric power Company	The Japan Atomic Power Company	Hokkaido	Tohoku	Tokyo	Chubu	Hokuriku	Kansai	Chugoku	Shikoku	Kyushu	Total
1973	15,225			5,140			9,124	72			29,561
1974	12,361			7,674			9,578	6,941			36,554
1975	12,023			3,869	352		11,072	6,959		3,780	38,055
1976	14,359			15,424	5,351		17,564	5,829		6,711	65,238
1977	10,926			5,826	3,855		18,199	5,115	4,298	6,913	55,132
1978	16,645			25,737	5,345		22,260	6,392	5,838	7,330	89,547
1979	18,694			34,788	11,451		19,815	7,013	5,536	5,108	102,405
1980	20,361			35,623	12,901		35,167	6,058	5,572	6,867	122,549
1981	16,424			34,044	12,776		35,734	6,519	6,975	12,470	124,942
1982	17,758			42,679	12,948		36,024	5,499	14,339	14,475	143,722
1983	20,324			44,849	12,741		41,754	6,292	15,121	13,855	154,936
1984	18,980		7,296	51,838	12,156		45,192	6,888	14,951	20,508	177,809
1985	20,858		6,681	58,862	12,793		62,133	6,750	13,957	24,109	206,143
1986	21,995		6,871	65,827	13,696		59,277	6,858	14,181	27,702	216,407
1987	26,339		6,524	70,121	18,512		59,702	6,961	15,672	28,657	232,488
1988	26,085		6,925	75,775	15,451		51,169	6,574	15,310	26,099	223,388
1989	25,758	6,792	6,177	61,218	18,902		58,610	12,387	13,919	26,461	230,224
1990	29,767	7,092	5,908	77,445	14,701		53,020	15,183	14,204	27,470	244,790
1991	26,983	13,608	6,978	82,833	18,927		53,669	15,433	14,662	27,529	260,622
1992	28,124	13,488	6,350	86,558	19,596		58,435	12,995	14,967	27,433	267,946
1993	20,396	14,300	6,686	90,172	21,854	5,880	64,136	13,325	13,369	28,743	278,861
1994	28,743	15,799	6,981	98,708	26,273	6,655	64,791	13,491	16,878	32,680	310,999
1995	27,004	15,983	10,635	109,491	30,126	6,998	66,327	14,534	22,560	37,577	341,235
1996	28,779	14,103	15,310	112,335	29,476	6,892	73,636	13,538	22,100	35,591	351,760
1997	27,390	14,316	13,975	115,379	29,179	7,047	81,371	14,312	21,154	42,300	366,424
1998	23,134	16,184	15,519	122,972	28,797	8,760	82,286	16,433	22,221	42,153	378,459
1999	7,690	15,896	14,678	125,053	26,701	6,668	79,347	16,145	22,385	44,109	358,671
2000	17,427	15,117	16,190	117,773	29,244	7,472	80,236	8,710	21,297	45,222	358,688
2001	21,836	14,947	14,470	117,722	23,541	7,352	82,001	16,347	20,759	40,567	359,541
2002	21,947	16,283	20,300	89,946	10,154	8,488	85,724	16,502	22,619	44,858	336,822
2003	22,111	13,879	18,382	36,490	17,091	3,065	83,946	12,138	22,323	45,964	275,388
2004	22,647	13,840	18,387	87,552	15,321	6,970	66,111	12,321	19,411	44,748	307,308
2005	20,672	15,070	12,855	97,350	23,171	7,986	70,444	14,077	21,493	44,802	327,921
2006	19,666	16,043	14,929	108,679	15,602	8,328	71,513	11,567	21,665	42,090	330,082
2007	16,278	15,473	22,512	71,945	21,422	0	67,181	12,970	22,405	44,328	294,513
2008	12,924	11,397	20,734	70,898	19,890	7,770	68,637	12,318	21,982	43,528	290,077
2009	13,560	15,687	25,118	83,504	12,474	12,849	72,944	14,083	20,335	43,548	314,102
2010	18,778	23,275	24,509	82,156	13,318	13,407	72,911	2,773	22,952	42,018	316,096
2011	881	12,816	0	22,320	2,060	0	34,823	7,225	11,349	16,242	107,715
2012	0	839	0	0	0	0	12,585	0	0	0	13,424
Total	836,519	332,228	351,880	2,659,038	618,149	132,588	2,155,812	395,528	578,758	1,074,544	9,135,044

Table II-23 Generating Time by Plant (by Month in FY2012)

(Unit: Hours)

Establisher	Plant Name	Licensed output (MW)	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Fiscal Year Total
B W R															
The Japan Atomic Power Company	Tokai No. 2	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tsuruga Unit 1	357	0	0	0	0	0	0	0	0	0	0	0	0	0
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	524	0	0	0	0	0	0	0	0	0	0	0	0	0
	Onagawa Unit 2	825	0	0	0	0	0	0	0	0	0	0	0	0	0
	Onagawa Unit 3	825	0	0	0	0	0	0	0	0	0	0	0	0	0
	Higashidori Unit 1	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	460	0												0
	Fukushima Daiichi Unit 2	784	0												0
	Fukushima Daiichi Unit 3	784	0												0
	Fukushima Daiichi Unit 4	784	0												0
	Fukushima Daiichi Unit 5	784	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daiichi Unit 6	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daini Unit 1	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daini Unit 2	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daini Unit 3	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fukushima Daini Unit 4	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 1	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 2	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 3	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 4	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 5	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 6	1,356	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kashiwazaki-Kariwa Unit 7	1,356	0	0	0	0	0	0	0	0	0	0	0	0	0
Chubu Electric Power Co., Inc.	Hamaoka Unit 3	1,100	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hamaoka Unit 4	1,137	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hamaoka Unit 5	1,380	0	0	0	0	0	0	0	0	0	0	0	0	0
Hokuriku Electric Power Co.	Shika Unit 1	540	0	0	0	0	0	0	0	0	0	0	0	0	0
	Shika Unit 2	1,206	0	0	0	0	0	0	0	0	0	0	0	0	0
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	460	0	0	0	0	0	0	0	0	0	0	0	0	0
	Shimane Unit 2	820	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal		28,682	0	0	0	0	0	0	0	0	0	0	0	0	0

Table II-23 Generating Time by Plant (by Month in FY2012) (cont'd)

(Unit: Hours)

Establisher	Plant Name	Licensed output (MW)	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Fiscal Year Total
P W R															
The Japan Atomic Power Company	Tsuruga Unit 2	1,160	0	0	0	0	0	0	0	0	0	0	0	0	0
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	579	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tomari Unit 2	579	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tomari Unit 3	912	720	119	0	0	0	0	0	0	0	0	0	0	839
The Kansai Electric Power Co., Inc.	Mihama Unit 1	340	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mihama Unit 2	500	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mihama Unit 3	826	0	0	0	0	0	0	0	0	0	0	0	0	0
	Takahama Unit 1	826	0	0	0	0	0	0	0	0	0	0	0	0	0
	Takahama Unit 2	826	0	0	0	0	0	0	0	0	0	0	0	0	0
	Takahama Unit 3	870	0	0	0	0	0	0	0	0	0	0	0	0	0
	Takahama Unit 4	870	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ohi Unit 1	1,175	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ohi Unit 2	1,175	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ohi Unit 3	1,180	0	0	0	653	744	720	744	720	744	744	672	744	6,485
	Ohi Unit 4	1,180	0	0	0	269	744	720	744	720	744	744	672	744	6,101
Shikoku Electric Power Co., Inc	Ikata Unit 1	566	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ikata Unit 2	566	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ikata Unit 3	890	0	0	0	0	0	0	0	0	0	0	0	0	0
Kyushu Electric Power Co., Inc.	Genkai Unit 1	559	0	0	0	0	0	0	0	0	0	0	0	0	0
	Genkai Unit 2	559	0	0	0	0	0	0	0	0	0	0	0	0	0
	Genkai Unit 3	1,180	0	0	0	0	0	0	0	0	0	0	0	0	0
	Genkai Unit 4	1,180	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sendai Unit 1	890	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sendai Unit 2	890	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal		20,278	720	119	0	921	1,488	1,440	1,488	1,440	1,488	1,488	1,344	1,488	13,424
Total		48,960	720	119	0	921	1,488	1,440	1,488	1,440	1,488	1,488	1,344	1,488	13,424

Table II-24 Trends in

Establisher	Plant Name	Licensed output (MW)	1993	1994	1995	1996	1997	1998	1999	2000
B W R										
The Japan Atomic Power Company	Tokai No. 2	1,100	7,560	7,908	6,512	7,145	6,412	8,634	323	8,184
	Tsuruga Unit 1	357	5,750	6,637	7,051	6,249	5,618	6,776	3,384	1,010
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	524	6,686	6,981	5,010	8,562	6,708	6,842	7,245	8,760
	Onagawa Unit 2	825			5,625	6,749	7,267	8,678	7,433	7,430
	Onagawa Unit 3	825								
	Higashidori Unit 1	1,100								
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	460	4,718	8,760	7,001	4,011	8,760	7,407	6,120	6,336
	Fukushima Daiichi Unit 2	784	7,459	3,138	6,708	7,752	7,217	3,192	6,459	6,898
	Fukushima Daiichi Unit 3	784	6,567	5,499	6,024	8,564	1,320	5,781	5,920	8,760
	Fukushima Daiichi Unit 4	784	5,323	7,944	8,179	6,559	4,498	8,448	8,196	5,866
	Fukushima Daiichi Unit 5	784	5,699	5,701	7,138	8,496	6,428	7,217	6,024	4,374
	Fukushima Daiichi Unit 6	1,100	5,087	8,760	6,540	5,840	7,608	7,177	7,597	6,134
	Fukushima Daini Unit 1	1,100	5,416	6,997	8,784	6,425	5,911	6,673	8,784	6,910
	Fukushima Daini Unit 2	1,100	8,587	6,696	6,459	7,708	8,090	7,104	7,837	6,692
	Fukushima Daini Unit 3	1,100	6,542	4,466	7,992	8,439	7,132	7,905	6,656	8,760
	Fukushima Daini Unit 4	1,100	7,368	7,873	7,409	6,502	7,678	8,760	7,750	6,324
	Kashiwazaki-Kariwa Unit 1	1,100	6,575	6,744	7,200	8,051	6,557	6,923	7,728	8,391
	Kashiwazaki-Kariwa Unit 2	1,100	8,327	6,962	7,353	6,579	8,760	7,769	7,859	6,232
	Kashiwazaki-Kariwa Unit 3	1,100	5,592	6,961	7,526	8,760	7,621	6,467	7,357	8,760
	Kashiwazaki-Kariwa Unit 4	1,100		3,534	7,971	7,648	7,233	7,741	8,784	5,871
	Kashiwazaki-Kariwa Unit 5	1,100	6,912	8,673	7,207	7,523	6,707	8,760	7,429	6,712
	Kashiwazaki-Kariwa Unit 6	1,356				3,480	7,308	8,205	7,994	7,175
	Kashiwazaki-Kariwa Unit 7	1,356					6,552	7,443	6,558	7,579
Chubu Electric Power Co., Inc.	Hamaoka Unit 1	540	3,751	5,420	6,916	6,460	7,070	8,454	5,978	4,808
	Hamaoka Unit 2	840	6,657	5,476	8,118	7,671	6,944	6,462	4,336	8,339
	Hamaoka Unit 3	1,100	6,406	8,760	7,454	6,585	7,863	7,277	8,784	7,336
	Hamaoka Unit 4	1,137	5,040	6,617	7,638	8,760	7,302	6,604	7,603	8,760
	Hamaoka Unit 5	1,380								
Hokuriku Electric Power Co.	Shika Unit 1	540	5,880	6,655	6,998	6,892	7,047	8,760	6,668	7,472
	Shika Unit 2	1,206								
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	460	6,229	4,835	7,518	6,396	6,712	7,673	8,784	965
	Shimane Unit 2	820	7,096	8,656	7,016	7,142	7,600	8,760	7,361	7,745
Subtotal		30,062	151,227	166,653	185,347	190,945	191,923	207,891	192,952	188,582

Generating Time of Each Plant

(Unit: Hours)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand total
6,052	6,002	7,344	8,163	4,914	6,527	7,913	6,375	3,055	6,388	0	0	208,572
7,944	8,152	7,277	7,471	7,565	7,505	4,837	4,512	2,681	6,008	0	0	246,733
6,897	3,841	5,927	4,732	2,909	0	5,408	218	7,587	5,736	0	0	159,756
6,110	8,562	4,188	7,105	3,641	3,262	6,123	8,617	4,473	5,257	0	0	100,518
1,464	7,897	8,268	6,550	3,569	4,922	3,354	5,737	6,362	6,051	0	0	54,174
				2,736	6,745	7,627	6,162	6,696	7,465	0	0	37,431
3,303	4,992	0	0	4,210	6,504	3,596	4,808	8,190	4,555	0	0	197,531
6,109	8,736	0	5,866	5,857	4,063	8,087	7,557	6,592	6,004	0	0	207,916
7,529	2,592	5,504	3,435	7,848	6,421	5,864	7,896	6,244	5,984	0	0	208,493
7,793	4,032	250	6,055	2,873	6,798	7,956	6,183	7,261	5,832	0	0	205,540
7,885	7,584	4,855	5,122	5,940	5,287	6,455	6,804	7,282	5,389	0	0	211,215
8,363	5,938	2,222	2,234	6,336	7,164	5,675	8,256	6,798	3,240	0	0	195,780
6,586	6,744	5,131	4,344	7,542	6,473	6,571	7,728	8,128	5,814	0	0	195,209
8,110	2,259	0	5,164	5,781	8,760	4,617	7,129	8,136	6,760	0	0	179,096
2,823	4,032	628	5,880	2,550	7,669	6,730	6,403	7,186	8,271	0	0	154,142
7,607	4,680	0	3,285	5,048	3,610	6,703	8,134	6,394	6,377	0	0	151,504
6,533	3,720	0	7,510	1,776	8,059	792	0	0	7,182	3,048	0	150,646
8,688	3,462	0	6,561	6,035	7,776	610	0	0	0	0	0	111,061
6,660	3,144	0	6,592	7,524	6,924	2,554	0	0	0	0	0	92,442
6,087	6,744	6,020	3,239	8,760	2,772	2,554	0	0	0	0	0	84,958
7,763	8,016	0	8,051	6,446	5,688	0	0	0	3,048	7,176	0	128,159
7,122	7,224	7,857	6,419	6,072	8,461	627	0	4,795	6,659	8,640	0	98,039
8,760	6,047	4,023	7,796	6,751	6,250	2,554	0	6,497	7,041	3,456	0	87,308
5,301	0	0	0	0	0	0	0	—	—	—	—	144,570
4,231	2,256	7,830	0	0	0	0	0	—	—	—	—	160,940
5,941	4,149	3,624	6,918	7,315	6,081	7,038	8,347	6,084	5,814	0	0	161,197
8,068	3,750	5,637	6,651	8,549	6,610	7,145	7,653	5,314	5,989	1,018	0	124,708
			1,752	7,306	2,912	7,239	3,891	1,076	1,515	1,042	0	26,733
7,352	8,488	3,065	6,970	7,578	6,042	0	0	8,527	5,543	0	0	109,938
				408	2,286	0	7,770	4,322	7,864	0	0	22,650
8,654	7,742	6,290	7,801	6,308	4,331	5,975	8,302	5,658	0	0	0	233,121
7,694	8,760	5,848	4,520	7,769	7,236	6,994	4,016	8,425	2,773	7,225	0	162,406
193,427	159,545	101,787	156,185	167,918	173,138	141,598	142,497	153,764	148,559	31,605	0	4,612,488

Table II-24 Trends in

Establisher	Plant Name	Licensed output (MW)	1993	1994	1995	1996	1997	1998	1999	2000
P W R										
The Japan Atomic Power Company	Tsuruga Unit 2	1,160	7,086	7,080	7,036	7,927	6,609	7,724	3,983	8,233
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	579	7,208	8,760	7,199	6,896	7,373	8,760	7,112	7,619
	Tomari Unit 2	579	7,092	7,039	8,784	7,208	6,943	7,424	8,784	7,498
	Tomari Unit 3	912								
The Kansai Electric Power Co., Inc.	Mihama Unit 1	340	4,300	0	586	8,760	7,137	7,304	6,726	8,760
	Mihama Unit 2	500	0	4,883	6,402	7,369	7,832	7,228	5,914	6,255
	Mihama Unit 3	826	5,951	7,730	5,436	5,040	7,788	8,760	7,466	6,154
	Takahama Unit 1	826	4,592	4,871	6,731	6,384	6,021	7,424	8,708	7,728
	Takahama Unit 2	826	6,706	6,156	6,036	7,449	7,717	7,657	7,772	7,608
	Takahama Unit 3	870	6,983	6,898	8,585	6,662	7,224	7,654	7,630	8,110
	Takahama Unit 4	870	6,737	8,760	6,809	6,761	7,727	8,760	6,616	7,256
	Ohi Unit 1	1,175	4,535	4,042	8,194	6,281	6,679	7,776	7,181	5,699
	Ohi Unit 2	1,175	7,834	6,091	3,918	7,280	6,111	3,638	5,451	7,765
	Ohi Unit 3	1,180	8,760	7,265	6,911	7,399	8,376	8,251	7,944	7,844
	Ohi Unit 4	1,180	7,738	8,095	6,719	4,251	8,760	7,835	7,939	7,057
Shikoku Electric Power Co., Inc	Ikata Unit 1	566	6,572	7,296	6,840	6,744	7,080	7,807	7,150	5,596
	Ikata Unit 2	566	6,797	7,014	8,784	6,911	6,831	7,039	8,784	6,941
	Ikata Unit 3	890		2,568	6,936	8,445	7,243	7,374	6,451	8,760
Kyushu Electric Power Co., Inc.	Genkai Unit 1	559	6,706	4,886	6,911	8,466	7,309	6,568	6,604	8,154
	Genkai Unit 2	559	7,094	6,026	8,274	7,477	6,559	6,463	7,722	7,276
	Genkai Unit 3	1,180	336	6,402	8,772	6,639	7,383	6,896	8,784	7,208
	Genkai Unit 4	1,180					6,000	6,783	7,061	8,760
	Sendai Unit 1	890	5,847	8,760	6,887	6,133	6,289	8,471	7,214	6,660
	Sendai Unit 2	890	8,760	6,606	6,733	6,877	8,760	6,973	6,723	7,164
Subtotal		20,278	127,634	137,228	149,483	153,357	165,750	170,568	165,719	170,106
G C R										
The Japan Atomic Power Company	Tokai	166	0	7,118	6,405	7,459	8,751	—	—	—
Subtotal		166	0	7,118	6,405	7,459	8,751	—	—	—
Total		50,506	278,861	310,999	341,235	351,760	366,424	378,459	358,671	358,688

Generating Time of Each Plant (cont'd)

(Unit: Hours)

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand total
7,840	7,793	7,490	7,013	8,193	5,634	3,528	2,037	7,824	6,382	881	0	165,891
7,664	8,760	6,981	6,773	7,499	8,760	7,145	5,554	7,156	8,760	504	0	163,735
7,283	7,523	6,898	7,067	7,571	7,283	8,328	5,843	6,131	7,232	3,528	0	149,187
								2,400	7,283	8,784	839	19,306
6,607	6,799	7,620	5,814	4,808	5,145	4,750	6,695	6,389	5,699	0	0	195,612
8,167	7,687	7,265	4,886	8,065	7,366	2,651	5,838	6,397	5,389	6,027	0	220,174
7,135	8,416	7,759	3,135	0	2,083	6,472	7,025	6,378	8,760	1,043	0	217,456
7,760	6,658	8,784	6,815	7,659	6,450	8,492	6,345	7,193	6,826	0	0	224,209
8,760	7,656	6,759	6,732	8,760	6,890	3,323	6,279	7,808	6,017	5,735	0	221,971
7,366	7,679	6,830	8,152	6,656	6,604	5,674	5,768	6,525	7,006	7,823	0	196,670
7,342	8,760	7,583	6,873	6,509	8,760	6,712	5,801	7,426	7,464	2,687	0	193,100
6,582	8,760	7,232	6,645	6,715	6,370	7,980	7,320	4,745	5,420	2,564	0	191,396
6,372	7,354	7,717	8,031	6,523	6,085	6,792	7,474	5,849	5,441	6,232	0	206,496
7,507	7,556	8,784	1,818	7,765	7,001	7,378	3,463	6,738	7,517	0	6,485	144,305
8,404	8,399	7,611	7,210	6,984	8,760	6,958	6,630	7,498	7,371	2,712	6,101	144,423
7,512	7,819	6,918	5,117	7,560	7,665	7,283	6,828	6,283	7,330	3,744	0	236,729
5,926	7,224	8,783	6,657	5,173	7,009	7,285	7,896	6,642	6,862	6,912	0	217,388
7,321	7,575	6,622	7,637	8,760	6,991	7,837	7,258	7,410	8,760	692	0	124,641
5,413	7,156	6,773	7,746	7,194	6,891	6,658	8,634	7,113	6,988	5,874	0	239,506
4,610	7,109	8,370	7,499	6,952	5,449	8,259	6,234	6,628	7,290	0	0	214,453
7,316	7,231	8,784	7,041	7,523	6,628	8,784	7,187	7,043	6,097	0	0	126,054
7,208	7,270	7,257	8,483	7,499	6,813	6,923	8,634	7,331	7,355	5,758	0	109,132
7,260	8,760	7,376	7,092	6,875	8,760	6,684	6,372	6,673	7,658	937	0	194,829
8,760	7,332	7,404	6,888	8,760	7,548	7,020	6,468	8,760	6,630	3,673	0	190,570
166,114	177,277	173,601	151,123	160,003	156,944	152,915	147,581	160,338	167,537	76,110	13,424	4,307,233
—	—	—	—	—	—	—	—	—	—	—	—	215,324
—	—	—	—	—	—	—	—	—	—	—	—	215,324
359,541	336,822	275,388	307,308	327,921	330,082	294,513	290,077	314,102	316,096	107,715	13,424	9,135,044

Ⅲ STATUS OF PERIODICAL INSPECTIONS OF NUCLEAR POWER PLANTS

III-1 Outline of Periodical Inspections of Nuclear Power Plants

The details of the periodical inspections are described in "III-2 Periodical Inspections by Plant."

(1) Periodical Inspections of Commercial Nuclear Power Plants

Periodical inspections were conducted for the following 2 reactors (0 BWR and 2 PWRs) in FY2012 based on Article 54-1 of the Electric Utilities Industry Act. Inspections were carried out on the appearance, disassembly, leakage, function and performance of the reactor pressure vessels, reactor cooling system equipment, instrumentation and control system equipment, fuel handling equipment, radiation management equipment, disposal equipment, reactor containment facilities, emergency standby power generation devices, and steam turbines. The results indicated that there was no abnormality.

It was also verified that the work related to the periodical inspections was carried out within the exposure limit prescribed by the Act.

<The first, third, and fourth quarters>

No achievements

<The second quarter>

Power station	Number of transports	Periodical inspection period (Date of shutdown to periodical inspection end date)	Major renewal activities, etc.	Total exposure dose / Maximum exposure dose
Ohi Power Station Unit 3	15	Mar. 18, 2011 to Aug. 3, 2012 (505 days)	- Modification work on the steam turbine - Repair work on the pressurizer pipe stub, etc. - Modification work on the containment recirculation sump screen - Modification work on the containment sump water rising rate measuring instrument - Replacement work on the instrumentation power supplies of regularly used system, etc.	(Note) / (Note)
Ohi Power Station Unit 4	14	Jul. 22, 2011 to Aug. 16, 2012 (392 days)	- Modification work on the steam turbine - Repair work on the pressurizer pipe stub, etc. - Modification work on the containment sump water rising rate measuring instrument - Modification work on reactor protection device - Removal of the reactor irradiation test specimen, etc.	(Note) / (Note)

(Note) Not published by the former Nuclear and Industrial Safety Agency

The periodical facility inspections for Hamaoka Nuclear Power Station Units 1 and 2, approved in the decommissioning plan on November 18, 2009, are performed in accordance with Article 29-1 of the Nuclear Reactor Regulation Act. The periodical facility inspections at that power station were conducted from January 25 to May 30, 2012 for Unit 1 and from January 27 to May 30, 2012 for Unit 2. Both units were certified as passing the inspection

Note that based on Article 29-1 of the Nuclear Reactor Regulation Act, Tokai Power Station, which has no nuclear fuel materials, was approved in the decommissioning plan and does not need to undergo the periodical facility inspections.

(2) Periodical Inspections of Nuclear Power Plants in the Research and Development Stage

The periodical facility inspections for the Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center (normally known as "Fugen") are performed in accordance with Article 29-1 of the Nuclear Reactor Regulation Act. The 25th periodical inspection of Fugen began on November 8, 2012 and was completed on January 10, 2013. This inspection was certified as having been completed.

The Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center which is under construction, will undergo periodical inspections after passing the pre-operational inspection.

III-2 Periodical Inspection by Plant

1. Applicant	The Kansai Electric Power Co., Inc.
2. Outline of plant and facilities	(1) Name: Ohi Nuclear Power Station Unit 3, 15th (2) Output power: 1180 MW (3) Commissioning Date: December 1991
3. Inspection application date	(Note)
4. Date of certificate issuance	August 3, 2012
5. Period of inspection	(1) Inspection period and date of certificate issuance March 18, 2011 - August 3, 2012 (date of certificate issuance) (2) Difference from the original plan (Note)
6. Outline of inspection	(1) Objects of inspection Reactor pressure vessel, reactor cooling system equipment, instrumentation and control system equipment, fuel equipment, radiation management equipment, disposal equipment, reactor containment facility, emergency standby power generation device and steam turbine (2) Inspection method and result By attending the periodical licensee inspections conducted by the licensee, or confirming the record of the periodical inspection, it was confirmed that the licensee provides a suitable inspection procedure and conducts periodical licensee inspections according to the procedure, and that the electrical installation under inspection conforms to the technical standards stipulated in the Ordinance of the Ministry of Economy, Trade and Industry. (3) Standards applied to inspections (Note)
7. Result	Good
8. Related permission items	None
9. Other remarks	(1) Observation of periodical licensee inspections (Note) (2) Summary of major renewal activities, etc. carried out during the periodical inspection - Modification work on the steam turbine - Repair work on the pressurizer pipe stub, etc. - Modification work on the containment recirculation sump screen - Modification work on the containment sump water rising rate measuring instrument - Replacement of the instrumentation power supplies of regularly used system (3) Exposure dose of workers engaged in radiation work (Note) 1) Total exposure dose: 2) Average dose: 3) Maximum exposure dose: (4) Maintenance plan (Note)

(Note) Not published by the former Nuclear and Industrial Safety Agency

1. Applicant	The Kansai Electric Power Co., Inc.
2. Outline of plant and facilities	(1) Name: Ohi Nuclear Power Station Unit 4, 14th (2) Output power: 1180 MW (3) Commissioning Date: February 1993
3. Inspection application date	(Note)
4. Date of certificate issuance	August 16, 2012
5. Period of inspection	(1) Inspection period and date of certificate issuance July 22, 2011 - August 16, 2012 (date of certificate issuance) (2) Difference from the original plan (Note)
6. Outline of inspection	(1) Objects of inspection Reactor pressure vessel, reactor cooling system equipment, instrumentation and control system equipment, fuel equipment, radiation management equipment, disposal equipment, reactor containment facility, emergency standby power generation device and steam turbine (2) Inspection method and result By attending the periodical licensee inspections conducted by the licensee, or confirming the record of the periodical inspection, it was confirmed that the licensee provides a suitable inspection procedure and conducts periodical licensee inspections according to the procedure, and that the electrical installation under inspection conforms to the technical standards stipulated in the Ordinance of the Ministry of Economy, Trade and Industry. (3) Standards applied to inspections (Note)
7. Result	Good
8. Related permission items	None
9. Other remarks	(1) Observation of periodical licensee inspections (Note) (2) Summary of major renewal activities, etc. carried out during the periodical inspection - Modification work on the steam turbine - Repair work on the pressurizer pipe stub, etc. - Modification work on the containment sump water rising rate measuring instrument - Modification work on reactor protection device - Removal of work on the reactor irradiation test pieces (3) Exposure dose of workers engaged in radiation work (Note) 1) Total exposure dose: 2) Average dose: 3) Maximum exposure dose: (4) Maintenance plan (Note)

(Note) Not published by the former Nuclear and Industrial Safety Agency

1. Applicant	Chubu Electric Power Company, Inc.
2. Outline of plant and facilities	- Name: Hamaoka Nuclear Power Station Unit 1 - Approval of decommissioning plans: November 18, 2009 - Overall process: FY2009 to 2036 Preparation for disassembly: FY2009 to 2014 Disassembly and removal of neighboring facilities in the reactor area: FY2015 to 2022 Disassembly and removal of the reactor area: FY2023 to 2029 Disassembly and removal of buildings: FY2030 to 2036
3. Inspection application date	December 22, 2011
4. Date of certificate issuance	May 30, 2012
5. Period of inspection	January 25 to May 30, 2012
6. Outline of inspection	- Facilities subject to periodical inspection (those for handling and storing nuclear fuel materials) (1) Nuclear fuel material handling and storage facilities (2) Radioactive waste disposal facility (3) Radiation management facility (4) Emergency power supply facility
7. Result	It was confirmed that the facilities subject to periodical inspection conform to the technical standards stipulated in Article 3-17-2 of the Rules for the Installation, Operation, etc. of Commercial Power Reactors in accordance with Article 29-2 of the Act for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors, as a result of the function test of the reactor building ventilation system, etc. Thus a certificate of conformance to the facility periodical inspections was issued accordingly.
Radiation worker dose during periodical facility inspection period	Measurement period: January 25 to May 30, 2012 Number of workers: 37 (28 employees and 9 outside workers) Measuring device: Personal electronic dosimeter Average dose: 0.01 mSv Maximum dose: 0.08 mSv Internal exposure: None

1. Applicant	Chubu Electric Power Company, Inc.
2. Outline of plant and facilities	- Name: Hamaoka Nuclear Power Station Unit 2 - Approval of decommissioning plans: November 18, 2009 - Overall process: FY2009 to 2036 Preparation for disassembly: FY2009 to 2014 Disassembly and removal of neighboring facilities in the reactor area: FY2015 to 2022 Disassembly and removal of the reactor area: FY2023 to 2029 Disassembly and removal of buildings: FY2030 to 2036
3. Inspection application date	December 22, 2011
4. Date of certificate issuance	May 30, 2012
5. Period of inspection	January 27 to May 30, 2012
6. Outline of inspection	- Facilities subject to periodical inspection (those for handling and storing nuclear fuel materials) (1) Nuclear fuel material handling and storage facilities (2) Radioactive waste disposal facility (3) Radiation management facility (4) Emergency power supply facility
7. Result	It was confirmed that the facilities subject to periodical inspection conform to the technical standards stipulated in Article 3-17-2 of the Rules for the Installation, Operation, etc. of Commercial Power Reactors in accordance with Article 29-2 of the Act for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors, as a result of the function test of the reactor building ventilation system, etc. Thus a certificate of conformance to the facility periodical inspections was issued accordingly.
Radiation worker dose during periodical facility inspection period	Measurement period: January 27 to May 30, 2012 Number of workers: 33 (24 employees and 9 outside workers) Measuring device: Personal electronic dosimeter Average dose: 0.00 mSv Maximum dose: 0.04 mSv Internal exposure: None

1. Applicant	Japan Atomic Energy Agency (JAEA)
2. Outline of plant and facilities	- Name: Japan Atomic Energy Agency Fugen Decommissioning Engineering Center, Tsuruga Head Office (Commonly known as Fugen) - Approval of decommissioning plans: February 12, 2008 - Overall process: FY2007 to 2033 Spent fuel transportation period: FY2007 to 2017 Disassembly and removal of neighboring facilities in the reactor area: FY2018 to 2022 Disassembly and removal of the reactor: FY2023 to 2031 Disassembly of buildings: FY2032 to 2033
3. Inspection application date	August 1, 2012
4. Date of certificate issuance	January 10, 2013
5. Period of inspection	September 1 to December 28, 2012
6. Outline of inspection	- Facilities subject to periodical inspection (1) Nuclear fuel material handling and storing facilities (2) Radioactive waste disposal facility (3) Radiation management facility (4) Emergency power supply facility
7. Result	It was confirmed that the reactor facilities on which inspections were requested by JAEA on August 1, 2012 in accordance with Article 29-1 of the Act for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors conform to Article 21-2 of the Rules for the Installation, Operation, etc. of Nuclear Power Reactors in a Research and Development Stage in accordance with 29-2 of said Act. Thus a certificate was issued accordingly.
Radiation worker dose during periodical facility inspection period	(Note)

(Note) Not published by the former Nuclear and Industrial Safety Agency

IV STATUS OF PERIODIC SAFETY MANAGEMENT EXAMINATION OF NUCLEAR POWER PLANTS

IV-1 Outline of Periodic Safety Management Reviews of Nuclear Power Plants

In Periodic Safety Management Reviews, the Japan Nuclear Energy Safety Organization conducts document examinations (including additional site reviews without notice), based on the electric technology rules (JEAC4111 and JEAC4209) of the Japan Electric Association, of organizations, inspection methods, and process controls, etc. for periodic licensee inspections conducted by licensees in accordance with Article 55-4 of the Electricity Utilities Industry Act. The Minister of Economy, Trade and Industry evaluates the result of these Examinations.

Three applications for Periodic Safety Management Reviews were made by March 31, 2013.

The status of Periodic Safety Management Reviews is shown in "IV-2 Status of Periodic Safety Management Reviews of Nuclear Power Plants."

No.	Target items of review
1	Periodic licensee inspection to be performed during the 4th maintenance cycle of Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station Unit 5
2	Periodic licensee inspection to be performed during the 9th maintenance cycle of Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Station Unit 6
3	Periodic licensee inspection to be performed during maintenance prior to the 1st periodic inspection and the 1st maintenance cycle of Hokkaido Electric Power Co., Inc., Tomari Power Station Unit 3

Periodic Safety Management Examination for Commercial Nuclear Power Plants

(1st quarter of FY2012)

1. Outline of Periodic Safety Management Reviews and Evaluation Results

(Target items of review)

(1) Periodic licensee inspection to be performed during the 4th maintenance cycle of Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station Unit 5

(2) Periodic licensee inspection to be performed during the 9th maintenance cycle of Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Station Unit 6

(3) Periodic licensee inspection to be performed during maintenance prior to the 1st periodic inspection and the 1st maintenance cycle of Hokkaido Electric Power Co., Inc., Tomari Power Station Unit 3

(Review results)

The results of the review by the Japan Nuclear Energy Safety Organization (hereinafter, JNES) are as follows:

(1) Hamaoka Nuclear Power Station Unit 5

The quality management system at the Hamaoka Nuclear Power Station functions properly, and the periodic licensee inspection is conducted autonomously without major problem under an appropriate system.

(2) Kashiwazaki-Kariwa Nuclear Power Station Unit 6

The quality management system and the implementation system for periodic licensee inspections at the Kawazaki-Kariwa Nuclear Power Station have been mostly established and conducted.

(3) Tomari Power Station Unit 3

The quality management system at the Tomari Power Station functions properly, and the periodic licensee inspection is conducted autonomously without major problem under an appropriate system.

(Evaluation results)

The Nuclear and Industrial Safety Agency conducted detailed evaluations based on the reports and explanations given by the Japan Nuclear Energy Safety Organization. The results are shown below.

(1) Hamaoka Nuclear Power Station Unit 5

In the organization examined and evaluated in the review, the quality management system is functioning properly, and periodic licensee inspections are conducted properly and autonomously. However, there is a need to monitor the establishment status and effectiveness of the recurrence prevention measures for the overdue inspection periods and the improvement items in part of the maintenance effectiveness evaluation process, on which the licensee itself is working.

(2) Kashiwazaki-Kariwa Nuclear Power Station Unit 6

Although most of the quality management system in the organization examined and evaluated in the safety management review, and the implementation system for periodic licensee inspections have been established and implemented, there is a need to monitor the implementation status, etc. of recurrence prevention measures for the overdue inspection period and unexamined pieces of equipment subject to periodic licensee inspections in future reviews.

(3) Tomari Power Station Unit 3

Although there is a need to verify the appropriateness of corrective actions for the defect of visual inspection in the periodic inspection, and the establishment status of improvements in nonconformity management and corrective action process, the quality management system in the organization examined and evaluated in the safety management review is functioning without major problems and periodic licensee inspections are conducted autonomously without major problems under an appropriate system.

2. Evaluation Criteria, etc.

(Review items)

(1) Items based on the Electricity Utilities Industry Act, Article 55-5

• Organizations relevant for periodic licensee inspections

• Inspection methods

• Process control

(2) Items specified in Article 73-8, which applies in Article 94-7-1 of the Rules for the Enforcement of the Electric Utilities Industry Act

• Items relating to the management of the licensee if the licensee cooperates during the inspection

• Items relating to the management of the inspection records

• Items relating to education and training regarding the inspection

(Criteria that can be applied when appropriateness of the review items is assessed)

(1) Criteria relating to quality assurance

Electrical technology rules of the Japan Electric Association, "Nuclear Power Generating Facilities Safety Quality Assurance Regulation"
(JEAC4111-2003 and JEAC4111-2009)

(2) Criteria relating to maintenance management

Electrical technology rules of the Japan Electric Association, "Code for Maintenance at Nuclear Power Plants" (JEAC4209-2003 and JEAC4209-2007)

(3) "Concerning the Interpretation of the Nuclear Power Station Periodic Licensee Inspection" (Heisei 20.12.22, Genin No. 4)

(Example of evaluation)

(1) The organization examined and evaluated in the safety management review has an adequate system for conducting periodic licensee inspections properly and autonomously.
(Next review: Among the six review items for organizations relating to periodic licensee inspections, inspection methods, etc., two items (management of records and education and training) will not be applied.)

(2) With regard to the implementation system for periodic licensee inspections in the organization examined and evaluated in the safety management review, there is a need to monitor the implementation status of corrective actions.(Next review: The six items will be applied as usual.)

1. Chubu Electric Power Co., Inc.

Application for periodic safety management review	Akihisa Mizuno, President and Director, Chubu Electric Power Co., Inc. (Date of application: February 12, 2010, Application No.: HonHatsuGenHatsu 96)
Target items of review	Periodic licensee inspection performed during the 4th maintenance cycle of Hamaoka Nuclear Power Station Unit 5
Periodic safety management review (Japan Nuclear Energy Safety Organization)	1. Period of the safety management review March 15, 2010 to March 21, 2012
	2. Notification date of periodic safety management review results April 20, 2012 (Notification No. 09, KenKeiJuAn-0095)
	3. Outline of the review results The Nuclear and Industrial Safety Agency accepted the notification of the periodic safety management review results that was submitted by the Japan Nuclear Safety Organization (hereinafter, JNES) on April 20, 2012 to the Minister of Economy, Trade and Industry, and then received an explanation of the status of the periodic safety management review by JNES. JNES selected the "inspection planning process," "inspection management process," "maintenance effectiveness evaluation process," and "nonconformity management/corrective action process" as the review items for fundamental systems relating to the periodic licensee inspection performed during the 4th maintenance cycle of Hamaoka Nuclear Power Station Unit 5 (document review) and for specific systems relating to periodic licensee inspection (on-site review). As a result of the review, it was confirmed that continuous efforts are being made to prepare quality management system-related standards and improve the implementation system for periodic licensee inspections and that positive efforts are being made to construct and implement a better quality management system. During the previous unit review (the 4th safety management review of Hamaoka Nuclear Power Station Unit 3), the inspection period of several pieces of equipment was found to be overdue due to incomplete quality management system documents, but correction was not made due to failure to perform nonconformity management for the overdue inspection period which caused the organization not to be aware of the requirement. It was also found that the incorrect inspection time entered in the Inspection Plan Management Table was not corrected. (*). The implementation status of recurrence prevention measures were, therefore, inspected in this review, and it was confirmed that the action plan provided by the power station for preventing the recurrence of nonconformities was implemented. The effectiveness of corrective actions was, however, not confirmed. It should be monitored in future reviews.. For the "inspection planning process," "inspection management process," and "nonconformity management/corrective action process," selected as important processes for conducting periodic licensee inspections, there are standards in place for each process, and each of the processes has been established and implemented in accordance with these standards. With regard to the "maintenance effectiveness evaluation process," there are standards for evaluating the effectiveness of maintenance in place, and the process has been established and implemented in accordance with these standards. The power station has reflected the aging phenomena of equipment, components inspected, etc. into the inspection plan and retrieved pre-inspection data based on said inspection plan to use such data as the input information for maintenance effectiveness evaluations. However, the aging phenomena of equipment to be inspected at two or more cycle intervals as well as the components to be inspected are planned to be reflected into the inspection plan by FY2013. Therefore, JNES will continue to monitor such status. In consideration of the above, JNES concluded that the quality management system for Hamaoka Nuclear Power Station is functioning properly, and that periodic licensee inspections are conducted autonomously without major problems under an appropriate system.
	4. Review items Document reviews and on-site reviews (the inspection planning process, inspection management process, maintenance effectiveness evaluation process, and nonconformity management and corrective action process)
Evaluation (Nuclear and Industrial Safety Agency)	1. Evaluation results In the organization examined and evaluated in the review, the quality management system is functioning properly, and periodic licensee inspections are conducted properly and autonomously. However, there is a need to monitor the establishment status and effectiveness of the recurrence prevention measures for the overdue inspection periods and the improvement items in part of the maintenance effectiveness evaluation process, on which the licensee itself is working.
	2. Notification of evaluation July 3, 2012 (Notification No. Heisei 24・04・20 Gen 1)
	3. Reasons for evaluation (results and grounds) As a result of an examination of the review results based on the notification and explanations given by JNES, the Nuclear and Industrial Safety Agency requires to confirm the effectiveness of the recurrence prevention measures for the overdue inspection periods and the streamlining status of part of the maintenance effectiveness evaluation process, which the licensee itself is working on, and that JNES is to monitor such status.
	4. Status of evaluation committee meetings: Explanation of, and hearings on the review results with Q&A on May 14, 2012 Review of the evaluation on May 31, 2012
Other	

(*) As the similar nonconformity as mentioned above was found during the operational safety inspection, the Nuclear and Industrial Safety Agency directed Chubu Electric Power Co., Inc. on October 12, 2010 to provide an improvement plan including the clarification of the cause of incorrect entry of inspection time, development of recurrence prevention measures and definition of internal rules, procedures and integrity assessment for the postponement of inspections, and report it to the Nuclear and Industrial Safety Agency. The report from Chubu Electric Power Co., Inc. was received on November 30, 2010.
The Nuclear and Industrial Safety Agency determined that with regard to the incorrect entry of data and integrity assessments, Chubu Electric Power Co., Inc. performed appropriate cause analysis and implemented appropriate recurrence prevention measures. However, it regarded the ambiguous handling of inspection periods only as target values, and failure to implement nonconformity management as violation of the requirements for the operational safety program, and issued a strong warning to Chubu Electric Power Co., Inc. on December 3, 2010.
(Already issued on October 12, November 30, and December 3, 2010.)

2. Tokyo Electric Power Co., Inc.

Application for periodic safety management review	Toshio Nishizawa, President, Tokyo Electric Power Co., Inc. (Date of application: Sept. 30, 2010, Application No.: SouKanHatsu 22-232)
Target items of review	Periodic licensee inspection performed during the 9th maintenance cycle of Kashiwazaki-Kariwa Nuclear Power Station Unit 6
Periodic safety management review (Japan Nuclear Energy Safety Organization)	1. Period of the safety management review Oct. 31, 2010 to Mar. 25, 2012
	2. Notification date of periodic safety management review results Apr. 25, 2012 (Notification No. 06, KenKeiJuAn-0045)
	3. Outline of the review results The Nuclear and Industrial Safety Agency accepted the notification of the periodic safety management review results submitted by the Japan Nuclear Safety Organization (hereinafter JNES) on April 25, 2012 (re-submission on May 30, 2012 due to correction of errors) to the Minister of Economy, Trade and Industry, and then received an explanation of the status of the periodic safety management review by JNES. JNES selected the "procurement management process," "inspection process management process," "maintenance effectiveness evaluation process," and "nonconformity management/corrective action process" as the review items for fundamental systems relating to the periodic licensee inspection performed during the 9th maintenance cycle of Kashiwazaki-Kariwa Nuclear Power Station Unit 6 (document review) and for specific systems relating to the periodic licensee inspection (on-site review). The result of review confirmed that positive efforts have been made to improve the quality management system by continuously reviewing quality management system standards and a system relating to periodic licensee inspections. For the "procurement management process" and "inspection process management process" selected as importance processes for conducting periodic licensee inspections, there are standards in place for each process, and each of the processes has been established and implemented in accordance with these standards. With regard to the "maintenance effectiveness evaluation process," there are basic standards for evaluating the effectiveness of maintenance in place and the process has been established and implemented in accordance with these standards. The licensee plans to introduce a new system and provide pre-inspection data relating to the equipment aging phenomena used for evaluating the effectiveness of maintenance. Therefore, JNES will confirm the implementation status of maintenance effectiveness evaluation using the new system. With regard to the "nonconformity management/corrective action process," there are standards in place and nonconformities relating to periodic licensee inspections were removed, the causes identified, and recurrence prevention measures implemented according to relevant manuals. However, the nonconformity of failure to report for the suspension and restart of part of the inspection was found.. The licensee identified the cause of this nonconformity, evaluated the need for corrective actions and conducted required corrective actions. JNES will monitor the implementation of appropriate measures for processing the suspended and restarted periodic licensee inspection. With regard to the overdue inspection period of some pieces of equipment found during the FY2010 operational safety inspection at Kashiwazaki-Kariwa Nuclear Power Station conducted by the Nuclear and Industrial Safety Agency, JNES concluded that there is a need to continue to monitor the implementation status of recurrence prevention measures (*1) reported by the power station on February 28, 2011. With regard to the unexamined pieces of equipment during the periodic licensee inspection of Unit 1, found in the periodic safety management review for Unit 1, the cause of omission was identified and corrective actions were conducted, but JNES concluded that there is a need to continue to monitor the implementation status of recurrence prevention measures in future reviews. In consideration of the above, JNES concluded that the quality management system for Kashiwazaki-Kariwa Nuclear Power Station is functioning properly, and that periodic licensee inspections are conducted autonomously without major problems under an appropriate system.
	4. Review items Document reviews and on-site reviews (the procurement management process, inspection process management process, maintenance effectiveness evaluation process, and nonconformity management and corrective action process)
Evaluation (Nuclear and Industrial Safety Agency)	1. Evaluation results Although most of the quality management system in the organization examined and evaluated in the safety management review, and the implementation system for periodic licensee inspections have been established and implemented, there is a need to monitor the implementation status, etc. of recurrence prevention measures for the overdue inspection period and unexamined pieces of equipment subject to periodic licensee inspections in future reviews.
	2. Notification of evaluation July 3, 2012 (Notification No. Heisei 24・05・30 Gen 37)
	3. Reasons for evaluation (results and grounds) As a result of an examination of the review results based on the notification and explanations given by JNES, the Nuclear and Industrial Safety Agency concluded that there is a need to monitor the overdue inspection period found in the safety management review, the implementation status of recurrence prevention measures for the unexamined pieces of equipment to be inspected in Unit 1, found during the periodic licensee inspection, the implementation status of nonconformity management and corrective actions, and the establishment status of the maintenance effectiveness evaluation process on which the licensee is working. In the 4th operational safety inspection in FY2011 of Kashiwazaki-Kariwa Nuclear Power Station, it was also revealed that there are no inspection plans to clarify the inspection time of individual instruments, and the presence of instruments whose inspection period has been overdue in Units 2, 3 and 4, which had been shut down for a prolonged period of time since the Chuetsu Offshore Earthquake in Niigata Prefecture in July 16, 2007. The Kashiwazaki-Kariwa Nuclear Power Station reactor operational safety program requires inspections and maintenance including repairs based on the maintenance plan, but the station failed to meet this obligation due to the lack of work process plans. Accordingly, a large number of instruments were left unexamined long after their inspection periods. Therefore, the Nuclear and Industrial Safety Agency issued a warning regarding the violation of the operational safety program to Tokyo Electric Power Co., Inc. (*2). Confirmation is necessary in the future periodic safety management reviews for the matters relating to conducting the periodic licensee inspections.
	4. Status of evaluation committee meetings: Explanation of, and hearings on the review results with Q&A on May 14, 2012 Review of the evaluation on May 31, 2012
Other	

*1 The Nuclear and Industrial Safety Agency evaluated the cause analysis and recurrence prevention measures reported by Tokyo Electric Power Co., Inc. on February 28, 2011 to be appropriate. However, it concluded that the requirements for quality assurance and maintenance management specified by Tokyo Electric Power Co., Inc. for the Kashiwazaki-Kariwa Nuclear Power Station reactor operational safety program (hereinafter, the operational safety program) were not met when a large number of instruments were left unexamined after their inspection periods because of the neglect of (1) the creation of and changes to the long-term inspection schedule, (2) inspection ordering in procurement management, (3) nonconformity management, and (4) maintenance conducted in accordance with maintenance management. Therefore, the Nuclear and Industrial Safety Agency issued a warning regarding this violation of the operational safety program to Tokyo Electric Power Co., Inc. (Already issued on March 2, 2011.)

*2 Already issued on March 2, 2011.

3. Hokkaido Electric Power Co., Inc.

Application for periodic safety management review	Katsuhiko Kawai, President and Director, Hokkaido Electric Power Co., Inc. (Date of application: December 2, 2009, Application No.: HokuDenGen 189)
Target items of review	Periodic licensee inspection performed during maintenance up to the 1st periodic inspection and the 1st maintenance cycle of the Tomari Power Station Unit 3 (*1)
Periodic safety management review (Japan Nuclear Energy Safety Organization)	1. Period of the safety management review December 22, 2009 to May 4, 2012
	2. Notification date of periodic safety management review results June 4, 2012 (Notification No. 09 KenKeiJuAn-0077)
	3. Outline of the review results The Nuclear and Industrial Safety Agency accepted the notification of the periodic safety management review results that was submitted by the Japan Nuclear Safety Organization (hereinafter, JNES) on June 4, 2012 (re-submission on July 6, 2012 due to correction of errors) to the Minister of Economy, Trade and Industry, and then received an explanation of the status of the periodic safety management review by JNES. JNES selected the “inspection planning and implementation process,” “condition monitoring process,” “maintenance effectiveness evaluation process,” and “nonconformity management and corrective action process” as the review items for fundamental systems relating to the periodic licensee inspection performed during the 1st maintenance cycle of Tomari Nuclear Power Station Unit 3 (document review) and for specific systems relating to the periodic licensee inspection (on-site review). As a result of the review, it was confirmed that quality management system-related standards are being continuously implemented, and continuous actions are being made to improve the system for implementing periodic licensee inspections. With regard to the “inspection plan and implementation process” and “condition monitoring process” selected as important processes relating to the periodic licensee inspection, there are standards in place for each process, and each of the processes has been established and implemented in accordance with these standards. With regard to the “maintenance effectiveness evaluation process,” there are major standards in place, and the process has been mostly established and implemented in accordance with these standards. The licensee has been using and improved a system for incorporating the evaluation of aging degradation into the effectiveness evaluation on a trial basis, and reviewed the method of collecting, consolidating and managing pre-inspection data based on the result obtained from the trial system as part of its effort to improve the efficiency of maintenance work. Therefore, JNES will monitor the implementation status of maintenance effectiveness evaluation under the improved system in future periodic safety management reviews for the power station. With regard to the “nonconformity management and corrective action process,” there are major standards in place. However, a follow-up review was conducted for the inconsistencies found in the previous unit inspection about the rules for "recording of the result of actions taken," a part of “Tomari Power Station nonconformity correction management procedures" which defines the procedures for corrective and recurrence prevention actions. Consequently JNES confirmed that the management procedure was revised and the operation was based on the revised procedure at Tomari Power Station, but since the operation is new, the establishment status will be monitored in future reviews. The licensee has been using a system for monitoring and measuring recurrence prevention measures for minor nonconformities, and reviewing the effectiveness of corrective and recurrence preventive actions on a trial basis. JNES will continuously monitor the operation status in future reviews. In the periodic steam turbine open inspection conducted by JNES, it was found that the inspectors of the power station performed visual inspection under the condition that there is an invisible part of the equipment by the inspectors. JNES regarded this as the item to be improved (*2), and conducted a follow-up review in this periodic safety management review, which led to the conclusion that the lack of consideration for the inspection method and inspection itself is to be improved in the periodic licensee inspection. The licensee corrected the condition, but JNES could not confirm the appropriateness of the correction in this review. It will be continuously monitored in future periodic safety management reviews. In consideration of the above, JNES concluded that the quality management system for Totamri Power Station is functioning properly, and that periodic licensee inspections are conducted properly and autonomously without major problems.
	4. Review items Document reviews and on-site reviews (the inspection planning and implementation process, condition monitoring process, maintenance effectiveness evaluation process, and nonconformity management and corrective action process)
Evaluation (Nuclear and Industrial Safety Agency)	1. Evaluation results Although there is a need to verify the appropriateness of corrective actions for the defect of visual inspection in the periodic inspection, and the establishment status of improvements in nonconformity management and corrective action process, the quality management system in the organization examined and evaluated in the safety management review is functioning without major problems and periodic licensee inspections are conducted autonomously without major problems under an appropriate system.
	2. Notification of evaluation August 7, 2012 (Notification No. 20120731 Gen 2)
	3. Reasons for evaluation (results and grounds) As a result of an examination of the review results based on the notification and explanations given by JNES, the Nuclear and Industrial Safety Agency determined that there is a need to confirm the implementation status of improvements in the maintenance effectiveness evaluation process promoted by the licensee, including the establishment status of corrective actions for incomplete standards in the nonconformity management and corrective action process. It also determined that there is a need to verity the appropriateness of the corrective action for the required improvement in the periodic "steam turbine open inspection.”
	4. Status of evaluation committee meetings: Explanation of, and hearings on the review results with Q&A on July 13, 2012 Review of the evaluation on July 13, 2012
Other	

*1 This is the first periodic safety management review for Unit 3 since it started the operation. The periodic licensee inspections conducted in the period from the starting day to the previous day of the 1st periodic inspection, and the period of the 1st maintenance cycle (from the day to start the 1st periodic inspection to the previous day of the 2nd periodic inspection) are subject to the review.

*2 In the periodic "steam turbine open inspections" conducted on January 27, 2011, the JNES inspector confirmed that the person of Hokkaido Electric Power Co., Inc. in charge of inspection performed the visual inspection of steam turbines under the condition that part of the equipment, i.e., the 9th stator vane of the 2nd low-pressure turbine (hereafter, stator vane) was invisible (the top of the stator vane was more than one meter higher than the eye level of the personnel). The person stopped inspection. After that, this was corrected and inspections were started again.

The Hokkaido Electric Power Co. corrected the defect by (1) developing measures to allow visual inspections of all required parts and components, (2) revising the work Instructions for temporary scaffold installation, etc., and (3) confirming the related persons to follow the visual inspection guidelines.

V STATUS OF SAFETY INSPECTION FOR NUCLEAR POWER PLANTS

V-1 Outline of Operational Safety Inspections for Nuclear Power Plants

(1) Commercial nuclear power reactors

i) Operational Safety Inspections

Operational Safety Inspections of commercial nuclear power reactors have been conducted since July 1, 2000, when the Act for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors (hereinafter "Nuclear Reactor Regulation Act") was enforced after the revision based on the lessons learned from the first criticality accident in Japan at a uranium processing facility in September 1999. The revision mandated that the reactor licensees undergo periodic safety inspections, conducted by the ministerial authority, to verify the status of compliance with the operational safety program. The revision also appointed nuclear safety inspectors to engage in other affairs related to the safety inspections, in order to ensure their effectiveness.

A total of 17 nuclear safety inspector offices have been established to govern commercial power reactors throughout Japan. Nuclear safety inspectors there conduct the operational safety inspections pursuant to Article 37-5 of the Nuclear Reactor Regulation Act to examine the compliance status of nuclear power reactor licensees and their employees with the operational safety inspections. They specifically perform the following tasks specified in Article 37-6 of the Nuclear Reactor Regulation Act:

1. On-the-spot inspections of offices or plants
2. Inspections of accounts, documents, equipment, components, and other objects
3. Questioning to workers and other concerned parties
4. Requests to licensees to submit nuclear source materials, nuclear fuel materials, materials contaminated by nuclear fuel materials, as well as other necessary samples

(2) Nuclear power reactors in the research and development stage

i) Operational Safety Inspections

Operational safety inspections are conducted into the status of compliance with the operational safety program by the reactor licensee and the workers at the site where the Fast Breeder Reactor Research and Development Center, Tsuruga Head Office, Japan Atomic Energy Agency is being constructed, pursuant to Article 37-5 of the Nuclear Reactor Regulation Act, in the same manner as inspections of commercial nuclear power reactors.

(3) Nuclear power reactors in the decommissioning stage

i) Operational Safety Inspections

Operational safety inspections are conducted into the status of compliance with the operational safety program by the reactor licensees and the workers at the graphite-moderated gas-cooled reactors in the Tokai Power Station, Hamaoka Nuclear Power Station Units 1 and 2, and the Fugen Decommissioning Engineering Center, Tsuruga Head Office, Japan Atomic Energy Agency, (commonly known as "Fugen"), pursuant to Article 37-5 of the Nuclear Reactor Regulation Act, in the same manner as inspections of commercial nuclear power reactors.

V-2 Status of Operational Safety Inspections by Nuclear Power Plants

Operational Safety Inspections results from each of the quarters, from the first to the fourth, are summarized as follows.

Attached Table 1 presents the inspection results by nuclear power plant from the first quarter to the fourth quarter.

V-2 Status of Operational Safety Inspections for Nuclear power plants

Results of operational safety inspections for commercial power reactor

(1st quarter of FY 2012)

The first operational safety inspections of FY2012 and those inspections on actions important for ensuring safety in the first quarter of FY2012 were conducted at 16 nuclear power stations, pursuant to Paragraph 2, Article 72-3 of the Act for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors (hereinafter “Nuclear Reactor Regulation Act”). The inspection results are described as follows.

1. Results of the first operational safety inspections conducted in FY 2012

(1) Purpose of inspections

Safety inspections were conducted on the status of the commercial power reactor licensees’ (hereinafter “licensees”) and their employees' compliance with the operational safety program, pursuant to Article 37-5 of the Nuclear Reactor Regulation Act, in order to ensure safety at nuclear power stations.

(2) Inspection period and inspectors

During the period specified in the attached Table 1, inspections were conducted by nuclear safety inspectors stationed in the 16 Nuclear Safety Inspector’s Offices throughout Japan.

However, no safety inspection was implemented at Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Co., Inc. during the 1st quarter of FY 2012.

(3) Inspection details

The safety inspections in this quarter specifically focused on operational safety activities, as well as the basic inspection items listed in the attached Table 1 for each power station. Inspection tours of the facilities, inspection of the objects, and questions to the parties concerned were made in order to confirm the status of compliance with the operational safety program.

Special inspections were conducted at Shimane Nuclear Power Station on the “status of remedial actions in response to the violation of the operational safety program related to inadequate maintenance management” in order to examine the implementation of remedial actions and recurrence prevention measures.

(4) Inspection results

The inspection results obtained by making inspection tours, inspecting objects, and questioning parties concerned were presented in the attached Table 1.

No violations, however, were identified among the categories of the operational safety program violations (hereinafter “operational safety program violation categories”) as defined in the “Commercial Power Reactor Safety Inspection Implementation Procedure” (NISA bylaws).

2. Results of operational safety inspections on actions important for ensuring safety

(1) Purpose of inspections

Safety inspections are conducted on the status of the commercial power reactor licensees’ (hereinafter “licensees”) and their employees compliance with the operational safety program, pursuant to Article 37-5 of the Nuclear Reactor Regulation Act, in order to ensure safety at nuclear power plants.

(2) Inspection period and inspectors

During the first quarter of FY 2012 (April 1 to June 30, 2012), the nuclear safety inspectors stationed in the Nuclear Safety Inspector’s Offices conducted safety inspections on the status of operational safety activities related to the actions important for ensuring safety in the power station (and units) listed in the attached Table 2.

(3) Inspection details

The safety inspections in this quarter specifically focused on operational safety activities for power stations (units) listed in the attached Table 2. Inspection tours of the facilities, inspection of the objects, and questions to the parties concerned were made in order to confirm the status of compliance with the operational safety program.

(4) Inspection results

The inspections confirmed the proper Implementation of operational safety activities related to actions important for ensuring safety at each station (unit) in accordance with the procedure manual developed in each station. The inspections identified no violations among the operational safety program violation categories.

3. Violation of the operational safety program outside of the operational safety inspection period

During the period of April 1 to June 30, 2012 in the first quarter of FY 2012, no event outside of the operational safety inspection period was identified that constitute a “violation 1,”“violation 2,”and “violation 3” in accordance with the operational safety program violation categories. The identified “observations” were reported in the attached Table 3.

Attached Table 2:
Results of operational safety inspections on actions important for ensuring safety

Power station			Items of safety inspections on actions important for ensuring safety	Period of inspection
Hokkaido Electric Power Co., Inc.	Tomari	Unit 3	Safety inspection during reactor shutdown	May 2 to May 10, 2012
			Safety inspection during midloop operation (before fuel removal)	May 9 to May 15, 2012
			Safety inspection during refueling (removal)	May 15 to May 21, 2012
Tokyo Electric Power Co., Inc.	Kashiwazaki-Kariwa	Unit 5	Safety inspection during refueling (fuel loading)	May 2 to May 24, 2012
		Unit 6	Safety inspection during refueling (removal)	March 30 to April 10, 2012
			Safety inspection during seawater system changeover	April 11 to April 17, 2012
			Safety inspection during refueling (removal)	April 27 to May 7, 2012
			Safety inspection during refueling (fuel loading)	May 17 to May 31, 2012
Hokuriku Electric Power Co., Inc.	Shika	Unit 1	Safety inspection during seawater system changeover	May 8 to May 15, 2012
The Chugoku Electric Power Co., Inc.	Shimane	Unit 2	Safety inspection during refueling (fuel loading)	April 23 to May 2, 2012
Shikoku Electric Power Co., Inc.	Ikata	Unit 2	Safety inspection during refueling (fuel loading)	April 5 to April 13, 2012
Kyushu Electric Power Co., Inc.	Genkai	Unit 4	Safety inspection during midloop operation (after fuel loading)	March 28 to April 9, 2012

Attached Table 3:
Operational Safety Program Violation Category - “observations”

Power station		Number of violations	Summary of operational safety program violations
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Nuclear Power Station	1 case ◇	Articles138 and 143 of the operational safety program stipulates that the bottom temperature of the reactor pressure vessel should be monitored in accordance with the manual. The manual stipulates that a temperature gauge suitable for temperature monitoring should be selected as a monitoring temperature gauge. A temperature gauge unsuitable for temperature monitoring was selected as a monitoring temperature gauge under the circumstance where a recording instrument was jumpered in the event of gauge failure of the gauge to enter and connects with temperature gauges other than the one in the original position, and instruments used at site were not checked for the Implementation of adequate impact evaluation. These were not implemented for requirements stipulated in the articles in the operational safety program. As there was no influence on the facility safety, it was classified as an ”observation.”

(Legend) ☆: during the safety inspection period
◇: outside of the safety inspection period

Summaries of results of operational safety inspections

(2nd Quarter of FY 2012)

The inspection was conducted in the second quarter of FY 2012 (July to September) on actions for ensuring safety concerning commercial power reactor, fabrication facility licensees, the reactor licensees (those who supply test and research reactors), reprocessing facility licensees and users, waste disposal facilities and waste storage facilities, and nuclear power reactor facilities (decommissioning).

I. Operational safety Inspections related to Nuclear Power Reactor Facilities (refer to the Attached Table 1)

1. The Second Operational Safety Inspection Conducted in FY 2012

(1) Purpose of inspections

Safety inspections were conducted on the status of the commercial power reactor licensees' (hereinafter "reactor licensees") and their employees' compliance with the operational safety program[*1)], pursuant to Article 37-5 of the Nuclear Reactor Regulation Act, in order to ensure safety at nuclear power stations.

*1) The operational safety program stipulates the following business:
quality assurance, system and evaluation, operational management, fuel management, radioactive waste management, radiation management, maintenance management, emergency measures, operational safety education, and recording and reporting.

(2) Inspection period and inspectors

During the period specified in the Attached Table 1 (about 2 weeks), inspections were conducted by nuclear safety inspectors stationed at power reactor site.

The results of operation safety inspections conducted at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. was already published (August 30, 2012).

(3) Inspection details

As shown in the Attached Table 1, regulation offices established inspection items specifically focused on the status of operational safety activities for each power station and made inspection tours of the facilities, inspection of the objects, and questions to the parties concerned in order to confirm the status of compliance with the operational safety program.

In addition, the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." was continuously confirmed this time to be conducted properly as well as operational safety inspections.

(4) Inspection results

The inspections identified no violations that fall under "violation 1," "violation 2," or "violation 3" among the operational safety program violation categories specified in the "Nuclear Reactor Safety Inspection Implementation Procedure" (Nuclear Regulation Authority bylaw [*2)](hereinafter "operational safety program violation categories"). As shown in the Attached Table 3, Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station reported 1 case of "monitoring items" were reported in the attached Table 3.

*2) The main evaluation index to determining the violations of the operational safety program is the influence of occurring events over operational safety program violation categories. The judgment criteria are based on safety functions, radiation exposure, and quality control. Depending on the magnitude of the influence, the violations were classified into "violation 1," "violation 2," or "violation 3." In addition, in case of minor effect, it was classified as "observation."

2. Results of operational safety inspections on actions important for ensuring safety

(1) Inspection details

The safety inspections in this quarter specifically focused on operational safety activities, for power stations (units) listed in the attached Table 2. Inspection tours of the facilities, inspection of the objects, and questions to the parties concerned were made in order to confirm the status of compliance with the operational safety program.

(2) Inspection results

The inspections confirmed the proper Implementation of operational safety activities related to actions important for ensuring safety at each station (unit) in accordance with the procedure manual and other guidelines defined for each station. The inspections identified no violations among the operational safety program violation categories. The results of operational safety inspections of reactor start-up conducted at the Ohi Unit 3 was published on July 20, 2012 and Unit 4 on August 9, 2012.

3. Violation of the operational safety program outside of the operational safety inspection period

No event outside of the operational safety inspection period was identified that constitute a "violation 1," "violation 2,"and "violation 3" in accordance with the operational safety program violation categories. One case of "observations," as shown in the attached Table 3, was identified at the Japan Atomic Power Company, Tsuruga Power Station.

Attached Table 2:
Results of operational safety inspections on actions important for ensuring safety

Power station			Items of safety inspections on actions important for ensuring safety	Period of inspection
Tokyo Electric Power Co., Inc.	Fukushima Daiichi	Unit 5	Safety inspection during seawater system changeover	August 22 to August 31, 2012
Chubu Electric Power Co., Inc.	Hamaoka	Unit 5	Safety inspection during refueling (removal)	August 20 to September 5, 2012
The Kansai Electric Power Co., Inc.	Ohi	Unit 3	Safety inspection during reactor start-up	June 27 to July 10, 2012
		Unit 4	Safety inspection during reactor start-up	July 12 to July 27, 2012
The Chugoku Electric Power Co., Inc.	Shimane	Unit 2	Safety inspection during refueling (removal)	August 30 to August 31, 2012
			Safety inspection during refueling (fuel loading)	September 10 to September 12, 2012

Attached Table 3:
Operational Safety Program Violation Category - “Observations”

Power station	Number of violations	Timing of violations	Summary of operational safety program violations
Hokuriku Electric Power Co., Inc. Shika Nuclear Power Station	1 case	☆	On August 8, 2012, 2 machinery maintenance and repair division workers entered the isolated controlled area of the solid waste storage (D/Y) to patrol the area. They neglected to take a procedure to enter the controlled area at the service building (S/B) entry/exit control room or D/Y entry/exit control room, opened the bypass door beside D/Y entry/exit control system without wearing an alarm pocket dosimeter (APD). But they wore glass badges during their entry (about 10 minutes). The evaluated exposure to the workers was 0.00mSv but this was classified as ”observation.” This event conflicts with Article 94-4 of the operational safety program (controlled area entry/exit control) because the entry into the isolated controlled area was not properly observed and workers neglected to take a procedure to enter the controlled area and entered without wearing APD. The status of recurrence prevention measures was to be monitored to see if it was properly implemented.
The Japan Atomic Power Company, Tsuruga Power station	1 case	◇	Around 2 pm on July 6, 2012, workers dug a boring at an investigation spot near a crush zone in a crush zone additional investigation. They bore a hole in a circulation water pipe (approx. 4 m in diameter) of Unit 2 buried about 5 m under the surface (currently during 18th periodic inspection). The contractor read the laid position of the circulation water pipe according to the laid piping diagram and entered center lines of two circulation water pipes by dashed lines. The contractor misunderstood the two center line entered by dashed line showed a shape of piping, and determined the position of boring was quite close to the circulation water pipes but did not interfere with them. In addition, the system did not allow the licensee to check a drawing prepared by the contractor. It was considered that Paragraph 7.4.1 (1), Article 3 of operational safety program was not properly implemented due to a failure to satisfy a basic rule of “ensuring the procured product meets the specified procurement requirement” in the procurement management. But as the influence on nuclear safety was small, it was classified as “observation.” In the future, the reactor licensee will implement corrective actions in line with the nonconformity management work guideline. The status will be verified.

(Legend)☆: during the safety inspection period
◇ : outside of the safety inspection period

Summaries of results of operational safety inspections (3rd quarter of FY 2012)

The inspection was conducted in the third quarter of FY 2012 (October to December). The results were described pursuant to the act for the regulation of nuclear source materials, nuclear fuel materials, and reactors (hereinafter the Nuclear Reactor Regulation Act.)

I. Operational safety Inspections related to Nuclear Power Reactor Facilities (refer to the Attached Table 1)

1. Results of the third operational safety inspections conducted in FY 2012*1))

(1) Purpose

Safety inspections are conducted on the status of the nuclear power reactor licensees' (hereinafter "reactor licensees") and their employees' compliance with the operational safety program*2), pursuant to Article 37-5 of the Nuclear Reactor Regulation Act, in order to ensure safety at nuclear power stations.

*1) Operation safety inspections conducted in the Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Co., Inc. was the second operation safety inspection in FY 2012.

*2) The operational safety program stipulates the following business: quality assurance, system and evaluation, operational management, fuel management, radioactive waste management, radiation management, maintenance management, emergency measures, operational safety education, and recording and reporting.

(2) Inspection period and inspectors

During the period specified in the Attached Table 1 (about 2 weeks), inspections were conducted by nuclear safety inspectors stationed at power reactor site.

(3) Inspection details

As shown in the Attached Table 1, regulation offices established inspection items specifically focused on the status of operational safety activities for each power station and made inspection tours of the facilities, inspection of the objects, and questions to the parties concerned in order to confirm the status of compliance with the operational safety program.

The inspection confirmed the "development and the status of the maintenance plan with extended shutdown," "status of existing devices and their operation regarding the alarm records" and "status of emergency safety measures of other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." were checked in line with the plan.

(4) Inspection items

The inspection results are presented in the Attached Table 1. The inspection identified an event that constitute a "violation" at the nuclear power reactor facilities, the Fast Breeder Reactor Research and Development Center, Tsuruga Power Station, Japan Atomic Energy Agency (hereinafter "prototype fast breed reactor "Monju").

In addition, the inspection identified 5 cases *4 at Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Co., Inc., and 2 cases*4 at Kashiwazaki-Kariwa Nuclear Power Station that fall under "observation"*3 category as shown in the Attached Table 2.

*3) If the violation of the operational safety program has minor effect, it was classified as "observation."

*4) The identified "observations" are as follows:

○Fukushima Daiichi Nuclear Power Station
- Unclear procedure of delegation of new and improved equipment from the work section to the power generation section
- Unclear controlled criteria in the nonconformity management
- Unclear procedure for alarm records regarding operational limits specified in the operational safety program.
- Treated water leakage caused by disconnection of drain hose at the Desalinaction Facility 3
- Leakage from hose to transfer the filtered water in the Unit 3 turbine building

○Kashiwazaki-Kariwa Nuclear Power Station
- Setting error of the background level at the emergency gas treatment system of radiation monitor of Unit 5
- Wrong disposal of low-level radioactive waste (concentrated liquid waste analysis sample)

(5) Summary of operational safety program violation in the prototype fast breeder reactor Monju

The inspection verified a fact that many pieces of equipment had not been inspected in accordance with the maintenance plan and equipment important for ensuring safety was included. It was judged that this case violates the Nuclear Reactor Regulation Act. It was ordered to take measures necessary to ensure safety such as the Implementation of inspection of the equipment that had not been inspected in line with the law, investigate the fact situation in case, and report causes and countermeasures, and so on. Necessary actions will be continuously taken in response to reports from licensees.

2. Results of operational safety inspections on actions important for ensuring safety

(1) Inspection details

The safety inspections in this quarter specifically focused on operational safety activities listed in the attached Table 3. Inspection tours of the facilities, inspection of the objects, and questions to the parties concerned were made in order to confirm the status of compliance with the operational safety program.

(2) Inspection results

The inspections confirmed the proper Implementation of operational safety activities related to actions important for ensuring safety at each station (unit) in accordance with the procedure manual and other guidelines defined for each station. The inspections identified no violation among the operational safety program violation categories.

Attached Table 2: Operational Safety Program Violation Category - “Observations”

Power station	Number of violations	Summary of operational safety program violations
Tokyo Electric Power Co., Inc. Fukushima Daiichi Nuclear power station	5 cases	[Event: Unclear procedure of delegation of new and improved equipment from the work section to the power generation section] The operational safety inspection examined the procedure of delegation of new and improved equipment to the power generation section as a part of the “status of operational safety activities related to electric equipment. The procedure of delegation from the work section to the facility management section (the power generation section) was not clear. In addition, it was verified a part of facilities were not properly delegated such as the facility belonging to the reactor injection system in the turbine building, which was not delegated from the work section to the facility management section after the start of operation. It was considered that the nuclear safety was not influenced in this case because both the work section and the facility management section take required measures such as inspection per matter. But it was classified as ”observation” because the fact that no clear rule about the facility delegation suitable for the situation after the accident constitutes a non-compliance with Paragraph 7.1 (Operation Plan), Article 122-2 (Quality assurance Program) of the operational safety program. As the licensees will develop a business flow as a clear rule about the facility delegation. The status of development will be verified.
		[Event: Unclear controlled criteria in the nonconformity management] The operational safety inspection examined if the nonconformities related to leakage were properly controlled as a part of the ”inspection of the status of operational safety related to contaminated water treatment system. Nonconformities were classified into ”nonconformities of the controlled,” which were controlled by the whole organization and the ”other nonconformities” and managed. The classification criteria was not clear. As a result, matters to be studied for improvement by more than one section were handled as the ”other nonconformities,” not ”nonconformities of the controlled.” So far, no similar matters attributable to a failure to be classified as nonconformities to be controlled by the organization have occurred, and the nuclear safety was not influenced. But the status showed important nonconformities to be handled by the organization were not properly controlled, a chance for the improvement in the organization was missed, which may lead to the influence over the nuclear safety. The event conflicts with Paragraph 8.3 (Nonconformity Management), Article 122-2 (Quality Assurance Program) of the operational safety program and was classified as ”observation.” In response to the matter, the licensees said they would clarify the criteria for judging the nonconformities of the controlled items with a manual or a guide. The status of improvement by them is to be further monitored.
		[Event: Unclear procedure of alarm records regarding the operational limit stipulated in the operational safety program] It was confirmed as a part of inspection of “ensuring of recording and record retention in the event of accident” conducted as a surprise inspection in the operational safety inspection that checking alarms related to operational limits among alarms preparing/saving the record under Article 167 of the operational safety program (Record), there was a leak from a document stipulating alarms recorded by those related to the auxiliary power supply system. A separately related manual, however, stipulates that a shift supervisor, who should keep records of important warnings and monitoring items, properly made and kept records of the status of facilities. It was considered that the nuclear safety was not influenced. There was no system, however, that requires a alarm to be recorded according to Article 167 of the operational safety program (Record). This violates the article that stipulates “details of alarm generated from an alarm device about the operational limits” should be recorded and was classified as ”observation.” The licensees said they would clarify alarms related to the operational limits in the future. The improvement status is to be monitored.
		[Event: Leakage of treated water resulting from the separation of drain hose from the Desalinaction Facility 3] The operational safety inspection examined the event on December 10, 2012 as a part of the “status of operational safety related to contaminated water treatment system. The event was the disconnection of drain hose *2 during the contaminated water treatment from a reverse osmosis membrane device*1 of the desalinaction facility and the treated water leak onto the floor. In a normal condition, the master valve of the drain hose was closed during contaminated water treatment. It was estimated that for some reason, this valve was half open and high pressure was imposed on the hose, which make the hose fall from the device. This drain hose was not used during contaminated water treatment. Getting high pressure, it was easily detached. Therefore, it was easily estimated that some malfunction of the valve during the water treatment will lead to the detachment of the hose. It was necessary to adopt preventive measures in advance. The status does not satisfy the ”use of proper equipment” required in Paragraph 7.5, Article 122-2 of the operational safety program (Quality Assurance Plan), violates it and was classified as ”observations.” In response to this event, licensees said they would take preventive maintenance measures for facilities. The status is to be monitored. *1 Reverse osmosis membrane device: A device removes salts from contaminated water accumulated in facilities of Fukushima Daiichi Nuclear power station. The contaminated water from which salts are removed was injected into a reactor. *2 Hose to be used to discharge contaminated water in a reverse osmosis membrane device. It was isolated and not used during treatment of contamination
		[Event: Leakage from hose for transfer of the filtered water in the Unit 3 turbine building] The operational safety inspection examined the event on December 11, 2012 as a part of the “status of operational safety related to contaminated water treatment system,” an inspection item. The event was the disconnection of a joint of pipe for transferring accumulated water during a pressure inspection, which was newly established in Unit 1 turbine building at Fukushima Daiichi Nuclear Power Station. Similar leak events occurred in the past, and necessary preventive measures were not properly performed. There was no influence on nuclear safety. It was uncontaminated filtered water made to flow on trial that leaked from the joint. The leaked water did not go out of the building. This, however, occurred because proper measures to prevent reoccurrence were not taken and violates Section 8.5.3 (Preventive Measures), Article 122-2 (Quality Assurance Plan). It was judged as “observation.” In response to this event, the licensees said they would take necessary measures after the completion of investigation of instructions of the facilities. The status is to be monitored.

Power station	Number of violations	Summary of operational safety program violations
Tokyo Electric Power Co., Inc. Kashiwazaki-Kariwa Nuclear power station	2 cases	[Subject: Setting error of the background level at the emergency gas treatment system of radiation monitor of Unit 5] Operational safety inspections in this quarter confirmed as "other inspections" that the setting of a background level of emergency gas treatment system radiation monitor at Unit 5 of Kashiwazaki-Kariwa Nuclear Power Station was incorrect. The gaseous waste management daily report dated November 1, 2012 said the emission concentration value of noble gas was recorded at Unit 5. At first, the licensee assumed that it was temporary fluctuation of the measurement value during a routine test of emergency gas processing system and informed to a shift supervisor. In response to an inquiry from a nuclear safety inspector after that, the licensee examined details of the event. It was found the emission concentration value of noble gas was recorded because a background calculated set value in the other monitor of the two systems was confused with a measurement value of the monitor, which made it easier to detect noble gas in the emergency gas treatment system radiation monitor since September 28. The event did not influence the nuclear safety because the background value turned out to be in favor of the safety and no radioactive gaseous waste above the detection limit was released. From September 28 to November 7, however, the licensee did not realize the setting error in the background level and from November 1 to 14 gave wrong notice to shift supervisors. This violates Section 7.5.1 (Operation Management) of Article 3 (Quality Assurance) of the operational safety program and was classified as "observations." In response to the matter, the licensees said they would improve software as well as operation processes to prevent background setting errors of emergency gas treatment system of radiation monitor. They said they would take preventive measures such as immediate information sharing of a similar event related release arises with shift supervisors and other interested parties. The status is to be monitored.
		[Subject: Erroneous disposal of low-level radioactive wastes (concentrated liquid waste analysis sample)] On October 24, 2012, the loss of sample bottle (2 liter) with liquid waste collected from the high conductivity liquid waste system concentrator. After that, related areas were searched but it was not found. Operational safety inspection of the event in this quarter confirmed as "other inspections." The sample was collected as analysis sample of concentrated liquid waste. Sample was stored and saved in 2 bottles of 1-liter samples. After that, storage was confirmed to take pictures of the sample. And then, the loss was recognized. The later investigation resulted in an assumption that the sample was disposed at a sampling sink by mistake. In addition, there was a rule that a date, a collecting unit, and management number should be written on a sample bottle. But it was assumed that similar inappropriate management of such bottle was conducted because the storage of more than one bottle without such number was identified. This time, there was no influence on the nuclear safety because samples, which were considered to be disposed by mistake, were moved from the sampling sink to the concentrated waste liquid tank and properly processed. It, however, seems that this event was attributable to improper management of assigning no management numbers to sample bottles. This violates Paragraph 7.5, Article 3 (Quality Assurance) and was classified as "observations". In response to the matter, the licensees said they would take measures such as the clarification of identification management of materials and equipment to be saved. The status is to be monitored.

Attached Table 3:

Results of operational safety inspections on actions important for ensuring safety

Power station			Items of safety inspections on actions important for ensuring safety	Period of inspection
Tohoku Electric Power Co., Inc.	Onagawa	Unit 1	Safety inspection during seawater system changeover	November 13 to November 16, 2012
Tokyo Electric Power Co., Inc.	Fukushima Daiichi	Unit 6	Safety inspection during seawater system changeover	November 19 to November 28, 2012
The Kansai Electric Power Co., Inc.	Mihama	Unit 3	Safety inspection during midloop operation	December 12 to December 17, 2012
			Safety inspection during refueling (removal)	December 21 to December 26, 2012
	Takahama	Unit 1	Safety inspection during midloop operation	December 4 to December 10, 2012
			Safety inspection during refueling (removal)	December 14 to December 18, 2012
The Chugoku Electric Power Co., Inc.	Shimane	Unit 2	Safety inspection during refueling (removal)	December 19 to December 21, 2012
			Safety inspection during refueling (fuel loading)	December 27 to December 28, 2012

The status of safety preservation activities

(4th quarter of FY 2012)

The inspection was conducted in the third quarter of FY 2012 (January to March). The results were described pursuant to the act for the regulation of nuclear source materials, nuclear fuel materials, and reactors (hereinafter the Nuclear Reactor Regulation Act.)

I. Operational safety Inspections related to Nuclear Power Reactor Facilities (refer to the Attached Table 1)

1. Results of the fourth operational safety inspections conducted in FY 2012*1)

(1) Purpose

Safety inspections were conducted on the status of the nuclear power reactor licensees' (hereinafter "licensees") and their employees' compliance with the operational safety program, pursuant to Article 37-5 of the Nuclear Reactor Regulation Act, in order to ensure safety at nuclear power stations.

*1) The operational safety inspections conducted at Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Co., Inc. was the third operational safety inspections in FY 2012

*2) The operational safety program stipulates the following business:

quality assurance, system and evaluation, operational management, fuel management, radioactive waste management, radiation management, maintenance management, emergency measures, operational safety education, and recording and reporting.

(2) Inspection period and inspectors

During the period specified in the attached Table 1 (about 2 weeks), inspections were conducted by nuclear safety inspectors stationed at power reactor site.

(3) Inspection details

As shown in the Attached Table 1, regulation offices established inspection items specifically focused on the status of operational safety activities for each power station and made inspection tours of the facilities, inspection of the objects, and questions to the parties concerned in order to confirm the status of compliance with the operational safety program.

The inspection confirmed the "development and the status of the maintenance plan with extended shutdown," "status of existing devices and their operation regarding the alarm records" and "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." were checked in line with the plan.

(4) Inspection items

The inspection results are presented in the Attached Table 1. In addition, the inspection confirmed one case (use of masks without dust filter) that falls under "observation" *3 at Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Co., Inc. The details were presented in the Attached Table 2.

*3) If the violation of the operational safety program has minor effect, it was classified as "observation."

(5) Status of the operational safety program violation in the Prototype Fast Breeder Reactor Monju

The operational safety inspection in this quarter examined violations of the operational safety program identified in the previous inspection, which was described in a report on January 31. It was proved that the inspection time limit of some equipment in departments had been exceeded (including Class 1) in the past though the report said no inspection period had been exceeded. This will require the necessary actions as well as further monitor the status of the actions of the licensees.

2. Results of operational safety inspections on actions important for ensuring safety

(1) Inspection details

The safety inspections in this quarter specifically focused on operational safety activities listed in the attached Table 3. Inspection tours of the facilities, inspection of the objects, and questions to the parties concerned were made in order to confirm the status of compliance with the operational safety program.

(2) Inspection results

The inspections confirmed the proper Implementation of operational safety activities related to actions important for ensuring safety at each station (unit) in accordance with the procedure manual developed in each station. The inspections identified no violations among the operational safety program violation categories.

3. Results of on-site inspection of deviation from the operational limit

(1) Inspection details

On-site inspection was conducted to confirm measures required at the time of deviation from the operational limit were properly performed for deviation from the operational limit at the temporary power failure of B-system emergency DC bus at Ohi Power Station, Unit 3 (Operation at rated thermal power) of The Kansai Electric Power Co. Inc. on February 6, 2013.

(2) Inspection results

The inspection confirmed that the bus was properly restored, which was required at the deviation from the operational limit. In addition, it was confirmed that all of the restoration work was completed.

It was confirmed that the fact analysis and the development of corrective actions were taken properly for this matter in the operational safety inspection.

Attached Table 3: Operational Safety Program Violation Category - "observations"

Power station	Number of violations	Summary of operational safety program violations
Tokyo Electric Power Co., Inc. Fukushima Daiichi Nuclear power station	1 case	[Event: Use of Masks without Dust Filter] Inspections of status of operational safety activities related to the radiation protection of subcontractors were conducted as surprising inspections because in two events of "working with full-face masks without dust filters" in February 2013 (a worker used a full-face mask without any dust filter in a "construction of cover-soil-over-felled trees temporary storage facility" on an old viewing platform in a premise of Fukushima Daiichi Nuclear Power Station on February 1, 2013 and dust filter was removed from a full-face mask worn by a worker in an old ground in a premise of Fukushima Daiichi Nuclear Power Station in February 14) consecutively occurred. Inspection confirmed that Fukushima Daiichi Nuclear Power Station Radiation Management Basic Manual (hereinafter the radiation management basic manual stipulated the standard for wearing protective equipment as a radiation management during work and Fukushima Daiichi Nuclear Power Station Radiation Management Specifications (hereinafter Radiation Management Specifications) required subcontractors to wear protective equipment and conduct inspections before use and inspection of protective equipment as protective garment/protective equipment management. It was, however, reported that in February 1 event, the workers did not conduct a final check of protective equipment required by the manual (leak check, etc.) when they wore full-face masks. In addition, in February 14 event, a worker conducted a final check of protective equipment at the time of wearing a full-face mask but found no filter was attached to the masks during travel after the completion of work and did an on-site review. The filter fallen from the mask was found on site. Inspections of the operational safety activities of licensees in these events confirmed that the radiation management specifications stipulates compliance items for radiation protection for subcontractors, but subcontractors did not check the status of compliance with compliance items and that as for the distribution of protective equipment in the basic manual of radiation management, though protective garment/equipment inspection details had been stipulated in advance and were expected to be implemented for every distribution (before use), the procurement requirements given to subcontractors when licensees consigned the distribution of masks to subcontractors did not include a confirmation inspection of filter installation on masks, and that the subcontractors did not have any procedure or inspection requirements for the distributions of masks with filters installed without fail. Based on these confirmations, it was judged that the management was not sufficient and licensees failed to ensure the confirmation and distributions of protective equipment. In consideration of the confirmation results above, it was confirmed that the final check of protective equipment and the management of protective garment/equipment distribution were not sufficient, and the radiation protection of subcontractors in a controlled area did not comply with Chapter 12 of the operational safety program. It was judged as a violation of the operational safety program (observations). An instruction for improvement was given to licensees. The status of improvements by licensees will to be monitored in the future.

Attached Table 3:
Results of operational safety inspections on actions important for ensuring safety

Power station			Items of safety inspections on actions important for ensuring safety	Period of inspection
Hokkaido Electric Power Co., Inc.	Tomari	Unit 1	Safety inspection during midloop operation	March 12 to March 18, 2013
			Safety inspection during refueling (removal)	March 15 to March 21, 2013
Tohoku Electric Power Co., Inc.	Onagawa	Unit 1	Safety inspection during seawater system changeover	February 12 to February 19, 2013
Tokyo Electric Power Co., Inc.	Kashiwazaki	Unit 1	Safety inspection during seawater system changeover	December 19, 2012 to January 9, 2013
			Safety inspection during refueling (removal)	February 15 to March 12, 2013
			Safety inspection during refueling (fuel loading)	February 15 to March 12, 2013
		Unit 7	Safety inspection during refueling (removal and fuelloading)	February 12 to March 4, 2013
The Kansai Electric Power Co., Inc.	Mihama	Unit 1	Safety inspection during midloop operation	February 8 to February 14, 2013
			Safety inspection during refueling (removal)	February 20 to February 25, 2013
	Osaka	Unit 1	Safety inspection during midloop operation	January 11 to January 29, 2013
			Safety inspection during refueling (removal)	January 25 to February 4, 2013
Shikoku Electric Power Co., Inc.	Ikata	Unit 1	Safety inspection during midloop operation	January 22 to January 30, 2013
			Safety inspection during refueling (removal)	February 5 to February 14, 2013
		Unit 2	Safety inspection during midloop operation	February 20 to February 26, 2013
			Safety inspection during refueling (removal)	March 4 to March 12, 2013
Kyushu Electric Power Co., Inc.	Genkai	Unit 3	Safety inspection during midloop operation	February 28 to March 6, 2013
			Safety inspection during refueling (removal)	March 5 to March 11, 2013
		Unit 4	Safety inspection during midloop operation	March 15 to March 21, 2013
			Safety inspection during refueling (removal)	March 19 to March 26, 2013
	Sendai	Unit 1	Safety inspection during midloop operation	January 24 to January 28, 2013
			Safety inspection during refueling (removal)	January 25 to February 4, 2013
		Unit 2	Safety inspection during midloop operation	February 5 to February 12, 2013
			Safety inspection during refueling (removal)	February 8 to February 15, 2013

Attached Table 1: Inspection Items and Inspection Results of Operational Safety Inspections in FY 2012

(1) Hokkaido Electric Power Co., Inc., Tomari Power Station

	First inspection
Period of inspection	Inspection period: May 28 (Mon.) to June 8 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of nonconformity management (2)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (3)Status of special maintenance activities related to the extended shutdown (4) Status of quality goal setting (including inspection at the head office) (5) Status of management review and safety culture development activities (including inspection at the head office) (6) Status of internal audits (inspection at the head office) (7) Status of education and training (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of nonconformity management,” the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.,” and the “status of special maintenance activities related to the extended shutdown,” the “status of quality goal setting (including inspection at the head office).” and etc.. Basic inspection of the “status of nonconformity management” confirmed that cause analysis, remedial actions, and preventive measures were properly implemented with the establishment of controlled areas in line with the operational safety program and other company regulation, etc., and that processing of nonconformity was accelerated, similar recurrent, and human errors were properly extracted. Inspection of the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” confirmed that the mid-and-long term plans were properly studied such as additional deployment of mobile generator cars, deployment of standby seawater pump motor, deployment of alternative seawater intake pump vehicle, and study of filter vent equipment to prevent overpressure damage of reactor containment, that deployed materials and equipment were maintained and managed according to manuals, and that routine inspections were properly carried out according to plan. Inspection of the “status of special maintenance activities related to the extended shutdown” confirmed that the 17th maintenance cycle maintenance plan for Tomari Unit 1 was revised in April, storage measures were developed for power station equipment in view of deterioration suppression, equipment integrity testing, and function maintenance as well as executed additional inspections, and that the measures were implemented since April. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tomari Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of nonconformity management (2)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (3)Status of special maintenance activities related to the extended shutdown (4) Status of fuel management (5) Status of gaseous waste management (6) Status of subcontractor's employees' wear of alarm personal dosimeter (7) On-site review of the status of long-term storage (surprise inspection) (8) Status of release of radioactive gaseous waste (surprise inspection) 2) Additional inspection items None
Inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of nonconformity management,” the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.,” the “status of special maintenance activities related to the extended shutdown,” the “status of fuel management,” the “status of gaseous waste management” the “status of subcontractor's employees' wear of alarm personal dosimeter” and etc.. Basic inspection of the “status of nonconformity management” confirmed that cause analysis, remedial actions, and preventive measures were properly implemented with the establishment of controlled areas in line with the operational safety program and other company regulation, etc., and that processing of nonconformity was accelerated while similar cases and recurrences were properly organized. The inspection of the “emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” verified that the mid-and-long-term measures were properly carried out such as the establishment of new water storage facilities on high ground and tide wall in the coastal area in the premise, and studies related to measures against flooding for the reactor building, auxiliary reactor building, etc. as well as additional deployment related to mobile generator cars and the inspection of deployed materials and equipment confirmed that the maintenance and management in accordance with guidelines were properly conducted according to the plan. The inspection of the “status of special maintenance activities related to the extended shutdown” confirmed that the 16th maintenance cycle maintenance plan for Tomari Unit 2 was revised this August, extracted storage measures and studied/determined additional maintenance measures for equipment in the power station from the standpoint of the long-term deterioration suppression, the integrity confirmation, and function maintenance, and so on in addition to existing additional inspections, and that they have been implemented since this August. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tomari Power Station

	Third inspection
Period of inspection	Inspection period: Nov. 26 (Mon.) to Dec. 7 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of nonconformity management (2)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (3)Status of special maintenance activities related to the extended shutdown (4) Status of operational management (measures for abnormal events) (5) Status of measures in the event of earthquakes and fire (6) Status of non-compliance training by young staffs and managers (surprise inspection) (7) Status of simulator operation on the assumption of earthquake and tsunami (surprise inspection) (8) Status of maintenance and operation related to alarm typer in the event of accident (surprise inspection) 2) Additional inspection items None
Inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of nonconformity management, the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.,” the “status of special maintenance activities related to the extended shutdown,” the “status of operational management (measures for abnormal events),” the “status of measures in the event of earthquakes and fire,” and so on. Basic inspection of the “status of nonconformity management” confirmed that cause analysis, remedial actions, and preventive measures were properly implemented with the establishment of controlled areas in line with the operational safety program and other company regulation, etc., and that processing of nonconformity was accelerated while similar cases and recurrences were properly organized. As the basic inspection of “Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.,” it was also verified that the inspection plan for the facilities was properly developed and the door closing and facility operation trainings along with the completion of installation of the steam generator direct water supply facilities of Tomari Units 1 and 2 as well as measures against flooding with 15 m above sea level for Reactor buildings and reactor auxiliary buildings of Tomari Units 1 and 2 as voluntary measures of licensees. The inspection confirmed that the maintenance and management of materials and equipment were performed properly in accordance with the plan. The inspection of ”status of special maintenance activities related to the extended shutdown” confirmed that continuous storage measures were taken for equipment at Tomari Units 1 and 2 from the standpoints of long-term deterioration suppression, the integrity confirmation, and function maintenance, and so on. In addition, it was confirmed with the “nonconformity management record” that no nonconformity attributable to the additional maintenance at Tomari Units 1 and 2, which were completed this November. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tomari Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.8 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of nonconformity management (2)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (3)Status of special maintenance activities related to the extended shutdown (4) Status of design and procurement management (including inspection at the head office) (5) Status of radioactive solid waste management (6) Status of routine operational safety activities in the maintenance and repair section (surprise inspection) (7) Status of nonconformity management by the nonconformity management committee (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of nonconformity management,” the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.,” the “status of special maintenance activities related to the extended shutdown.” and etc.. Basic inspection of the “status of nonconformity management” confirmed that cause analysis, remedial actions, and preventive measures were properly implemented with the establishment of controlled areas in line with the operational safety program and other company regulation, etc., and that processing of nonconformity was accelerated while similar cases and recurrences were properly organized. Inspection of the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” confirmed that the measures were properly carried out such as continuing study on the deployment of the emergency generator on high ground, the establishment of new storage facilities, measures to prevent hydrogen explosions, and the establishment of the command post (key seismic building) as well as the progress of establishment of tide wall in the coastal area in the premise as mid-and-long-term measures. It was also verified that measures against flooding with 15 m above sea level for reactor buildings and reactor auxiliary buildings of Tomari Units 1 and 2 nuclear as voluntary measures of licensees as well as the inspection plan for the facilities were properly developed and that the door closing and facility operation trainings were properly implemented. The inspection confirmed that the maintenance and management of materials and equipment were performed properly in accordance with the plan. The inspection of ”status of special maintenance activities related to the extended shutdown” confirmed that continuous storage measures were taken for equipment at Tomari Units 1 and 2 from the standpoints of long-term deterioration suppression, the integrity confirmation, and function maintenance, and so on. In addition, the inspection of the 17th cycle of special maintenance plan for Unit 1 confirmed that the next additional maintenance plan was developed based on March fuel extraction plan associated with a further extension of plant shutdown period. Inspection of routine inspections and inspection plans regarding electric/measurement control equipment at Tomari Units 1-3 confirmed that responsible divisions developed “inspection schedules” and “inspection frequency charts” at the time of facility introduction, that procedures were properly implemented in case of change, and that it was stipulated that if an inspection was not implemented within an inspection frequency determined in the chart, consultation with the nonconformity management committee should take place and if the excessive inspection frequency was recognized, it was regarded as nonconformity, and so on. No excessively high investigation frequency was identified. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station

	First inspection
Period of inspection	Inspection period: June 11 (Mon.) to June 22 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of maintenance and improvement of the quality management system</u> (2)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (3)<u>Status of nonconformity management, corrective measures, and preventive measures</u> (4)<u>Status of radioactive solid waste management</u> (5) Status of management of environmental monitoring areas and access-controlled areas (6) Status of management of routine tests (surprise inspection)
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of maintenance and improvement of the quality management system" the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," the "status of nonconformity management, corrective measures, and preventive measures" the "status of radioactive solid waste management." and etc.. The inspection of the "status of maintenance and improvement of the quality management system" confirmed that the management review for 2012 were conducted against results of operational safety activities in 2011 in accordance with the company standards, that the power station was setting quality goals and maintenance management targets for departments, reflecting the management review, and the improvement of operational safety activities was continued. Inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed the validity of seawater flood barrier, reinforcement of the water-tight building door, alternative water-sea pump, and hydrogen sensor work with the head office and taken over, and the work or detailed design were progressed in accordance with the mid-and-long term plan. In addition, it was confirmed that the emergency manual was revised at any time as needed and that details of the revision were known to all in the plant. Inspection of the "status of nonconformity management, corrective measures, and preventive measures" confirmed that the nonconformity cause analysis was continued at any time as needed. Inspections of nonconformities in 2011 confirmed that operational safety activities were evaluated to be effective because there were no important safety related event, no recurrence of nonconformity was found, and the number of nonconformities did not grow. In addition, the power station planned to further improve the nonconformity trend analysis method. Inspection of the "status of radioactive solid waste management" confirmed that radioactive solid waste such as concentrated liquid waste and spent resin was stored or conducted safekeeping in a properly managed condition in consideration of capacity. It was confirmed that miscellaneous solid waste was managed and used according to a temporary operation rule. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No operational safety program violations were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Higashidori Nuclear Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of nonconformity management, corrective measures, and preventive measures</u> (2) Status of safety culture development activities (3)<u>Status of management of inspection and servicing associated with extended shutdown</u> (4) Status of emergency measures (5) Status of radiation management (6) Status of routine tests (surprise inspection) 2) Additional inspection items None
Inspection results	The inspection items based on the basic policy were: the "status of nonconformity management, corrective measures, and preventive measures" and the "status of management of inspection and servicing associated with extended shutdown." In addition, inspections of the "status of safety culture development activities," the "status of emergency measures," and the "status of radiation management" were conducted. the "status of routine tests" was selected as a surprise inspection item and the inspection was performed. Inspections of the "status of nonconformity management, corrective measures, and preventive measures" confirmed the registration of events, judgment of nonconformity categories and requirement of corrective measures, decisions about proposed measures, Implementation of measures, etc. were properly conducted and that measures were properly managed without any delay. Inspection of the "status of safety culture development activities" confirmed that activity evaluation results and desires for improvements from the authority were reported to the top management, efforts were made to improve the activity plan for FY 2012, and additional study materials were being prepared. Inspections of the "status of management of inspection and servicing associated with extended shutdown" confirmed that since July 2011 when periodic inspection works necessary after the suspension of plant were completed, changes of the maintenance plan for Higashidori Unit 1 were reported to the national government twice due to the extended shutdown of plant, that individual inspection plans were developed in advance to implement additional inspections, etc. so that the predetermined inspection frequency could not be exceeded, and that no facility/equipment exceeded the inspection frequency as of the inspection period. Inspection of the "status of emergency measures" confirmed that the emergency preparedness action plan stipulated the notification route to external organizations in the event of accident, that the establishment of key seismic buildings were studied and flood barrier and seawall works, etc. were pursued according to plan, and that education materials on tsunami safety measures were developed and the training was offered to all personnel in the power station based on lessons learned from the accident at the Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Co., Inc. (hereinafter "Fukushima Daiichi Nuclear Power Station") Inspection of the "status of radiation management" confirmed that the radiation management was properly implemented in accordance with the procedure. In addition, it was confirmed that as preventive measures to prevent intentional dishonest actions in radiation protection, in addition to a check by the machine system and a checker at an entrance and exit gate, the dose comparative evaluation was conducted with APD and glass badge, that educations in compliance and the nuclear safety were given to all workers, and that the compliance was one of terms and conditions of the agreement with subcontractors. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. In addition, the status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No operational safety program violations were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Higashidori Nuclear Power Station

	Third inspection
Period of inspection	Inspection period: Nov. 26 (Mon.) to Dec. 7 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of maintenance and improvement of the quality management system (2) Status of safety culture development activities (3)Status of nonconformity management, corrective measures, and preventive measures (4)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (5) Status of internal audits (6) Ensuring of recording and record retention in the event of accident (surprise inspection) 2) Additional inspection items None
Inspection results	The inspection items based on the basic policy were: the "status of maintenance and improvement of the quality management system," "status of nonconformity management, corrective measures, and preventive measures," and the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." In addition, inspections of the "status of safety culture development activities" and the "status of internal audits" were conducted. Moreover, "ensuring of recording and record retention in the event of accident (surprise inspection) " was selected as a surprise inspection and the inspection was conducted. The "status of maintenance and improvement of the quality management system" was inspected at the head office, too. Inspections of the "status of safety culture development activities" and the "status of internal audits" were conducted only at the head office. The general nuclear safety manager for the Arai region (in charge of the Aomori region) joined inspections at the head office. The inspection of the "status of maintenance and improvement of the quality management system" examined the business process of the head office related to the development of the quality targets of the power stations and found that the head quarter directed all power stations and confirmed detailed activities of the power stations in accordance with the company standards. In addition, the inspection of the status of management review of the first half of FY2012 confirmed that the management review was conducted in accordance with the company standard and quality control and maintenance management targets were being reviewed. The inspection of the "status of nonconformity management, corrective measures, and preventive measures" confirmed the horizontal deployment of nonconformities arising at Higashidori Nuclear Power Station and those obtained in the company and from other companies. It also confirmed the head office complied with the internal targets related to the time limit of performing the treatment, managed the progress, and take proper measures. In addition, the continuity of the effectiveness evaluation was confirmed. The inspection drew several samples of nonconformities arising at Higashidori Nuclear Power Station, and confirmed the status such as investigation of causes, taking measures, and so on in accordance with the company standard. In addition, it was verified that the direct cause analysis related to human errors was performed in accordance with the company standard. The inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirms that the studies of filter vent equipment, key seismic buildings, and so on proceeded. In addition, it was confirmed that works related to flood barrier, seawall, and reinforce the water-tight building progressed according to the plan. At the beginning of the year, trainings related to emergency safety measures were planned. It was confirmed that the established trainings were conducted in accordance with the plan. It was confirmed that education materials on tsunami safety measures were developed and the training was offered to all personnel in the power station based on lessons learned from the accident at Fukushima Daiichi Nuclear Power Station of Tokyo Electric Power Co., Inc., The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. In addition, the status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No operational safety program violations were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Higashidori Nuclear Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.18 (Mon.) to Mar.1 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of nonconformity management, corrective measures, and preventive measures (2)Status of management of inspection and servicing associated with extended shutdown (3)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (4) Status of radioactive waste management (5) Status of inspection tours (surprise inspection) (6) Status of fire prevention measures (surprise inspection) 2) Additional inspection items None
Inspection results	The inspection items based on the basic policy were: the "status of nonconformity management, corrective measures, and preventive measures, "Status of management of inspection and servicing associated with extended shutdown" the "status of emergency safety measures of other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," and the "status of radioactive waste management" Moreover, the surprise inspection items were: the "status of inspection tours" and the "status of fire prevention measures." The inspection of the "status of nonconformity management, corrective measures, and preventive measures" draw several samples of nonconformities arising at Higashidori Nuclear Power and confirmed that causes were investigated and treated in accordance with the company standard, properly managed them such as the compliance with the internal target of the time limit of performing the treatment, effective evaluation after corrective and preventive measures were conducted without fail. In addition, it was confirmed the horizontal deployment was properly performed for nonconformities obtained in the company and from other companies. Inspections of the "status of management of inspection and servicing associated with extended shutdown" confirmed that the equipment inspection plan was developed lest the predetermined inspection timing should exceed and that a part of equipment had been inspected. In addition, it was confirmed that there was a mechanism that the excessive timing would be managed as nonconformity and properly coped with and that there was no equipment whose inspection timing exceeded as of the time. The inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirms with action plan plans and result tables that matters reflecting the emergency safety measures, severe accident measures, and stress test evaluation results progressed in accordance with the plan. It was confirmed that as for the emergency contact system, emergency internal/external contact systems had been clearly established and that there were records of external contacts at the time of the latest earthquake and tsunami. Inspection of the "status of radioactive wastes management" confirmed that due to the increase of solid waste storage, a transfer plan for drums and other miscellaneous solid wastes temporarily stored in the turbine building was developed and solid wastes were properly transferred according to the plan, a series of process from an actual preparation of carrying out drums, carrying out, carrying in to a solid waste storage, and storage in an designated area. In addition, it was confirmed that other radioactive solid waste, radioactive gaseous waste, and radioactive liquid waste controls were properly implemented. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. In addition, the status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No operational safety program violations were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(3) Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station

	First inspection
Period of inspection	Inspection period: June 4 (Mon.) to June 15 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (2)Status of nonconformity management, corrective measures, and preventive measures (3)Status of management review (director review) (4) Status of record management (5) Status of inspection tours (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." the "status of nonconformity management, corrective measures, and preventive measures," and the "status of management review (director review)." Basic inspections of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed that short-term measures were properly implemented and managed in line with the quality management system and that improvement was made such as the additional deployment of alternative injection cars, the mid-and-long term measures were properly being implemented according to the plan such as servicing of seawalls and flood barrier and design of alternative emergency seawater pump. Inspection of the "status of nonconformity management, corrective measures, and preventive measures" confirmed that the status of nonconformity management was reported in a quality assurance meeting and that the topic was surely followed. In addition, the inspection of the lost function of emergency auxiliary equipment cooling seawater pump (A) in Unit 1 confirmed that Nuclear Power Reactor Facilities Safety Management Committee reviewed the recurrence prevention measures Implementation plan and that measures approved by the director was pursued. Moreover, it was confirmed that preventive measures were properly managed with a "preventive measure management sheet management record" to prevent potential nonconformities in advance. Inspection of the "status of management review (director review)" confirmed that the effectiveness of the quality management system was reviewed and evaluated in a power station director review at a quality assurance meeting and was used as input information for management review. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (manual start-up test of the emergency diesel generator (A) of Unit 3, etc.), and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Onagawa Nuclear Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (2)Status of maintenance management (3) Status of radiation management (4) Status of internal audits (5) Status of subcontractor's employees' wear of alarm personal dosimeter (6) Status of safety culture development activities (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." the "status of maintenance management." and etc.. Basic inspections of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed that short-term measures were properly implemented and managed such as ensuring materials and equipment were inspected and the deployment of alternative seawater pump, etc. according to plan in accordance with quality management system documents including the "procedure manual related to actions for maintenance of reactor facilities to cope with power supply loss, etc." and that as for the mid-term measures, designs of reactor building vent equipment and hydrogen sensor were progressed according to plan. In addition, the inspection of trainings of emergency safety measures, etc. confirmed that trainings were properly conducted according to a procedure by witnessing the all AC power loss training and PCV vent training. Moreover, it was confirmed that trainings were evaluated in response to emergency drills (comprehensive training) and extracted challenges, etc. were improved by setting the policy and the time limit for the future measures. Inspection of the "status of maintenance management" confirmed that special maintenance plans were developed in accordance with the operational safety program and inspections were properly conducted according to inspection policy and plan based on the "equipment integrity testing plan associated with the Tohoku District - off the Pacific Ocean Earthquake." The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (manual start-up test of the emergency diesel generator (B) of Unit 1, etc.), and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Onagawa Nuclear Power Station

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<tr><th></th><th>Third inspection</th></tr>
<tr><td>Period of inspection</td><td>Inspection period: Dec. 3 (Mon.) to Dec. 14 (Fri.), 2012</td></tr>
<tr><td>Inspection items</td><td>1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy)
(1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u>
(2)<u>Status of maintenance management</u>
(3) Status of procurement management
(4) Status of radioactive waste management
(5) Status of maintenance and check related to alarm records (surprise inspection)
2) Additional inspection items
None</td></tr>
<tr><td>Inspection results</td><td>Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” the “status of maintenance management.” and etc..
Basic inspections of the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” confirmed that materials and equipment were inspected without fail in accordance with the ”procedure manual related to actions for maintenance of reactor facilities to cope with power supply loss, etc.” Inspection of the mid-term measures confirmed that the installation of a reactor building vent equipment and a hydrogen sensor were pursued according to plan.
In addition, it was confirmed that as further measures, in order to reinforce the emergency power supply for the high located crisis center, the installation of emergency generator on the roof and the high-ground power supply center aimed at the diversification of power supply and the promotion of the cable connection of power-supply car.
Inspection of the “status of maintenance management” confirmed that special maintenance plans were developed in accordance with the operational safety program and inspections were properly conducted according to inspection policy and plan based on the ”equipment integrity testing plan associated with the Tohoku District - off the Pacific Ocean Earthquake.”
In addition, it was confirmed that the following inspection policies were developed to prepare for a further extension of shutdown: ”important system and equipment required for the safety management, which were being operated (standby) during the shutdown, should be inspected as required (safety maintenance inspection),” ”the Implementation period should be determined and proper process control should be conducted,” and ”with view to the maintenance management of facilities during the plant shutdown, maintenance patrol, etc. (inspection tour of facilities, routine witness of operations, and alternative performance check) should be implemented.”
The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified.
The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (manual start-up test of the emergency gas treatment system (A) of Unit 3, etc.), and so forth. No particular issues were identified.
In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.</td></tr>
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<tr><th></th><th>Fourth inspection</th></tr>
<tr><td>Period of inspection</td><td>Inspection period: Mar.4 (Mon.) to Mar.15 (Fri.), 2013</td></tr>
<tr><td>Inspection items</td><td>1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy)
(1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u>
(2)<u>Status of maintenance management</u>
(3)<u>Status of nonconformity management, corrective measures, and preventive measures</u>
(4) Status of safety culture development activities
(5) Status of operational safety education (surprise inspection)</td></tr>
<tr><td>Inspection results</td><td>Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.,” the “status of maintenance management,” the “status of nonconformity management, corrective measures, and preventive measures,” and so on.
Basic inspections of the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” confirmed that materials and equipment were inspected without fail in accordance with the ”procedure manual related to actions for maintenance of reactor facilities to cope with power supply loss, etc.”
Inspection of the mid-term measures confirmed that reactor building vent equipment, a hydrogen sensor, and the high-ground power supply center were established according to plan and that the instructions would be completed at the end of this year.
In addition, the inspection of installation work of emergency generator on the roof to reinforce the emergency power supply for the crisis center confirmed as additional measures confirmed the progress of the work according to plan.
Inspection of the “status of maintenance management” confirmed that special maintenance plans were developed in accordance with the operational safety program, that based on the ”equipment integrity testing plan associated with the Tohoku District - off the Pacific Ocean,” the Implementation period is determined for equipment which was continuously operated during the plant shutdown and important system equipment required to ensure safety in the standby condition, proper process management should be conducted, and that inspections were properly carried out according to the inspection plan.
In addition, it was confirmed with the ”maintenance procedure manual” that the system to be used as the nonconformity management if the system and inspections were not conducted in accordance with the plan when the inspection plan was changed.
Inspections of the “status of nonconformity management, corrective measures, and preventive measures” confirmed if any nonconformity arises, it was coped with without fail in accordance with the ”procedure manual for nonconformity management, corrective actions, and preventive measures,” etc. in response to results of the nonconformity study group. In addition, it was confirmed that corrective and preventive measures were reported to the nonconformity study group to prevent recurrence and prevention and that effectiveness of corrective measures was evaluated.
The inspections confirmed that operational safety activities for inspection items other than those above were properly carried out in line with the operational safety program. No violations of the operational safety program were identified.
The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (manual start-up test of the emergency diesel generator (B) of Unit 3), and so forth. No particular issues were identified.
In addition, the response to the deviation from operational limits arising during the safety inspection period was confirmed.
In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.</td></tr>
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(4) Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station

	First inspection
Period of inspection	Inspection period: Jul. 24 (Mon.) to Aug. 10 (Fri.), 2012
Inspection items	1) Basic inspection items (1) Status of quality assurance (2) Status of operational safety education (3) Status of operational safety activities related to radioactive waste management (4) Status of operational safety activities related to a shared spent fuel pool (5) Status of operational safety activities related to the maintenance function of inert atmosphere in a containment (6) Status of radiation management (7) Status of improvement related to instruction documents from Nuclear and Industrial Safety Agency (8) Status of improvement related to remarks at the previous operational safety inspections (9) Status of emergency gas treatment system routine test and manual start-up tests of the auxiliary common diesel generator (surprise inspection) (10) Unauthorized use of subcontractor's employees' wear of alarm personal dosimeter (additional confirmation) 2) Additional inspection items None
Inspection results (continued)	Operational safety inspections were conducted at Fukushima Daiichi Stabilization Center and Fukushima Daiichi Nuclear Power Station on basic inspection items such as the quality assurance added to the previous operational safety program, the operational safety education, the maintenance function of inert atmosphere in a containment, the status of radioactive waste management, the radiation management, the status of compliance with the operational safety related to a shared spent fuel pool as well as improvement instruction documents from NISA and the confirmation of status of remedial actions in response to the remarks pointed out by the previous operational safety inspections. Inspections of the status of quality assurance and the status of operational safety education confirmed that the internal audit and nonconformity management were conducted in accordance with manuals and that the education was conducted for targets without fail. As for the status of radioactive waste management, arising rubble and so on were stored in a proper storage and recorded depending on the dose rate, etc. In addition, radioactive concentrations of gaseous waste released from reactor buildings and common ventilator stack and radioactive gaseous waste released from containers were measured and it was confirmed that the radioactive concentration outside the Environmental Monitoring Area was controlled so that the concentration could not exceed the concentration limit of the notice of radiation doses. It was confirmed that the emergency gas treatment system and the instrumentation for release management were properly inspected in accordance with the developed inspection plan. As for the status of operational safety activities related to a shared spent fuel pool, it was confirmed by making inspection tours in accordance with patrol check sheets that the activities were properly conducted such as the establishment of manuals, etc. to cope with earthquakes and abnormal events as well as the check of pool water level, water temperature, and the presence or absence of instrumental anomalies, the Implementation of routine trainings and so on. As for the status of the maintenance function of inert atmosphere in a containment, it was confirmed by making inspection tours in accordance with patrol check sheets that the operation safety activities were properly conducted such as subcriticality monitoring of the reactor with the equipment and monitoring and evaluation of hydrogen gas concentration in a container as well as checking whether there was any anomaly in equipment including air filtration system. The inspection of the status of radiation management confirmed that the notification of access restrictions imposed on workers to a high-doze area by providing information such as a high-dose survey map and management of calibration of measuring instruments to be used for contamination inspection in the access control were properly conducted. However, it was recognized that subcontractors' employees work on site without wearing any pocket dosimeter with alarm (hereinafter "ADP") and that the licensees did not take sufficient measures to make workers wear APD. It was classified as "observation" as an item requiring the improvement of operational safety activities.

Inspection results	As for the improvement instruction documents from NISA, the confirmation of the status of improvement on site resulted in a recognition that a waterproof treatment had not been given around a manhole at the Desalinaction Facility, the number of monitoring cameras is not sufficient in the tank area, and a waterproof treatment on It was confirmed that instruction items other than these were properly implemented and the improvement measures had been completed. It was confirmed that "insufficient maintenance management plans," which was judged as violation in the status of improvement in response to the remarks pointed out by the previous operational safety inspections, had been completed, excluding the maintenance plan for building, etc., in process of creation, whose on-site confirmation was difficult due to high dose. In addition, inspections of the status of 4 items, which NISA gave improvement instructions to, confirmed that in response to violations, manuals, etc. were upgraded, the "development of maintenance plan" had been completed and the "structure required to change the operational safety program" had been established. On the other hand, "acquisition of staffs and systems" and the "involvement of the top management" were under review. Their status of improvement was to be further monitored. The following two cases among 8 cases were classified as "observations" and need to take further recurrence prevention measures and were to be continuously monitored. In "the system in inspection tours is partially unclear," the system pointed out in the previous inspection was improved, but the authorities of GM in 4 sections related to radiation management and those of the restoration foreman responsible for earthquake disasters and accidents, the post held by the same GM, were not clear. In the "place of the company regulation used in operational safety activities," the association with manuals, etc. pointed out in the previous inspection was improved. But this inspection found that the guide showing Implementation procedures of nonconformity management, etc. were not associated with higher ranking documents, and that the maintenance management manual for radiation measuring instruments quoted from chapters other than Chapter 12 of the operational safety program. It was confirmed the improvement of the other 6 "observations" were completed by revising manuals, etc. stipulating procedures and so on. In response to instructions from NISA during the operational safety inspection, the fact situation of the unauthorized use of APD by subcontractor's employees. As a result, it was found that licensees made changes before and after the earthquake: ensuring that workers wear APD due to damages of entry/exit management facilities on site and submitting radiation management plans from suppliers, which were required in an agreement. After the earthquake, the radiation protection education such as the compliance of wearing APD after the earthquake disaster. Suppliers did not reflect the influence of the accident in submitting radiation management plans, which were required by the agreement. The internal audit of suppliers related to the radiation management had not been implemented in the past. It was not recognized that the licensee made sufficient efforts to prevent the unauthorized use of APD. The licensee submitted a report on this event (dated August 13). On August 20, NISA evaluated it and is to take necessary measures in the future based on items confirmed in the operational safety inspection. The status of daily operational management activities during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified, because the operation logbook, takeover logbook, inspection tours of buildings of high seismic importance, etc. demonstrated that the operators were constantly stationed in buildings of high seismic importance and the tasks of each shift supervisor were duly taken over by the next shift supervisor. In addition, inspection of on-site implementation of operational safety activities confirmed by witnessing routine tests of the emergency gas treatment system of Unit 5 that tests were conducted in accordance with the procedure and the equipment integrity was established. In consideration of inspection results above, it was judged that as for operational safety activities related to selected inspection items, summarizing the operational safety inspection, the operational safety program is generally complied with except one monitoring item pointed out in the status of radiation management. In addition, the improvement status is to be further monitored in safety inspections, etc. in order to ensure operational safety activities in compliance with the operational safety program and the measures to improve the reliability of medium-term facility management plan.

	Second inspection
Period of inspection	Inspection period: Dec. 3 (Mon.) to Dec. 18 (Tue), 2012 During the above period, an additional inspection was conducted on Dec.14, 2012 (Fri.) and Dec. 17, 2012 (Mon.)
Inspection items	1) Basic inspection items (1) Status of operational safety activities related to the reactor injection system (2) Status of operational safety activities related to contaminated water treatment system (3) Status of operational safety activities related to electric equipment (4) Status of operational safety activities related to the management of rubble produced on a premise of the power station (5) Confirmation of "recording and record retention in the event of accident" (surprise inspection) (6) Status of radiation management (surprise inspection) (7) Status of remedial actions in response to past violations 2) Additional inspection items (1) Insufficient maintenance management plan (2) Violations of the operational safety program in components with overdue inspections at the Kashiwazaki -Kariwa Nuclear Power Station, the Fukushima Daiichi Nuclear Power Station, and the Fukushima Daini Nuclear Power Station.
Inspection results (continued)	The basic inspection items in this operational safety inspection were: confirmation of the status of compliance with operational safety activities related to the management of reactor injection system facilities, contaminated water treatment system facilities, electric equipment, and rubble produced on a premise of the power station, and confirmation of the status of improvement measures related to the past violation items including those whose improvement status (one observation and two violations) were to be confirmed in the fourth operational safety inspection in FY 2010, which was interrupted by the earthquake. Moreover, the basic inspections of the status of radiation management and"ensuring of recording and record retention in the event of accident," which was reported in September 2012, were carried out as surprise inspections and confirmation was made. Inspection of the reactor injection system facilities confirmed that the operation and the maintenance managements were properly conducted according to manuals. It was confirmed that maintenance plans were developed for newly installed refrigerator for buffer tank, core spray system line of reactor injection pump in the turbine building, and necessary manuals were upgraded. Inspection of education and training related to the reactor injection system facilities confirmed that study materials were prepared and that trainings were conducted according to plan depending on abilities of key members. Inspection of the procurement management of the reactor injection system facilities confirmed with construction procedure manuals and reports that the constructions on site satisfied the procurement requirement items and the qualifications of polyethylene pipe constructions with instruction procedure manuals and workshop participant lists at the time of attending trainings by private companies. Inspection of nonconformity management confirmed that the deviation from operational limits on reactor injection flow at Unit 3 on November 26 and the ongoing natural decrease of the reactor injection water amount were properly handled according to manuals. Inspection of on-site Implementation of operational safety activities related to reactor injection facilities around the regular/emergency high-ground reactor injection pump confirmed they were properly conducted by witnessing the status of inspection tours of the licensee on site and that the necessary number of hoses was deployed by confirming fire hoses required to take measures against the reactor injection facilities in an emergency. In consideration of the confirmation results above, it was judged that the operation/maintenance/nonconformity management of the reactor injection system facility was conducted according to manuals and that the status of operational safety activities was proper.

Inspection results (continued)	Inspection of contaminated water treatment facilities confirmed that replacement list and a supply list were prepared in accordance with the guide and that the evaluation of necessary amounts of replacement and regular replacement and replenishment of supplies, and other management was conducted. It was recognized that actual and estimated wastes generated in operation and maintenance activities of facilities associated with contaminated water treatment were reported to the waste management group according to the manual. In addition, it was confirmed that the storage management of spent cesium adsorption tower was conducted in accordance with the management manual. It was confirmed that there was a plan add temporary storage facilities in succession to secure places to store the amount of wastes generated through operations of cesium absorption system, the second cesium absorption system and the Advanced Liquid Processing System (ALPS).It was confirmed that the abilities of operators required to operate and maintain facilities related to contaminated water treatment were judged according to manuals, necessary abilities were clarified, educations and trainings were given, and records were kept. It was confirmed that inspection tours of facilities associated with contaminated water treatment were properly implemented according to manuals. Inspection of nonconformity management checked the status of management of groups responsible for water treatment and found that nonconformities related to nuclear and radiation safety, etc., which should be managed by the organization, were managed as other nonconformities. There were no clear criteria for nonconformities to be managed by the organization. GM personally made decisions, which lead to variability. This was classified as operational safety program violation (observations). With a view to recurrence prevention of leak related to evaporation concentration device, on-site reviews of water-proof coat on RO-3 floor and weirs at the installation place of oil separation device. It was also confirmed that the overflow from the weir was evaluated in case a leak from the device occurs. In addition, it was confirmed by on-site review of the status of work to change of accumulated water transfer pressure hose at Unit 3 into polyethylene pipe that the work was properly implemented. The event of treated water leakage caused by disconnection of drain hose at the Desalinaction Facility 3 on December 10, 2012 during the operational safety inspection was required to rebuild the desalinaction facility and improve the operation management. This event was classified as operational safety program violation (observations). The cause of leakage of filtered water in a corridor on the 1st floor of the Unit 3 turbine building on December 11, 2012 was a failure to implement some preventive measures suitable for a careful method of equipment operation on the assumption that a hose might detach a joint according to past cases. This was classified as an operational safety program violation (observations). In consideration of the confirmation results above, it was judged that the operation/maintenance/nonconformity management of the contaminated water treatment facilities was conducted according to manuals and that the status of operational safety activities related to contaminated water treatment facilities was proper. Inspection of electric equipment confirmed that manuals were upgraded along with the additional facilities for the southern 66 kV switchyard equipment, auxiliary common M/C2B, auxiliary common diesel generators (A) and (B), southern 66 kV switchyard, and metal-clad remote monitoring instruments, and the maintenance plan was developed based on them, and changes in procedures, manuals, etc. were properly conducted. It was, however, confirmed that since the new installation and improvement of facilities at the stabilization center, the delegation procedure to the facility management point (the power generation section) had not been established. There was a risk that in the future, functional requirements of equipment might not be ensured and that the conditions might not be fully managed. As a process necessary for the operation had not been established, this event was judged as an operational safety program violation (observations).In this event, the process required for the operation had not been established. It was classified as a violation of the operational safety program (observation). The maintenance management was conducted for emergency diesel generator, electric equipment (M/C) and related mechanical equipment at Units 5 and 6 according to the "long-term inspection plan for Unit 5 (Unit 6) at Fukushima Daiichi Nuclear Power Station associated with the extended shutdown after the earthquake." It was confirmed that the routine tests for emergency diesel generators at Units 5 and 6 and the notice of the record were properly implemented. As for electric equipment, it was confirmed at the shared spent fuel pool building, their installation status of diesel generators (A) and (B) common on the premise and the related equipment was proper.

Inspection results (continued)	In consideration of the confirmation results above, it was judged that the operation/maintenance management of electric equipment was properly conducted according to manuals and that excluding observation items above, the status of operational safety activities was proper. It was confirmed that a temporary storage area was established according to the procedure based on manuals to manage the rubble, etc. generated on the premise of the power station. As measures to achieve the site-boundary dose 1mSv/year, a distance to the site boundary and a shielding of cover soil, etc. in selecting a possible storage of rubble of high-level radioactivity were considered. It was confirmed that the established temporary storage area reflected actual surface as well as measures were studied: rubble of high-level radioactivity should be moved to the center of the site, and the self-shielding effect of rubble should be used. The estimated value of site-boundary dose from a cover-soil temporary storage facility was 0.058 mSv/year for 1-4 tanks. It was confirmed that in transferring rubble, a temporary storage or carrying out was applied with management sheet in accordance with a manual and that contents confirmation, designation of temporary storage area, and measures at the time of shipment were noticed. It was confirmed that for a temporary storage at a cover-soil temporary storage facility, metal rubble were mixed with concrete rubble and regardless of rubble types, rubble were arranged to enhance the storage efficiency to the maximum extent, and anti-scattering measures were taken in shipment. It was confirmed that the analysis and inspection tour of space dose rate, radioactivity concentration in the air, and subsurface water at a cover-soil temporary storage facility were conducted in accordance with manuals and guides, and the measurement and inspection tour results were recorded and managed. The plan said in principle, materials required during abnormal events would be procured every abnormal event. But it was confirmed that spare parts would be obtained in advance to prepare for highly probable events such as breakages of film materials for accordion type and ordinary tents. On-site reviews related to the management of rubble, etc. confirmed that cover-soil temporary storage facilities and temporary storage equipment (A tent) accommodated rubble properly and β contaminant was properly stored on E yard. In consideration of the confirmation results above, it was judged that the operation management of rubble produced on the premise of the power station was properly conducted according to manuals and that the status of operational safety activities was proper. Inspection of the current equipment specifications and the maintenance management method of Alarm typer at Units 5 and 6 were conducted as a surprise test including on-site reviews to confirm whether the descriptions in the report "Ensuring of Recording and Record Retention in the Event of Accident" submitted from the licensee in September 2012 match the actual status. Details of reports had no conflict with actual equipment and were proper. In addition, inspections of details of alarms given from an alarm device over the operational limits stipulated in Chapter 12 of the operational safety program in the remote monitoring room and in the water treatment control room of the important anti-seismic building. The scope of alarms in the remote monitoring room of the important anti-seismic building was not clear, and records required by the operational safety program could neither be made nor kept properly. This was classified as operational safety program violation (observations) . It was confirmed that the details of alarms generated from an alarm device in the water treatment control, which was required by the operational safety program, was properly selected and recorded. As for radiation management, an on-site review was conducted centering on recurrence prevention measures for "subcontractors' workers not wearing APD" event to confirm the exposure management was properly implemented. It was judged based on confirmation results that the daily exposure management on site was properly implemented. Inspection of the status of improvement measures for the past violation items confirmed the status of two "observations" in the first operational safety inspection in 2011, i.e., the status of partial uncertain of "the system in inspection tours is partially unclear" and "position of the company regulation used in operational safety activities." As the improvement was identified and completed. In addition, the status of countermeasures for "observations," that is, "subcontractors' workers not wearing APD" was confirmed. So far, the events have not recurred and the status has been improved. The effectiveness is to be further monitored in the future. One observation and two violations were to be confirmed in the fourth operational safety inspection in FY 2010, which was interrupted by the earthquake. The state of improvement was confirmed.

Inspection results	The statuses of measures of the "improper connection of radioactive liquid waste with the drain piping of nonradioactive liquid waste treatment system and the release at Fukushima Daiichi, Fukushima Daini, and Kashiwazaki-Kariwa Nuclear Power Stations" and the "lost function of the reactor core isolation cooling system at Unit 5 of Fukushima Daiichi Nuclear Power Station" were confirmed, and the confirmation was completed as the improvement was identified. As for the "evaluation error of the minimum service temperature of the reactor pressure vessel at Fukushima Daiichi Nuclear power station," most countermeasures had been completed, but measures in accordance with the authorized impact statement have not been taken. The status of improvement is to be further monitored in the future. Additional inspection items were the "insufficient maintenance management plan" and "violations of the operational safety program in components with overdue inspections at the Kashiwazaki-Kariwa Nuclear Power Station, the Fukushima Daiichi Nuclear Power Station, and the Fukushima Daini Nuclear Power Station." However, both measures were under review or had been being implemented. The status of improvement is to be further monitored in the future. The status of daily operational management activities during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified, because the operation logbook, takeover logbook, inspection tours of important anti-seismic building, etc. demonstrated that the operators were constantly stationed in important anti-seismic building and properly monitor the status of the plant, and the tasks of each shift supervisor were duly taken over by the next shift supervisor. In addition, the inspection of on-site Implementation of operational safety activities confirmed by witnessing a leak test of polyethylene pipe in the accumulated water transfer line of Unit 3 that the tests were conducted in accordance with the procedure and the equipment integrity is established. In consideration of inspection results above, it was judged that summarizing the operational safety inspection in this quarter, operational safety activities associated with selected inspection items were properly conducted excluding 5 observation items. The nuclear regulation authority is to further monitor the status of improvement through operational safety inspections to ensure operational safety activities were in accordance with the operational safety program,

	Third inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.12 (Tue.), 2013 During the above period, an additional inspection was conducted on Mar. 8 (Fri.), 2013, and Mar. 11 (Mon.), 2013
Inspection items	1) Basic inspection items (1) Status of operational safety related to operation monitoring (2) Status of operational safety activities by the chief engineer (3) Status of record and reporting (4) Status of monitoring inspection of reactor containment gas management equipment (surprise inspection) (5) Status of operational safety activities related to radiation protection of subcontractors (surprise inspection) (6) Status of remedial actions in response to past violations (monitoring item) 2) Additional inspection items (1) Insufficient maintenance management plan (2) Violations of the operational safety program in components with overdue inspections at the Kashiwazaki -Kariwa Nuclear Power Station, the Fukushima Daiichi Nuclear Power Station, and the Fukushima Daini Nuclear Power Station.
Inspection results (continued)	The basic inspection items of operational safety inspection were the status of operational safety activities related to operation monitoring of reactor injection system, pools of spent fuel, etc. and the confirmation of the status of remedial actions related to the past violations. Moreover, the basic items were carried out: the status of monitoring inspection of reactor containment gas management equipment and the status of operational safety activities related to radiation protection of subcontractors. In addition, the additional inspection items were carried out to examine the status of maintenance management: the insufficient maintenance management plan and the violations of the operational safety program in components with overdue inspections at the Kashiwazaki-Kariwa Nuclear Power Station, the Fukushima Daiichi Nuclear Power Station, and the Fukushima Daini Nuclear Power Station The inspection of the status of operational safety related to operation monitoring confirmed by reviewing the shift organizational chart, specified training management card, shift supervisor takeover logbooks, etc. that the system for operators, their acquisition, and takeover were properly carried out, by reviewing operation logbooks, patrol check sheets, etc. that operation monitoring, actions at the time of alarms actuation, and checks of operational limits were properly carried out, by reviewing water quality measurement result reports, etc. that water quality management was properly carried out, and by reviewing nonconformity management reports that the nonconformity management was properly carried out. In addition, it was confirmed by a witness in a centralized monitoring room in a key seismic building that the status of operation monitoring by a shift member and the status of shift takeover were properly conducted. In consideration of the confirmation results above, it was judged that the operation/maintenance/nonconformity management of the contaminated water treatment facilities was conducted according to manuals and that the status of operational safety activities was proper. Inspection of operational safety activities by chief engineers confirmed that the chief of nuclear/siting appointed two chief engineers and four acting engineers with certificates of approval for nuclear chief engineer appointment and dismissal and that duties were properly carried out during the absence of a chief engineer with certificates of approval for nuclear acting engineers and certificates of approval for reviews by Nuclear power station Safety Management Committee reviews. Inspection of the inspection of chief engineers' duties confirmed with target records that when they judge the operational limits were not satisfied, and when they judge the operational limits were satisfied, they checked reports from the first operation manager, when they received a report, which they judged did not satisfy the operational limits, they reported information they checked on their own and the supervision condition of the operational safety to the president, and examined operation and daily logbooks, etc..

Inspection results (continued)	In addition, it was confirmed with certificates of approval for nuclear acting engineers that the job takeover from a chief engineer to an acting engineer, etc. was properly conducted, and that the jobs of two nuclear chief engineers in event of emergency were clarified by the "place and role of reactor chief in the event of nuclear emergency." In consideration of the confirmation results above, it was judged that the duties of chief engineers, takeover from a chief engineer to an acting engineer, and delegated duties during the absence of a chief engineer were properly conducted according to manuals and that the status of operational safety activities related to chef engineers was proper. Inspection of the status of record and report confirmed with records prepared by GMs and the status of retention that records were made and retained according to the document and record management basic manual. A shift (member) and the power station GM prepare operation logbooks, digital recorder data, patrol check sheet as records. It was determined that technical GM is responsible for retaining these records excluding some exceptions. Due to influences of accidents at Fukushima Daiichi Nuclear Power Station, centralized control points have not been secured, and the records were not delegated to technical GM but the shift and the power station GM, authors, kept records. At present, Technology GM is establishing centralized control points and plans to accept records when they were ready. The status of record keeping by Technology GM in future safety inspections, etc. is to be monitored in the future. Health and Safety GM creates individuals' original records for dose control as dose control records of personnel engaged in radiation work; The records related to the dose in 2012 would be prepared in the same way as before the accident. The status is to be further monitored in future safety inspections, etc. It was confirmed that the 2010-2011 annual dose limit record, which had been delayed due to the influence of the accidents at Fukushima Daiichi Nuclear Power Station, will be created in 2012. In addition, it was identified that though preservation periods of records stipulated in the operational safety program were satisfied, the period of records described in primary documents is different from that described in tertiary documents. At present, the program is being revised. The status of record keeping by Technology GM in future safety inspections, etc. The information of the preservation periods is to be further monitored in future operational safety inspections. The inspection of reports confirmed what happened if it was judged that reports do not satisfy operational limits: the deviations from the operational limits related to the reactor injection system on August 30 and November 26, 2012 were properly reported to the director of the stabilization center, the director, chief engineer, and the president. In consideration of the confirmation results above, it was judged that the status of records and reports is proper: records were created and preserved properly and the preservation period of records is adequately established, and necessary reports were conducted according to manuals. The monitoring inspection of reactor containment gas management equipment is conducted. In order to confirm if operational safety activities related to the inspection were properly carried out, inspections of maintenance management, quality assurance, plans, and other activities were carried out as surprise inspections including on-site reviews. The inspections confirmed that inspection items, maintenance modes, inspection intervals, etc. were double-checked in preparing long-term inspection plans in accordance with maintenance manuals and inspection/care guides, that the first inspection should be conducted within 17 months though a basic inspection interval is 24 months and the validity of maintenance modes and inspection intervals was evaluated by conducting a simplified drift evaluation, etc., using inspection results, that as for the safety measures before inspection, no deviation from the operational limits was found by checking the stop range and determining the details of the measures, a judgment of approval of inspections was made by design documents, that nonconformity events arising in inspections were handled properly by nonconformity management reports, that as for nonconformities related to long-term inspections, inspection results could be properly reflected in a long-term inspection schedule, and that as for the procurement management related to inspections, procurement requirements were examined by additional specifications and instruction procedure manuals.

Inspection results (continued)	In consideration of the confirmation results above, it was judged that monitor inspections of reactor containment gas management equipment were properly carried out in accordance with manuals and the status of operational safety activities related to monitor inspections of reactor containment gas management equipment is proper. Inspections of status of operational safety activities related to the radiation protection of subcontractors were conducted as surprising inspections because in two events of “working with full-face masks without dust filters” in February 2013 (a worker used a full-face mask without any dust filter in a “instruction of cover-soil-over-felled trees temporary storage facility” on an old viewing platform in a premise of Fukushima Daiichi Nuclear Power Station on February 1, 2013 and dust filter was removed from a full-face mask worn by a worker in an old ground in a premise of Fukushima Daiichi Nuclear Power Station in February 14) consecutively occurred. Inspection confirmed that the basic manual of radiation management stipulates the standard for wearing protective equipment as a radiation management during work, that radiation management specifications require subcontractors to wear protective equipment, checkup before use, and inspect protective equipment as protective garment/equipment management as a compliance item in the management of entry in a controlled area. However, in February 1 event, the worker did not conduct a final check of protective equipment required by the manual at the time of wearing a full-face mask (leak check, etc.) and in February 14 event, the worker made the final check of protective equipment at the time of wearing a full-face mask, but found no filter was attached to the masks during travel after the completion of work and did an on-site review. The filter fallen from the mask was found on site. Inspections of the operational safety activities of licensees in these events confirmed that the licensee did not check the status of compliance of subcontractors in the radiation protection and that as for the distribution of protective equipment in the basic manual of radiation management, the procurement requirements given to subcontractors when licensee consigned the distribution of masks to subcontractors did not include a confirmation inspection of filter installation on masks, and that the subcontractors did not have any procedure or inspection requirements for the distributions of masks with filters installed without fail. Based on these confirmations, it was judged that the management was not sufficient and licensees failed to ensure the confirmation and distributions of protective equipment. In consideration of the confirmation results above, the radiation protection by subcontractors in a controlled area stipulated in Chapter 12 of the operational safety program was judged as violations of operational safety program (observations) because the final check of protective equipment and the management of protective garment/equipment distribution were not sufficient. Inspection of the status of improvement measures for the past violation items (observations) found in examining the status of one ”observation” case in the second operational safety inspection in 2010, i.e., the status of the ”evaluation error of the minimum service temperature of the reactor pressure vessel at Fukushima Daiichi Nuclear power station,” found that measures had not been completed. The status of improvement is to be further monitored in the future. Inspection of one ”observation” case in the first operational safety inspection in 2012, that is, ”subcontractors' workers not wearing APD” confirmed the status of measurements. The confirmation of the status of improvement was completed because the event has not recurred and the improvement has been made since the Implementation of measures. The effectiveness is to be further monitored in the future. The status of improvement of five ”observations” in the second operational safety inspection in FY 2012 had been confirmed: ”procedure of delegation of newly installed and improved equipment to the power generation sector,” ”unclear controlled criteria in the nonconformity management,” ”shortage of selection of alarms given from alarm devises on the operational limits stipulated in the operational safety program,” ”treated water leakage caused by disconnection of drain hose at the Desalinaction Facility 3,” and ”leakage from hose for transfer of the filtered water in the Unit 3 turbine building.”

Inspection results	Two additional inspection items were ”insufficient maintenance management plans” and the ”violations of the operational safety program in components with overdue inspections at the Kashiwazaki-Kariwa Nuclear Power Station, the Fukushima Daiichi Nuclear Power Station, and the Fukushima Daini Nuclear Power Station.” Both measures were under review or during the Implementation. The status of improvement is to be further monitored in the future. The status of daily operational management activities during the safety inspection period was examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth The operation logbook, takeover logbook, inspection tours of buildings of high seismic importance, etc. demonstrated that the operators are constantly stationed in buildings of high seismic importance and properly monitor the status of the plant, and that the tasks of each shift supervisor are duly taken over by the next shift supervisor. In addition, from March 4 to 8, Article 136 of the operational safety program was applied and the shift out of operational limits was made according to the plan to implement the maintenance work of device for separating nitrogen gas. It was confirmed that proper measurements were taken for them. Summarizing the operational safety inspection in this quarter in consideration of the inspection results above, we judged that the operational safety activities for selected inspection items were properly conducted. The nuclear regulation authority is to further monitor the status of improvement through operational safety inspections, etc. to ensure operational safety activities were in accordance with the operational safety program,

(5) Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station

	First inspection
Period of inspection	Inspection period: June 11 (Mon.) to June 22 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures</u> (2)<u>Status of the restoration plan</u> (3)<u>Status of maintenance management</u> (4) Status of compliance with operational limits (5) Status of compliance of measures in the event of earthquakes and fire (6) Status of management of access-controlled areas and environmental monitoring areas (surprise inspection)
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures,” the “status of the restoration plan,” and the “status of maintenance management.” and etc. Basic inspections of the “status of emergency safety measures” confirmed that emergency safety measures and measures for severe accidents based on instruction documents from NISA were properly implemented and maintained. Inspections of the “status of the restoration plan” confirmed that measures following the disaster were properly conducted to further ensure the maintenance of cold shutdown in accordance with the restoration plan developed according to the nuclear licensee disaster prevention work plans Inspections of the “status of maintenance management” confirmed that the maintenance management of facilities, etc. required for cool shutdown maintenance was properly conducted according to the ”special maintenance plan” developed due to the extended shutdown of the plant. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Fukushima Daini Nuclear Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1) <u>Status of the restoration plan</u> (2) Status of radiation management (3) Status of radioactive solid waste management (4) Status of subcontractor's employees' wear of alarm personal dosimeter (“APD”) (5) Status of remedial actions in response to past violations (monitoring item) (6) Status of release control of radioactive liquid waste (surprise inspection) 2) Additional inspection items None
Inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of restoration plan,” the “status of radiation management,” the “status of radioactive solid waste management.” and etc. Basic inspections of the “status of the restoration plan” confirmed by focusing on the restoration of Unit 3, which was scheduled to be completed at the end of September 2012 that the restoration measures were properly implemented to further ensure the cool shutdown maintenance in accordance with a ”restoration plan based on the Nuclear Operator Emergency Action Plan.” Inspection of the “status of radiation management” confirmed the changes of the controlled area categories and carrying out of goods out of control area were properly managed. In addition, the inspection of the “status of radioactive waste management” confirmed that temporary miscellaneous solid waste collection places and solid waste storage, etc. were properly managed. Moreover, it was confirmed that as a result of confirmation of the status of improvement by power reactor licensees of the past observation items (about the unrealized accident management education for key support organization members), efforts at improvement were made to clarify the contents and targets of education. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Fukushima Daini Nuclear Power Station

	Third inspection
Period of inspection	Inspection period: Dec. 3 (Mon.) to Dec. 18 (Tue.), 2012 During the above period, an additional inspection was conducted on Dec.14 (Fri.), Dec. 17 (Mon.), and Dec. 18 (Tue.)
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of maintenance management</u> (2) Status of radioactive gaseous waste management (3) Status of fuel management (4) Status of the safety management system (5) Status of maintenance and check related to alarm records (surprise inspection) 2) Additional inspection items Status of remedial actions in response to the violation of the operational safety program
Inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of maintenance management,” the “status of fuel management,” the “Status of maintenance and check related to alarm records.” and etc. The basic inspection of the “status of maintenance management” confirmed that in compliance with the “special maintenance plan” developed during the suspended shutdown of the plant, the maintenance management of facilities, etc. required for the maintenance of cold shutdown was properly conducted. The basic inspection of the “status of fuel management” confirmed that operational limits in the operational safety program were complied with, and that fuels loaded in the reactor at Unit 4 were transferred to a pool of spent fuel in accordance with the work procedure stipulated in manuals, etc. The basic inspection of the “status of maintenance check related to alarm records,” which was conducted as a surprise inspection, confirmed that the printer and the process computer system fully satisfy specifications shown in “ensuring of recording and record retention in the event of accident (September 2012)” and that the maintenance inspection was properly conducted. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. In addition, the inspection of the “status of remedial actions in response to the violation of the operational safety program,” which was implemented as an additional inspection, confirmed that in accordance with recurrence prevention measures against direct factors and recurrence prevention measures based on organization factors would be implemented in the future according to the action plan, etc., and that the event was reviewed by the Nuclear Power Plant Safety Management Committee with the power station director as chairman and by the committee with the chief of nuclear/siting of the head office as chairman and that the root cause analysis results and recurrence prevention measures related to the event were reported to the president. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (manual start-up test of the emergency diesel generator (HPCS) of Unit 2), and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Fukushima Daini Nuclear Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.18 (Mon.) to Mar.1 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures</u> (2)<u>Status of the restoration plan</u> (3)<u>Status of nonconformity management</u> (4) Status of emergency measures (5) Status of operator training (surprise inspection) 2) Additional inspection items None
Inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measure,” the “status of the restoration plan,” the “status of nonconformity management,” the “status of emergency measures.” and etc. Basic inspections of the “status of emergency safety measures” confirmed that measures against severe accidents based on instruction documents from NISA such as emergency safety measures including securing emergency power supply and measures against hydrogen explosions were properly implemented and maintained, those of the “status of the restoration plan” confirmed that in accordance with the “restoration plan based on the Nuclear Operator Emergency Action Plan” developed to further ensure the maintenance of cold shutdown, the residual heat removal system, cooling system, etc. at Unit 2 were restored, those of the “status of nonconformity management,” human-error common factor analysis and nonconformity management related to such errors were properly implemented, those of the “status of emergency errors” confirmed that in determining the on-site organization for nuclear emergency preparedness, staffs, and materials and equipment for nuclear disaster prevention, while the Nuclear Emergency Preparedness committee discussed them, the director approved them in accordance with the operational safety program, and a comprehensive training is annually held to cope with emergencies. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (manual start-up test of the emergency diesel generator (B) of Unit 4), and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(6) Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station

	First inspection
Period of inspection	Inspection period: June 11 (Mon.) to June 22 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures of other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2)<u>Status of maintenance management (inspection in response to problems/challenges based on the results of operational safety inspections in 2011)</u> (3) Status of fuel management (4) Status of periodic assessment of nuclear power reactor facilities (reporting phase) (5) Status of remedial actions in response to past violations (monitoring item) (6) Status of routine tests (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures of other power stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." the "status of maintenance management (the inspection in response to issues and challenges at power stations based on results of inspections in 2011, etc.)" and etc. Basic inspections of the "status of emergency safety measures of other power stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed that the status of measures described in the "Emergency Safety Measures of Kashiwazaki-Kariwa Nuclear Power Station (Implementation Report)" developed by the licensee since the fourth operational safety inspection in FY 2011 was inspected to find that measures were implemented according to plan and that equipment was properly installed. The licensee evaluated the influence over important equipment and facilities in case where a tsunami led to floods into lower floors of buildings. Within about 4 hours from attack by a tsunami, flood from an air conditioning duct hole in the make up water condensate (MUWC) pump room in Unit 1 causes the pump to become inoperative. It was evaluated that some thorough holes require the improvement of water cut-off performance and implement measures. The progress status of emergency safety measures including these are to be monitored in operational safety inspection in the future. Inspection of the "status of maintenance management" examined the status of nonconformity management against inadequacy in maintenance management of measurement control equipment at Units 2-4 during the extended shutdown, which were judged as violation in operational safety inspections in FY 2011, examined the status and Implementation status of recurrence prevention measures, and confirmed that recurrence prevention measures, corrective measures, and preventive measures were being implemented targeted for the first half of FY 2012. In addition, it was confirmed that the maintenance management of shutdown units was conducted in accordance with developed manuals and that effectivity evaluation record sheet was prepared according to a manual on maintenance effectiveness evaluation. As for other basic inspection items, operational safety activities were properly conducted based on the operational safety program. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (manual start-up test of the emergency diesel generator (System A) of Unit 5), and so forth. No particular issues were identified. In consideration of the above, summing up the findings of the first safety inspection in FY 2012, it was judged that the operational safety activities were conducted properly.

<table>
<tr><th></th><th>Second inspection</th></tr>
<tr><td>Period of inspection</td><td>Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012</td></tr>
<tr><td>Inspection items</td><td>1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy)
(1)<u>Status of emergency safety measures of other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u>
(2)<u>Status of maintenance management (inspection in response to problems/challenges based on the results of operational safety inspections in 2011</u>)
(3) Status of management review
(4) Status of internal audits
(5)Status of nonconformity management
(6) Status of management of radiation workers' wear of alarm personal dosimeter
(7) Status of remedial actions in response to past violations
(8) Status of routine tests (with witness) <surprise inspection>
2) Additional inspection items
None</td></tr>
<tr><td>Inspection results (continued)</td><td>The safety inspection was conducted, for which priority inspection items were the “status of emergency safety measures of other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.,” ”status of maintenance management (the inspection in response to issues and challenges at power stations based on results of inspections in 2011, etc.) and for which inspection items were the “status of management review,” the “status of internal audits,” and the “status of nonconformity management” as scheduled from the beginning.
The inspection of the “status of emergency safety measures in other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” confirmed that appropriate actions were taken according to the plan, including the improvements described in the “Emergency Safety Measures at the Kashiwazaki-Kariwa Nuclear Power Station (Implementation Report)” developed by the licensee and developed individual training plans for staffs of teams performing maintenance activities for reactor facilities to cope with power supply loss and conducted trainings according to annual individual training plan as well as the examination of the measures that were being carried out since the first safety inspection in 2012.In addition, “30 countermeasures obtained from the technical experiences in the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” were discussed and new countermeasures for low earthquake-resistant facilities such as water stop countermeasures were confirmed. The future safety inspections and others will confirm the status including them.
The investigation of the “status of maintenance management” confirmed with the work procedure manuals and work reports that Article 107 of the operational safety program, the maintenance management plan, was complied with and the preservation activities were conducted. It was confirmed that the inspection of effectiveness evaluations of maintenance and maintenance management were summarized in the ”maintenance activities management indicator summing up results in FY 2011” and the ”effectiveness evaluation of maintenance control in FY 2011.”Inspection of the status of correction measures related to the inadequacy in maintenance management of measurement control equipment at Units 2-4 during the extended shutdown confirmed that 2,370 units had been inspected as of August 24 (progress rate about 84 %).</td></tr>
<tr><td>Inspection results</td><td>Inspection of the “status of management review” confirmed that the management review was conducted two months later than in previous years in order to reflect the mission report of the accidents at the Fukushima Daiichi Nuclear Power Station, but the input of management, manager, and power station director reviews and the follow-ups, etc. of the previous year were properly conducted, and that as a result of management reviews, adequate outputs were conducted such as instruction of quality policy review. It was confirmed that the quality policy review was to be re-examined with the end of the first half as a target execution date.
Inspection of the “status of internal audit” examined the actual internal audit at the power station in FY 2011 and the internal audit plan at the power station in FY 2012. In FY 2011, the service quality audit was conducted according to plan. In FY 2012, the service quality audit plan was developed based on the development policy in response to the evaluations in the previous year. It was confirmed that the internal audit for the power station was properly implemented.
Inspection of the “status of nonconformity management” confirmed that the nonconformity management committee properly performed operational safety activities such as classifications of nonconformities into categories, Implementation of measures, instructions and advices, etc. In addition, the nonconformity management was properly conducted. With the accumulated nonconformity report database, matters that need to ensure the recurrence prevention were extracted. As a result of analysis and study, activities for improvement were conducted such as finding problems and challenges.
In addition, the inspection of the “status of management of radiation workers' wear of alarm personal dosimeter,” which was added as an inspection item based on nonconformities in restoration works of the accidents at Fukushima Daiichi Nuclear Power Station confirmed that the notification by additional radiation protection education and fliers and surprise inspections by radiation managers were conducted to prevent intentional nonconformity of pocket dosimeter with alarm (ADP), and that activities were properly conducted to prevent nonconformities.
Inspection of the “status of remedial actions in response to past violations (monitoring item) ” confirmed improvement measures were executed successively for ”non-compliance with the limits on operations of the central control room emergency ventilator and air conditioning system of Unit 5,” ”violations of the operational safety program in components with overdue inspections at the Kashiwazaki-Kariwa Nuclear Power Station, the Fukushima Daiichi Nuclear Power Station, and the Fukushima Daini Nuclear Power Station,” and ”delay in judgement of deviation from operational limit in dealing with failures of direct current power supply (B) at Unit 7,” The status of improvements not confirmed in this inspection was to be monitored in the future operational safety inspection.
The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (manual start-up test of the emergency diesel generator (System A) of Unit 4), and so forth. No particular issues were identified.
In consideration of the above, summing up the findings of the second safety inspection in FY 2012, it was judged the operational safety activities were conducted properly by the licensee.</td></tr>
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Kashiwazaki-Kariwa Nuclear Power Station

	Third inspection
Period of inspection	Inspection period: Nov.30 (Mon.) to Dec. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures of other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2) <u>Inspection associated with extended shut down of the plant</u> (3) Status of radioactive solid waste management (4) Status of inspection tours (with witness) <surprise inspection> 2) Additional inspection items (the underlined items indicate priority inspection items in accordance with the safety inspection basic policy) (1) <u>Recurrence prevention measures and their Implementation status in response to the root cause analysis related to inadequacy in maintenance management of Units 2, 3, and 4 and the status of Implementation</u> (2)<u>Nonconformities in maintenance management of components with overdue inspections</u> (3) <u>Recurrence prevention measures and their Implementation status in response to the root cause analysis related to non-compliance with the limits on operations of the central control room emergency ventilator and air conditioning system of Unit 5</u>
Inspection results (continued)	In accordance with the basic policy of the office, the following operational safety inspections were conducted: the “status of emergency safety measures of other power stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” and the “inspection associated with extended shut down of the plant.” Among additional inspection items, the following were priority inspection items: ”recurrence prevention measures and their Implementation status in response to the root cause analysis related to inadequacy in maintenance management of Units 2, 3, and 4 and the status of Implementation,” ”nonconformities in maintenance management of components with overdue inspections,” and ”measures to prevent recurrence and their Implementation status in response to the root cause analysis related to non-compliance with the limits on operations of the central control room emergency ventilator and air conditioning system of Unit 5.” Moreover, in accordance with (the third) operational safety inspection plan in FY 2012, inspection of the “status of radioactive solid waste management” ”non-compliance with the limits on operations of the central control room emergency ventilator and air conditioning system of Unit 5” The inspection of the “status of emergency safety measures in other power stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” confirmed that appropriate actions were taken according to the plan, including the improvements described in the “Emergency Safety Measures at the Kashiwazaki-Kariwa Nuclear Power Station (Implementation Report)” developed by the licensee and developed individual training plans for staffs of teams performing maintenance activities for reactor facilities to cope with power supply loss and conducted trainings according to annual individual training plan as well as the examination of the measures that were being carried out since the second safety inspection in 2012.Various works associated with emergency safety measures were being conducted. The status of progress is to be further monitored in the future. Inspections related to the “inspection associated with extended shut down of the plant” examined the statuses of operation and maintenance management at plants (Units 2, 3, and 4) that were experiencing extended shutdown after Niigataken Chuetsu-oki Earthquake and plants that were experiencing shutdown for routine inspections last year (Units 1, 5, 6, and 7) to ensure the safety of plants in shutdown. The shutdown was extended. It was confirmed that a “special maintenance plan for suspended shutdown of reactor equipment” was developed according to manuals and that routine tests and inspection tours, etc. were carried out for facilities whose functions were required during the maintenance management such as inspections and repair of equipment and shutdown.

Inspection results	Inspection of the “status of radioactive solid waste management” aimed at the confirmation of the status of radioactive fallout distribution inspection to confirm the influence of radioactive fallout caused by the accidents at Fukushima Daiichi Nuclear Power Station and the status of the first shipment of low level radioactive solid waste from Kashiwazaki-Kariwa Nuclear Power Station. In the distribution inspection of radioactive fallout caused by the accidents at Fukushima Daiichi Nuclear Power Station, it was judged that there was no influence of the fallout. It was confirmed that as for the shipment of low level radioactive solid waste from the station, 1,400 drums were taken out of the station according to plan and that records were made. Inspection of “recurrence prevention measures and their Implementation status in response to the root cause analysis related to inadequacy in maintenance management of Units 2, 3, and 4 and the status of Implementation” aimed at the confirmation of the recurrence prevention measures against the nonconformity of the maintenance management of measurement control equipment at Units 2, 3, and 4 and the status in response to the root cause analysis reported from the licensee on September 28, 2012. It was confirmed that the manual guide was prepared based on the countermeasures plan of the ”excess of equipment inspection/calibration time based on a special maintenance program at Units 2, 3, and 4.” it is to be continuously monitored in the future operational safety inspections, etc. to see the manual guide builds the system where organization factor measures including the establishment effectively function. Inspection of ”nonconformity in maintenance management of components with overdue inspections” confirmed that as for the wrong maintenance management of equipment exceeding the inspection frequency, an inspection was conducted to confirm the recurrence prevention measures in response to the root cause analysis reported by the licensee on September 28. 2012 and its status. The recurrence prevention measures and the status were confirmed. Inspection of recurrence prevention measures confirmed measures were steadily implemented and operated. Recurrence prevention measures attributable to organizational factor analysis were being developed. The head office confirms the status, etc., and reports to the management (president or the chief of nuclear/siting) from time to time, and confirms with the top management of power stations via the operational safety steering committee and the safety committee. They are to be monitored in operational safety inspections, etc. Inspection of ”measures to prevent recurrence and their Implementation status in response to the root cause analysis related to non-compliance with the limits on operations of the central control room emergency ventilator and air conditioning system of Unit 5” aimed at confirming the status since the second operational safety inspection of non-compliance with operational limits of the central control room emergency ventilator and air conditioning system of Unit 5 and recurrence prevention measures in response to root cause analysis reported by the licensee on August 13, 2012 and confirmed recurrence prevention measures and the status. Inspection of recurrence prevention measures confirmed measures were steadily implemented and operated. Corrective and preventive measures in response to organizational factors were at the stage where current situations and the duty allocation were confirmed. They are to be monitored in future operational safety inspections, etc. ”Surprise inspections” confirmed that by witnessing inspection tours and inspection of operators in the reactor building and containment at Unit 1 during the shutdown for periodic inspection on December 4, no facilities/equipment malfunctioned. In other inspections, operational safety investigation was given to two nonconformities found since the second operational safety inspection in 2012. The inspection during the inspection period confirmed that the two nonconformities were classified as operational safety program violation (observations). The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, summing up the findings of the third safety inspection in FY 2012, it was judged the operational safety activities were generally conducted properly by the licensee.

	Fourth inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.12 (Tue.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures of other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (2)Status of maintenance management (investigation in response to problems/challenges based on the results of operational safety inspections in 2011) (3) Status of safety culture development activities (4) Status of remedial actions in response to past violations of the operational safety program (observations) (5) Status of maintenance and check related to alarm records <surprise inspection> 2) Additional inspection items (the underlined items indicate priority inspection items in accordance with the safety inspection basic policy) (1) Recurrence prevention measures and their Implementation status in response to the root cause analysis related to inadequacy in maintenance management of Units 2, 3, and 4 and the status of Implementation (2)Nonconformities in maintenance management of components with overdue inspections (3) Recurrence prevention measures and their Implementation status in response to the root cause analysis related to non-compliance with the limits on operations of the central control room emergency ventilator and air conditioning system of Unit 5
Inspection results (continued)	The safety inspection was conducted in accordance with the basic policies of the office, for which basic inspection items were the "status of emergency safety measures of other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," "status of nonconformity management (the inspection in response to issues and challenges at power stations based on results of inspections in 2011, etc.) and priority inspection items were the "recurrence prevention measures and their Implementation status in response to the root cause analysis related to inadequacy in maintenance management of Units 2, 3, and 4," "nonconformity in maintenance management of components with overdue inspections," and "recurrence prevention measures and their Implementation status in response to the root cause analysis related to non-compliance with the limits on operations of the central control room emergency ventilator and air conditioning system of Unit 5," and in addition, inspections of the "status of safety culture development activities" were conducted in line with the (fourth) operational safety inspection plan in 2012. The inspection of the "status of emergency safety measures in other power stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed with records and witness that the inspection of the status of the countermeasures described in the "Emergency Safety Measures at the Kashiwazaki-Kariwa Nuclear Power Station (Implementation Report)" developed by the licensee since the third safety inspection in 2012, appropriate actions were taken according to the plan, and individual trainings for staffs of teams performing maintenance activities for reactor facilities were conducted according to individual training annual plans to cope with power supply loss as well as a "guide for tsunami accident management" were revised, reflecting the status of installation of facilities Various works associated with emergency safety measures were being conducted. The status of progress is to be further monitored in operational safety inspection, etc. in the future. Inspection of the "status of nonconformity management (investigation in response to problems/challenges based on the results of operational safety inspections in 2011)" confirmed that in accordance with "nonconformity management and corrective/preventive measures basic manual," etc., the nonconformity management committee performed operational safety activities such as classifications of nonconformities into categories, Implementation of measures, instructions and advices of measures, etc. It was confirmed that since FY 2012, the quality assurance group had been playing a central part of creating task teams, where interested groups join across sections to support activities to solve common challenges in the power station and overcome weak points of individual groups. In addition, it was confirmed that activities were performed to improve the identification and the management of the nonconformity event GIII in response to a fact that the maintenance information had many degradations of facilities and equipment. It was heard that the environment where staffs perform actions, recognizing the reduction of nonconformities was continuously improved and developed. Inspection of the "status of safety culture development activities" confirmed that the basic policy of safety culture development activities was established in accordance with the operational safety program and legal compliance and safety culture development. It was confirmed that as for activities in FY 2012, safety culture development activity plan was established and that reviews were made to large-scale addition of important

Inspection results	measures to enhance the safety culture development activities during the quarter. In addition, it was confirmed that along with this review, the review of the method of reviewing activities in 2012was being studied. It was confirmed that as for the status of activities, planned details were implemented by an Implementation report, etc. Inspection of the "status of remedial actions in response to past violations of the operational safety program (monitoring item)" confirmed the following two points: The factor analysis and recurrence prevention measures were implemented for the "setting error of the background level at the emergency gas treatment system of radiation monitor of Unit 5." In the "radioactive gaseous, liquid, and solid waste management manual," it was confirmed with instruction documents that the measurement/setting procedure was added to prevent wrong treatment of data. In addition, it was confirmed that the handling and operation in case the variable width of the background level was exceeded were added to an instruction document and that the specifications of software for environmental minicomputer (device to unify the system monitoring outdoor radiation) would be improved. It was confirmed that as for the "erroneous disposal of condensed liquid waste sample of low level radioactive waste for hard-to-measure nuclide analysis," the root cause analysis was carried out, problems and direct factors were analyzed, and 15 items were established as recurrence prevention measures. Among measures, physical categories of samples to be stored and those to be disposed, hot laboratory arrangement, the development of furniture and clarification of storage by sample had been implemented, and informed to all subcontractors in additional outsourcing specifications, etc. It was confirmed that among related manual guides, the "water quality service guide" was revised and that other two guides were being revised. Inspection of the "status of maintenance and check related to alarm records <surprise inspection> " confirmed that the specifications of the electronic storage system, alarm typer, etc. were same as those described in the report "Ensuring of Recording and Record Retention in the Event of Accident (September 2012)," and that the maintenance inspections were properly implemented. Inspection of "recurrence prevention measures and their Implementation status in response to the root cause analysis related to inadequacy in maintenance management of Units 2, 3, and 4 and the status of Implementation" confirmed that as a part of the recurrence prevention measures and the status, the manual guide was revised in response to root cause analysis. It was confirmed that action plans for services, which seem to have higher risks, and that while they were being verified and checked, some were being implemented. In the future, the mechanism would be built to implement services in accordance with manual guides and enhance the effect of direct cause measures and organizational factor measures for the actions. They were to be monitored in operational safety inspections, etc. Inspection of "nonconformities in maintenance management of components with overdue inspections" confirmed that the licensee prepared measure Implementation plan based on reports and the status of activities including organization factor measures, etc., since the third operational safety inspection, which were under a staff responsible for measure Implementation. It was confirmed that the head office nuclear power quality and safety section confirmed the status of enhancement of the involvement of top management in the power station, reported it to the president and the chief, showed it in the company intranet, and planned to perform similar actions three times in the future. The Implementation of a part of the four organizational factor measures was not confirmed: the "improvement of education in the company regulation regarding the maintenance management," the "shift to the maintenance/budget management system," "review of measures against the extended inspection plan," and "improvement of maintenance quality." But the Implementation of the others was confirmed: they were conducted according to plan. Organizational factor measures had items that would be implemented around the end of March 2013. They are to be monitored in the future operational safety inspection, etc. Inspection of "measures to prevent recurrence and their Implementation status in response to the root cause analysis related to non-compliance with the limits on operations of the central control room emergency ventilator and air conditioning system of Unit 5" confirmed that measures were conducted according to plan in order to build the "Organizational Factor 1: mechanism of clarifying requirements of operational safety program" and "Organizational Factor 2: mechanism of clarifying duty allocation" by the end of March 2013 according to specific Implementation details of organizational factor measures related to the 'operational safety program related to operations of the emergency ventilator and air conditioning system' of Unit 5 at Kashiwazaki-Kariwa Nuclear Power Station" prepared by the quality and safety section. Corrective and preventive measures in response to organizational factors were at the stage where the mechanism had been being developed. They are to be monitored in future operational safety inspections, etc. In consideration of the above, summing up the findings of the fourth safety inspection in FY 2012, it was judged the operational safety activities were conducted properly by the licensee.

(7) Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station

	First inspection
Period of inspection	Inspection period: June 11 (Mon.) to June 22 (Fri.), 2012 June 29 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2) <u>Status of management review</u> (3) Status of the safety management system (4) Status of emergency measures (5) Status of measures in the event of earthquakes and fire (6) Status of routine tests (routine tests of reactor equipment cooling water system and reactor equipment cooling seawater system) (with witness) (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," the "status of management review," and so on. Basic inspection of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." examined the status since the fourth operational safety inspection in 2011 and confirmed that planned contents including the ongoing installation of wave barrier wall were improved as required and were properly pursued as measures. Inspection of the "status of management review" confirmed that the analysis evaluation results by process directors of the head office and power stations were reflected in the input of management review and management review output improvement activities were planned. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Hamaoka Nuclear Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2) Status of subcontractor's employees' wear of alarm personal dosimeter (3) Status of fuel management (4) Status of operational safety activities based on special maintenance plan (5) Status of environmental monitoring area management (6) Status of safety culture development activities (7) Status of routine tests (manual start-up test of the emergency gas treatment system at Unit 4) (with witness) (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," and so on. Basic inspections confirmed the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." since the first operational safety inspection in FY 2012 and that one year extension of the target completion period of the work against tsunami announced in July 2012 (December 2012) was caused by congestion of works associated with the reinforcement of measures for electric power supply systems announced in March 2012. The plan details were improved as required and pursued properly as measures including the ongoing work on the installation of the wave barrier wall. The operation plans of emergency safety measures including measures against sever accidents were consistent both in hardware and software, which were reflected in manuals, trainings, etc. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Hamaoka Nuclear Power Station

	Third inspection
Period of inspection	Inspection period: Nov. 26 (Mon.) to Dec. 7 (Tue), 2012 Dec. 12 (Wed.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2) Status of procurement management (3) Status of measures for abnormal events (4) Status of radioactive wastes (radioactive liquid/gaseous waste) (5) Status of maintenance and check related to alarm records (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," and so on. Basic inspections confirmed the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." since the second operational safety inspection in FY 2012 and that the plan details were improved as required and pursued properly as measures including the ongoing work on the installation of the wave barrier wall. The operation plans of emergency safety measures including measures against sever accidents were consistent both in hardware and software, which were reflected in manuals, trainings, etc. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Hamaoka Nuclear Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.8 (Fri.), 2013 Mar. 13 (Wed.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2)<u>Status of nonconformity management and corrective actions</u> (3) Status of record and reporting (including surprise inspection) (4) Status of radiation management (5)<u>Status of maintenance management</u>
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," the "status of nonconformity management and corrective measurement," and the "status of maintenance management" and etc. Basic inspections of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed the status since the previous operational safety inspection (the third operation in FY 2012). They confirmed the measures to further enhance the safety based on the estimated data of tsunami height associated with Cabinet Office "Committee for Modeling a Nankai Trough Megaquake, "which was released in August 2012, and that measures based on the past plans were properly pursued. The operation plans of emergency safety measures including measures against sever accidents were consistent both in hardware and software, which were reflected in manuals, trainings, etc. Inspection of the "status of nonconformity management and corrective actions" confirmed with nonconformity management records that the nonconformity management process was documented in the company guideline/guidance. In addition, inspection of the variety in judgment confirmed that various types of instructions in the power station and reviews in related meetings tried to improve individual capacities, that various measures including ABC activity were implemented to reduce human errors, and that preventive and corrective measures were properly implemented. Inspection of the "status of maintenance management" confirmed that considering the electric/measurement control equipment at Monju of Japan Atomic Energy Agency, Fast Breeder Reactor Research and Development Center that had not been inspected, the electric/measurement control equipment at Hamaoka Nuclear Power Station were properly inspected, that there was a rule that nonconformity measures were properly taken to changes of inspection period exceeding the inspection frequency, and that no nonconformity related a deviation from the inspection frequency had arisen since the previous operational safety inspection related to the maintenance management (the second inspection in FY 2012). The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(8) Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station

	First inspection
Period of inspection	Inspection period: June 4 (Mon.) to June 15 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2)<u>Status of nonconformity management</u> (3)<u>status of maintenance management</u> (4) Status of management review (5) Status of safety culture development activities (6) Status of power supply training with high-voltage power-supply cars (surprise inspection) (7) Status of transportation of low-pressure turbine rotor (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," the "status of nonconformity management," the "status of maintenance management," and so on. Basic inspection of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed that inspections of equipment and materials required for emergency safety measures, etc., educations and trainings were implemented without fail in accordance with the emergency manual. In addition, it was confirmed that measures developed as mid-and-long term plans were steadily pursued according to plan. Inspection of the "status of nonconformity management" confirmed that the management of nonconformities attributable to human errors, corrective measures, and preventive measures were properly implemented and efforts to decrease human errors were continuously made. Inspection of the "status of maintenance management" confirmed that operational safety activities based on a special maintenance plan associated with extended shutdown were properly implemented both in long-term storage of systems and equipment and additional inspections. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Shika Nuclear Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2)<u>status of maintenance management</u> (3) Status of abnormal events and emergencies (4) Status of the safety management system (5) Status of subcontractor's management of pocket dosimeter (6) Status of routine tests "Unit 2 central control room ventilator system separation operation and outdoor air intake operation" (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," the "status of maintenance management," and so on. Basic inspections of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed inspections of equipment and materials required for emergency safety measures, etc., educations and trainings were implemented without fail in accordance with the emergency manual. In addition, it was confirmed that measures developed as mid-and-long term plans were steadily pursued according to plan. Inspection of the "status of maintenance management" confirmed a series of work procedures from the isolation of facilities associated with works to the restoration and nonconformity associated with the isolation were properly implemented. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. But it was found at Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station, in entering a solid waste storage (D/Y) in the isolated controlled area, employees did not take an entry procedure and entered the controlled area without carrying APD with them. As a result of fact confirmation, it was classified as "observations" The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were generally conducted properly.

Shika Nuclear Power Station

	Third inspection
Period of inspection	Inspection period: Dec. 3 (Mon.) to Dec. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2)Status of radioactive waste management (3) Status of operational safety education (4) Status of recurrence prevention measures related to the past violations (5) Confirmation of status of report details related to alarm records (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” and etc. Basic inspections of the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” confirmed inspections of equipment and materials required for emergency safety measures, etc., educations and trainings were implemented without fail in accordance with the emergency manual. In addition, it was confirmed that measures developed as mid-and-long term plans were steadily pursued according to plan. The status is to be confirmed in operational safety inspections in the future. Inspection of the status of radioactive waste management confirmed that radioactive gaseous, liquid, and solid wastes were respectively implemented properly. Inspection of the status of recurrence prevention measures related to the past violation confirmed the status: for example, a monitoring staff of service building (S/B) entry/exit office received notification from a person to enter the controlled area of the solid waste storage (D/Y) and monitored the completion of a procedure for entry with a monitoring camera, The status of report details related to alarm records were examined and no nonconformity was found. It was confirmed that they were used properly in the main control room and on site. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Shika Nuclear Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.8 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.</u> (2)<u>Status of nonconformity management</u> (3)<u>Status of maintenance management</u> (4) Status of safety culture development activities (including inspection at the head office) (5) Confirmation of the status of storage of materials and equipment for emergency safety measures (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.,” and so on. Basic inspections of the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.” confirmed inspections of equipment and materials required for emergency safety measures, etc., educations and trainings were implemented in accordance with the emergency manual. In addition, it was confirmed that measures developed as mid-and-long term plans were steadily pursued according to plan. Inspection of the “status of nonconformity management” confirmed that measures for measures to address common factors causing trouble had been continuously implemented, efforts were made to prevent troubles, and trainings were given through activities of working groups of the committee for promoting human performance improvement to ensure basic actions Inspection of the “status of maintenance management” confirmed that the completion time of shift from the inspection criteria chart to the maintenance item decision chart was studied in response to the trend of the next routine inspection time, the maintenance management mechanism was surely functioning, and additional inspections based on the special maintenance plan due to the extended shutdown of the plant were properly conducted to handle equipment that had not been inspected at Monju. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operations of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(9) The Kansai Electric Power Co., Inc., Mihama Power Station

	First inspection
Period of inspection	Inspection period: May 28 (Mon.) to June 8 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures at the Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.(including inspection at the Nuclear Power Division Head Office) (2)Status of individual operations, which have become routine works, based on the basic action policy (including inspection at the Nuclear Power Division Head Office) (3)Status of maintenance management in response to the aging of facilities (4) Status of maintenance management associated with extended shutdown of the plant (5) Status of nonconformity management and corrective actions (6) Status of management review (including inspection at the Nuclear Power Division) (7) Status of remedial actions in response to past violations (monitoring item) (8) Status of radioactive waste management (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures at the Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," "the "status of individual operations, which have become routine works, based on the basic action policy," "status of maintenance management in response to the aging of facilities. " and etc. Among these items, inspections were conducted at the Nuclear Power Division of the Kansai Electric Power Co., Inc. jointly with the Ohi Nuclear Safety Inspector's Office, Takahama Nuclear Safety Inspector's Office, and the regional nuclear safety management officer (in charge of the Wakasa region) on the "status of emergency safety measures at the Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," "the "status of individual operations, which have become routine works, based on the basic action policy," and the "status of management review." Inspection of the "status of emergency safety measures at the Mihama Power Station in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed the progress from the previous operational safety inspection, as well as mid- to long-term measures, are being planned and carried out properly. In addition, it was confirmed that equipment and materials introduced by the emergency safety measures, etc. were maintained and managed according to the program and trainings related to the use of materials and equipment were given. It was confirmed that in response to results of the management review in FY 2011, the status of individual operations, which have become routine works, based on the basic action policy was revised into a quality policy in consideration of the status surrounding the nuclear power after the accidents at Fukushima Daiichi Nuclear Power Station. In addition, it was confirmed that the quality targets and safety culture development activities were planned at Mihama Power Station under the new quality policy. Inspection of the "status of maintenance management in response to the aging of facilities" confirmed the status of long-term maintenance management policy for Hamanaka Unit 3, which had been operating for 30 years. In addition, it was confirmed that plans for items whose Implementation were postponed or interrupted as a consequence of the Tohoku Great Earthquake were being reviewed. The inspections confirmed that operational safety activities for other inspection items were carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, and making inspection tours of the reactor facilities. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Mihama Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures at Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (2)Status of individual operations, which have become routine works, based on the basic action policy (3)Status of maintenance management in response to the aging of facilities (4) status of maintenance management associated with extended shutdown of the plant (5) Status of nonconformity management and corrective actions (6) Status of remedial actions in response to past violations (observation) (7) Status of subcontractor's employees' wear of alarm personal dosimeter (8) Status of fuel management (surprise inspection)
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures at Mihama Power Station in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," the "status of individual operations, which have become routine works, based on the basic action policy," the "status of maintenance management in response to the aging of facilities." and etc. Inspection of the "status of emergency safety measures at Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed the progress from the previous operational safety inspection and proper planning and Implementation of the mid-and-long-term measures. Inspection of the "status of individual operations, which have become routine works, based on the basic action policy" confirmed the development of the quality target achievement program and the annual plan of safety culture development activities and the status of operations at offices. In addition, it was confirmed that the data of the nuclear pipe thickness management system was properly transferred. Inspection of the "status of maintenance management in response to the aging of facilities" confirmed the progress of long-term maintenance management policy at Mihama Power station and the status of maintenance management related to Article 120 of the operational safety program. Inspection of the "status of maintenance management associated with extended shutdown of plant" confirmed the Implementation of maintenance activities based on a special maintenance plan for Mihama Units 1 and 3, which had been shutdown for a long time. Inspection of the "status of nonconformity management and corrective actions" confirmed that nonconformity management was properly conducted in cases extracted by the office from less important nonconformities. In addition, the item confirmed the event "seawater leak from air cooler of emergency diesel generator A of Mihama Unit 3 B" As for "Status of subcontractor's employees' wear of alarm personal dosimeter, the inspections confirmed that operational safety activities for other inspection items were carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, and making inspection tours of the reactor facilities. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Mihama Power Station

	Third inspection
Period of inspection	Inspection period: Dec. 3 (Mon.) to Dec. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures at Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (2)Status of quality assurance activities and safety culture development activities (3)status of maintenance management in response to the aging of facilities (4) status of maintenance management associated with extended shutdown of the plant (5)Status of nonconformity management, corrective measures, and preventive measures (6) Status of compliance with revisions of the operational safety programs (7) Status of remedial actions in response to past violations (observation) (8) Status of takeover and management of radiation measuring devices (surprise inspection) (9) Status of maintenance and check related to alarm records (surprise inspection) 2) Additional inspection items None
Inspection results	The basic inspection items were: the "status of emergency safety measures at Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.," the "status of quality assurance activities and safety culture development activities," the "status of maintenance management in response to the aging of facilities," the "status of maintenance management associated with extended shutdown of plant," the "status of nonconformity management, corrective measures, and preventive measures," the "status of remedial actions in response to past violations (monitoring item)." and etc. Inspection of the "status of emergency safety measures at Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc." confirmed the progress from the previous operational safety inspection and proper planning and Implementation of the mid-and-long-term measures. Inspection of the "status of quality assurance activities and safety culture development activities" confirmed that as for the status of activities in the first half of 2012, Inspection of the "status of maintenance management in response to the aging of facilities" confirmed the progress of maintenance management based on the long-term maintenance management policy in response to the aging of facilities since the previous maintenance inspection. Inspection of the "status of maintenance management associated with extended shutdown of plant" confirmed the Implementation of maintenance activities based on a special maintenance plan developed for Mihama Units 1 and 3, which had been shutdown for a long time. Inspection of the "status of nonconformity management, corrective measures, and preventive measures" confirmed the status of nonconformity management including "seawater leak from air cooler of emergency diesel generator A of Mihama Unit 3 B" occurring during the previous maintenance inspection period. Inspection of the "status of remedial actions in response to past violations (monitoring item)" confirmed the status of corrective measures for "omitted revisions of office regulation for operation in the event of accident and office regulation for operation," which the office classified as violations of the operational safety program (monitoring item) in the fourth safety inspection in FY 2011. The inspections confirmed that operational safety activities for other inspection items were carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, and making inspection tours of the reactor facilities. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Mihama Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.8 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures at Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (including inspection at the Nuclear Power Division Head Office) (2) Status of quality assurance activities and safety culture development activities" (including inspection at the Nuclear Power Division Head Office) (3)status of maintenance management in response to the aging of facilities (4) status of maintenance management associated with extended shutdown of the plant (5)Status of nonconformity management, corrective measures, and preventive measures (6) Status of power station reviews (7) Status of remedial actions in response to past violations (observation) (8) Status of management of environmental monitoring area related to radiation management (surprise inspection) 2) Additional inspection items None
Inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures at Mihama Power Station in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of quality assurance activities and safety culture development activities," "status of maintenance management in response to the aging of facilities," the "status of maintenance management associated with extended shutdown of the plant," the "status of nonconformity management, corrective measures, and preventive measures," and so on. Inspection of the "status of emergency safety measures at Mihama Power Station in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed the progress from the previous operational safety inspection and proper planning and implementation of the mid-and-long-term measures, and the implement action of trainings and inspections related to the operation of introduced materials and equipment according to the program. The quality assurance activities in the "status of quality assurance activities and safety culture development activities" were expected to be achieved. It was confirmed that the internal audit by the management audit office was implemented according to plan. It was confirmed that activities related to the priority measures, etc. of safety culture development activities in 2012 were implemented through the year, and that annual evaluation of safety culture were conducted at Mihama Power Station and the Nuclear Power Division. Inspection of the "status of maintenance management in response to the aging of facilities" confirmed the progress of maintenance management based on the long-term maintenance management policy in response to the aging of facilities since the previous maintenance inspection. In addition, it was confirmed that the effectiveness of maintenance management was evaluated and desirable improvements were extracted and reflected in the next year plan. Inspection of the "status of maintenance management associated with extended shutdown of the plant" confirmed that based on the special maintenance plan, storage measures for the long-term deterioration suppression of the system and equipment. In addition, by randomly sampling the records of the status of additional inspection based on the special maintenance plan carried out at Mihama Units 1 and 3, it was confirmed that inspections were properly conducted according to plan. Inspection of the "status of nonconformity management, corrective measures, and preventive measures" confirmed that corrective measures suitable for a cause of nonconformity were carried out for the "damage to the supercharger of the emergency diesel generator A of Mihama Unit 1" event occurring in February and less important nonconformities based on the program. The inspections confirmed that operational safety activities for other inspection items were carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, and making inspection tours of the reactor facilities. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

(10) The Kansai Electric Power Co. Inc. Ohi Power Station

	First inspection
Period of inspection	Inspection period: May 28 (Mon.) to June 8 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u>(including inspection at the Nuclear Power Division Head Office) (2) Status of management review (including inspection at the Nuclear Power Division Head Office) (3) Status of quality assurance activities (including inspection at the Nuclear Power Division Head Office) (4)<u>Status of nonconformity management</u> (5)<u>Status of management associated with extended shutdown of the plant</u> (6) Status of radiation management (surprise inspection)
Outline of inspection results	Basic inspection items were the “status of safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” the “status of nonconformity management,” the “status of management associated with extended shutdown of the plant,” and so on. Inspections were conducted at the Nuclear Power Division Head Office jointly with the Mihama Nuclear Safety Inspector’s Office, Takahama Nuclear Safety Inspector’s Office, and the regional nuclear safety management officer (in charge of the Wakasa region) on the “status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of safety culture development activities," and the “status of management review.” Basic inspection of the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that measures conducted by the licensee on its own as well as 30 measures obtained from the technical experiences in the accidents and 6 items stress tests required further efforts for the improvement of were steadily implemented and that further safety improvement and the enhancement of facilities were continuously pursued according to the mid-and-long term plan. Inspection of the “status of nonconformity management" confirmed that the process ensured the implementation: the information on defects would be immediately shared in the corrective action program (hereinafter “CAP (Corrective Action Program)”) study group, the details of correction measures were discussed in the CAP committee, uncompleted nonconformities were properly managed in the data base. Inspection of “status of management associated with extended shutdown of the plant” extracted equipment requiring additional inspection and investigation as well as inspected the equipment determined to need re-inspection of the periodical licensee inspections. In addition, it was confirmed that the plant safety during the extended suspension was properly secured by determining the storage policy in reference to the past storage management method during the extended suspension. The inspections confirmed that operational safety activities for other inspection items were carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Ohi Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon) to Sept. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2) Status of operational management (3) Status of document management (4)<u>Status of nonconformity management</u> (5)<u>Status of management associated with extended shutdown of the plant</u> (6) Management status of wearing personal dosimeter (7) Status of operations at offices (surprise test) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” the “status of nonconformity management,” the “status of management associated with extended shutdown of the plant” and etc. The inspection of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that measures conducted by the licensee on its own as well as 30 measures obtained from the technical experiences in the accidents and 6 items stress tests required further efforts for the improvement of were steadily implemented and that further safety improvement and the enhancement of facilities were continuously pursued according to the mid-and-long term plan. Inspection of the status of “nonconformity management” confirmed that the information on defects will be immediately shared in the corrective action program (hereinafter CAP (<u>C</u>orrective <u>A</u>ction <u>P</u>rogram)” study group, the details of correction measures were discussed in the CAP committee, and properly reviewed as required. In addition, according to the plan, corrective measures for some nonconformities were reviewed at the start-up of Units 3 and 4. It was confirmed that all of such reviews were done. Inspection of the horizontal deployment of nonconformities occurring at other plants confirmed that NISA obtained information other than required cases through the Nuclear Power Division and examined if the horizontal deployment was necessary. Inspection of the “status of management associated with extended shutdown of the plant” confirmed that maintenance activities were adequate at Units 3 and 4 because no extended shutdown was attributed to any defect occurring during the start-up. Moreover, special maintenance plans had been developed for Unit 1, which had been shut down for more than 1 year. It was confirmed that reviews and re-inspections of additional inspections were studied. The inspections confirmed that operational safety activities for other inspection items were carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (start-up test of the emergency circulation fan in the main control room of Unit 3 and the annulus clean-up fan of Unit4), and so on. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Ohi Power Station

	Third inspection
Period of inspection	Inspection period: Nov. 26 (Mon.) to Dec. 7 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2)<u>Status of management associated with extended shutdown of the plant</u> (3)<u>Status of nonconformity management</u> (4) Status of radioactive waste management (5) Status of procurement management (6) Status of operations at offices (surprise inspection) (7) Confirmation of report details related to alarm records (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of management associated with extended shutdown of the plant," the "status of nonconformity management." and etc. Inspection of the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that measures conducted by the licensee on its own as well as 30 measures obtained from the technical experiences in the accidents and 6 items the stress test requires further efforts for were steadily implemented and that further safety Improvement and better facilities were continuously pursued according to the mid-and-long term plan. Inspection of the "status of management associated with extended shutdown of the plant" confirmed that it was judged that the long-term storage method and maintenance activities were proper because Units 3 and 4 had no defect causing any extended shutdown in constant operation at the rated thermal power. In addition, additional inspections and re-inspections were properly carried out at Unit 1. The fuel removal was scheduled early next year, and relatively big changes in the storage status were expected. It was confirmed that special maintenance plans would be reviewed. Moreover, it was confirmed that a special maintenance plan was to be developed for Unit 2 by December 16, when one year has passed since the start of routine inspection. Inspection of the status of nonconformity management" confirmed that the information on defects will be immediately shared in the corrective action program (hereinafter "CAP (<u>C</u>orrective <u>A</u>ction <u>P</u>rogram)" study group, the details of correction measures were discussed in the CAP committee, and properly reviewed as required. In addition, it was confirmed that by using nucia information, the horizontal deployment of nonconformities generated at other plants was actively conducted. The inspections confirmed that operational safety activities for other inspection items were carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (start-up test of the emergency diesel generator B of Unit 3) , and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Ohi Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.8 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.(including inspection at the Nuclear Power Division Head Office)</u> (2) <u>Status of management review</u> (3) Status of safety culture development activities (including inspection at the Nuclear Power Division Head Office) (4)<u>Status of nonconformity management</u> (5)<u>Status of management associated with extended shutdown of the plant</u> (6) Status of operational management (7) Status of measures in the event of earthquakes and fire (surprise inspection) (8) Status of emergency measures (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of management review," the "status of management associated with extended shutdown of the plant" the "status of nonconformity management." and etc. Inspection of the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that measures conducted by the licensee on its own as well as 30 measures obtained from the technical experiences in the accidents and 6 items the stress test requires further efforts for were steadily implemented and that further safety improvement and better facilities were continuously pursued according to the mid-and-long term plan. Inspection of the "status of management review" confirmed that all activities at Ohi Power Station in accordance with the quality management system in 2012 (hereinafter "QMS") were discussed and evaluated properly in power station reviews, and that the results as well as the output information were compiled as input information of the quality assurance meeting to be conducted at the Nuclear Power Division. The fuel removal brought about relatively big changes in the storage status at Unit 1. The inspection of the "status of management associated with extended shutdown of the plant" confirmed that "special maintenance plans (maintenance measures related to the plant's extended shutdown)" were revised and that based on the revised plans, the system and equipment were stored. For Unit 2, "special maintenance plans (maintenance measures related to the plant's extended shutdown)" were developed. Based on them, the storage of system and equipment continued. Inspection of the status of nonconformity management" confirmed that the information on defects will be immediately shared in the corrective action program (hereinafter "CAP (<u>C</u>orrective <u>A</u>ction <u>P</u>rogram)" study group, the details of correction measures were discussed in the CAP committee, and properly reviewed as required. In addition, it was confirmed that in the analysis of existing nonconformity, operation was actively improved through revisions of company .regulation. The inspections confirmed that operational safety activities for other inspection items were carried out in line with the operational safety program. No violations of the operational safety program were identified. Among them, the inspection of the deviation from operational limits at the temporary power failure of B-system emergency DC bus at Unit 3 confirmed that by monitoring judgment of deviation from operational limits and the status of restoration actions, the factor analysis and corrective measures were properly developed both in tangibles and intangible. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (start-up test of C charging pump of Unit 3) , and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(11) The Kansai Electric Power Co. Inc. Takahama Power Station

	First inspection
Period of inspection	Inspection period: May 28 (Mon.) to June 8 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (including inspection at the Nuclear Power Division Head Office) (2)Status of safety culture development activities (including inspection at the Nuclear Power Division Head Office) (3) Status of management review (including inspection at the Nuclear Power Division Head Office) (4)Status of management associated with extended shutdown of the plant (5) Status of radiation management (surprise inspection)
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of safety culture development activities" the "status of management associated with extended shutdown of the plant." and etc. Inspections were conducted at the Nuclear Power Division jointly with the Ohi Nuclear Safety Inspector's Office, the Mihama Nuclear Safety Inspector's Office, and the regional nuclear safety management officer (in charge of the Wakasa region) on the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station" the "status of safety culture development activities," the "status of management review." and etc. Basic inspection of the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that the measures had been constantly planned and carried out at the power station according to the "status of safety measures related to the Tohoku District - off the Pacific Ocean Earthquake at the Takahama Power Station" and the "list of documentation related to emergency safety measures." In addition, at the Nuclear Power Division, it was verified that were making progress in accordance with the implementation plan for safety measures. Moreover, inspection of the maintenance of various materials and equipment deployed according to safety measures confirmed that the maintenance guideline for the materials and equipment were compiled and the maintenance was carried out accordingly. Inspection of the "status of safety culture development activities" confirmed that the "quality policy concerning the safety-first nuclear operation" would be upheld as the safety culture development policy for FY 2012 as a part of the "5 basic courses of action," as instructed by the company president, and reflecting the 10th management review. Likewise, it was confirmed that the policy was reviewed in response to changes in environment of the nuclear energy in response to the accidents at the Fukushima Daiichi Nuclear Power Station to widen the scope of activities. At the power station, the results of the safety culture evaluation at the Takahama Power Station in FY 2011 and instructions from the Nuclear Power Division were reflected in the development process of the "safety culture development activity plan at the Takahama Power Station for FY 2012." In addition, it was confirmed that offices at the power station had been developing the implementation plan in accordance with this activity plan and implement the activity since 2012. Inspection of the "status of management associated with extended shutdown of the plant" confirmed that when the plant's extended shutdown was expected, the storage measures were studied according to the statuses of plants and storage measures were carried out. Special maintenance plans were developed for Unit 1 in accordance with the operational safety program, and the required development of additional maintenance plans would start to maintain the plant's status of extended suspension. As for Unit 4, as required in the future, necessary development of additional maintenance plans would start to maintain the plant's status of extended suspension. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (self-inspection: load test of A emergency diesel generator of Unit 2, etc.), and so on. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Takahama Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon) to Sept. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (2)Status of management associated with extended shutdown of the plant (3)Status of radioactive solid waste management (4) Status of subcontractors' employees' wear of alarm personal dosimeter ("APD") (5) Shipment of spent fuels (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of management associated with extended shutdown of the plant." and etc. Basic inspections of the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed the measures had been constantly planned and carried out at the power station according to the "status of safety measures related to the Tohoku District - off the Pacific Ocean Earthquake at the Takahama Power Station" and the "list of documentation related to emergency safety measures." Moreover, it was confirmed that mid-and-long term measures were steadily proceeding as an equipment improvement activity: safe and flexible places were always looked for and reinforce works to prevent flooding. Inspection of the "status of management associated with extended shutdown of the plant" confirmed that special maintenance plans had been developed for Unit 1, inspection items required to continue the plant's suspension status were extracted, added inspections had started, and additional maintenance activities including the equipment maintenance management. As for Unit 4, special maintenance plans were developed. As required in the future, necessary development of additional maintenance plans would start to maintain the plant's status of extended suspension. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (start-up test of A emergency diesel generator of Unit 2, etc.) , and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Takahama Power Station

	Third inspection
Period of inspection	Inspection period: Dec. 6 (Mon.) to Dec. 19 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2) Status of periodic safety reviews (3) Status of nonconformity management and corrective actions (4) Status of fuel management (5) Status of education and training (6) Status of maintenance and check related to alarm records (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of periodic safety reviews." and etc. Basic inspections of the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that plans and the statuses were managed according to the "status of safety measures related to the Tohoku District - off the Pacific Ocean Earthquake at the Takahama Power Station" and the "list of documentation related to emergency safety measures" while the maintenance of various materials deployed as those for safety measures was maintained and managed in accordance with notices, that a static catalytic hydrogen recombiner was installed to enhance measures against hydrogen explosions related to measures for severe accidents, and that notices were properly revised and managed as documents, etc. Inspection of the "status of periodic safety reviews" confirmed that an implementation plan clarifying the evaluation implementation procedure, system, etc. in advance of a periodic safety review of Units 1 and 2 at Takahama Power Station The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (start-up test of the emergency diesel generator A of Unit 2) , and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Takahama Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.8 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (including inspection at the Nuclear Power Division Head Office) (2)<u>Status of safety culture development activities</u> (including inspection at the Nuclear Power Division Head Office) (3)<u>Status of management associated with extended shutdown of the plant</u> (4) Status of management review (5) Status of measures in the event of earthquakes and fire (6) Status of inspection tours (surprise inspection) (7) Status of record management (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of safety culture development activities," the "status of management associated with extended shutdown of the plant." and etc. Basic inspection of the "status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that various measures were continuously planned and carried out, leading to the steady progress of safety measures. Water-tight doors had been installed and started to be used. The Nuclear Power Division planned to remodel simulators to enhance the ability to cope with severe accidents as one of new measures. Inspection of the "status of safety culture development activities" confirmed offices at the power station carried out measures based on the priority measures in FY 2012, and that after the safety culture development activities in the entire power station was evaluated, challenges, etc. for improvement were extracted. In addition, it was confirmed that the Nuclear Power Division compiled evaluation results of power Stations and that the entire nuclear power division properly evaluated the activities. Inspection of the "status of management associated with extended shutdown of the plant" confirmed that special maintenance plans in response to the extended shutdown were properly developed at Units 2 and 3, and that the effectiveness evaluation of FY 2012 maintenance management was carried out based on the company standard. In addition, by randomly sampling the electric/measurement control equipment as the horizontal deployment related to uninspection of electric/measurement control equipment at Monju, it was confirmed that inspections were properly carried out according to the inspection frequency. Nonconformity management was carried out for the change of the overdue inspection time beyond the frequency (concession treatment). The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests (load test of the emergency diesel generator A of Unit 4) , and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(12) The Chugoku Electric Power Co. Inc. Shimane Nuclear Power Station

	First inspection
Period of inspection	Inspection period: Jun.5 (Tue) to Jun. 21 (Thurs.), 2012 During the above period, an additional inspection was conducted on Jun. 8 (Fri), 11 (Mon), and 12 (Tues), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2) Status of periodic safety reviews (3) Status of maintenance management (4) Status of education and training (surprise inspection) 2) Additional inspection items Status of remedial actions of violations of the operational safety program (Violation 1) in response to violations of the operational safety management
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." , the "status of periodic safety reviews." and etc. In addition, the "status of remedial actions in response to the operational safety program Violation (Violation 1) related to inadequate maintenance management, etc." was selected as an additional inspection item in order to confirm the status of improvement of the licensee based on the recurrence preventive measures. The inspections were conducted under the supervision and guidance of the special nuclear facility supervisor as special operational safety inspection. Basic inspection of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that the training in preparation for a station blackout and inspection of the materials and equipment necessary for the response to a station blackout were performed in accordance with the plan and that further measures to improve reliability including measures against flooding and measures against severe accidents including equipment for discharging hydrogen at the reactor building of Unit 2 were steadily proceeding. Inspection of the "status of periodic safety reviews" confirmed that in the third review planning stage for Unit 1 and the second review reporting stage for Unit 2, periodic safety reviews were properly carried out in accordance with procedures. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. An additional inspection of the "status of remedial actions in response to the operational safety program Violation (Violation 1) related to inadequate maintenance management, etc." confirmed that the measures to prevent recurrence were properly carried out according to the developed plan. The recurrence preventive measures were being improved. The status of improvement is to be monitored in the future operational safety inspection, and so on. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities (the reactor building of Unit 1), attending routine tests (manual start-up test of the emergency diesel generator of Unit 1) , and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

Shimane Nuclear Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon) to Sept. 14 (Fri), 2012 During the above period, an additional inspection was conducted on Sept. 3 (Mon), 10 (Mon) and 11 (Tue), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2)<u>Status of maintenance management</u> (3) Status of wear of alarm personal dosimeter (4) Status of nonconformity management (surprise inspection) 2) Additional inspection items Status of remedial actions of violations of the operational safety program (Violation 1) in response to violations of the operational safety management
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. the "Status of maintenance management" and etc.. In addition, the "status of remedial actions in response to the operational safety program Violation (Violation 1) related to inadequate maintenance management, etc." was selected as an additional inspection item in order to confirm the status of improvement of the licensee based on the recurrence preventive measures. The inspections were conducted under the supervision and guidance of the special nuclear facility supervisor as special operational safety inspection. Basic inspection of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that the training in preparation for a station blackout (hereinafter the "training") and inspection of the materials and equipment necessary for the response to a station blackout (hereinafter the "materials and equipment") were performed in accordance with the plan and that further measures to improve reliability including measures against flooding in the seawater pumps area and measures against severe accidents including equipment for discharging hydrogen at the reactor building of Unit 2 were steadily proceeding. In addition, as for the "status of maintenance" according to the "process control procedure during the plan shutdown," the"maintenance plan (during extended suspension)" was properly planned and revised for Unit 1 that was experiencing extended shutdown in accordance with the "process control procedure during the plan shutdown." Equipment subject to integrity testing/additional inspection was extracted according to the "equipment integrity testing plan associated with the suspended shutdown of Shimane Unit 1." Additional inspections, etc. were carried out according to plan. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. An additional inspection of the "status of remedial actions in response to the operational safety program Violation (Violation 1) related to inadequate maintenance management, etc." confirmed that the measures to prevent recurrence were properly carried out according to the developed plan. The recurrence preventive measures were being improved. The status of improvement was to be monitored in the future operational safety inspection, and so on. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities (the reactor building of Unit 2), attending routine tests (manual start-up test of the emergency power supply high pressure core spray system of diesel generator of Unit 2), and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

Shimane Nuclear Power Station

	Third inspection
Period of inspection	Inspection period: Nov. 27 (Tue) to Dec. 13 (Thurs.), 2012 During the above period, an additional inspection was conducted on Nov. 27 (Tue.), and Dec. 4 (Tue.) to 6 (Thurs.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (2)Status of maintenance management (3) Status of wear of alarm personal dosimeter (4) Status of operational management (5) Status of confirming influence of radioactive fallout caused by the accident (surprise inspection) (6) Status of maintenance and check related to alarm records (surprise inspection) 2) Additional inspection items Status of remedial actions of violations of the operational safety program (Violation 1) in response to violations of the operational safety management
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. ”, the “status of maintenance management” and etc.. In addition, the “status of remedial actions in response to the operational safety program Violation (Violation 1) related to inadequate maintenance management, etc.” was chosen as an additional inspection item in order to examine the improvement status of the licensee based on recurrence prevention measures. The inspections were conducted under the supervision and guidance of the special nuclear facility supervisor. Basic inspection of the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that the training in preparation for a station blackout (hereinafter the “training”) and inspection of the materials and equipment necessary for the response to a station blackout (hereinafter the “materials and equipment”) were performed in accordance with the plan and that further measures to improve reliability including the reinforcement of water barrier wall and measures against severe accidents including equipment for discharging hydrogen at the reactor building were steadily proceeding. In addition, as for the “status of maintenance management,” “maintenance plan (during extended suspension)” was properly planned and revised for Unit 1 that was experiencing extended shutdown in accordance with the “process control procedure during the plan shutdown.” Equipment subject to integrity testing/additional inspection was extracted according to the “equipment integrity testing plan associated with the suspended shutdown of Shimane Unit 1.” Additional inspections, etc. were carried out according to plan. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. An additional inspection of the “status of remedial actions in response to the operational safety program Violation (Violation 1) related to inadequate maintenance management, etc.” confirmed that the measures to prevent recurrence were properly carried out according to the developed plan and all items in the plan were carried out. The implementation status of recurrence prevention measures was to be monitored in the future operational safety inspection, etc. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities (the reactor building of Unit 2, etc.), attending routine tests (manual start-up test of the emergency power supply A-diesel generator of Unit 2) , and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

Shimane Nuclear Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.28 (Thurs.) to Mar.15 (Fri.), 2013 During the above period, an additional inspection was conducted on Mar. 8 (Fri), 11 (Mon), and 12 (Tues), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (2)Status of maintenance management (3) Status of management review (including inspection at the head office) (4) Status of internal audits (inspection at the head office) (5) Status of reactor core management (inspection at the head office) (6) Status of creation and preservation of records of maintenance (surprise inspection) 2) Additional inspection items Status of remedial actions of violations of the operational safety program (Violation 1) in response to violations of the operational safety management
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. the ”status of the maintenance management.” and etc. In addition, the “status of remedial actions in response to the operational safety program Violation (Violation 1) related to inadequate maintenance management, etc.” was chosen as an additional inspection item in order to examine the improvement status of the licensee based on recurrence prevention measures. The inspections were conducted under the supervision and guidance of the special nuclear facility supervisor. Basic inspection of the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that periodic training in preparation for a station blackout (hereinafter the “training”) and inspection of the materials and equipment necessary for the response to a station blackout (hereinafter the “materials and equipment”) were performed in accordance with the plan. Steady progress was also confirmed with the measures to improve the reliability of the reinforcement of the water barrier wall. In addition, inspection of the “status of maintenance management” confirmed that special maintenance plans were developed for Unit 2 as well as Unit 1 based on the “process control procedure during the plan shutdown,” that proper storage measures were implemented, and that additional inspection works completed in and after the previous inspection were properly carried out in Unit 1. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. An additional inspection of the “status of remedial actions in response to the operational safety program Violation (Violation 1) related to inadequate maintenance management, etc.” confirmed that all measures to prevent recurrence were properly carried out according to the developed plan and efforts were made to implement them all the time. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities (the reactor buildings of Units 1 and 2), attending routine tests (manual start-up test of the emergency power supply A-diesel generator of Unit 1, etc.), and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

(13) Shikoku Electric Power Co. Inc. Ikata Power Station

	First inspection
Period of inspection	Inspection period: June 4 (Mon.) to June 15 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (2)Status of maintenance management (3) Status of management review (including inspections at the head office and Nuclear Engineering Training Center) (4) Status of operational management (5) Status of management of access-controlled areas and environmental monitoring areas (6) Status of fire prevention measures (with witness) (surprise inspection)
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.," the "status of maintenance management," the "status of management review," and the "status of operational management" and etc. at the power station, Nuclear Engineering Training Center, and the head office. Basic inspection of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that measures developed by the licensee were steadily carried out according to plan including mid-and-long term measures, and that materials and equipment deployed for emergency were inspected and managed in accordance with materials and equipment management manual for emergency, etc. Inspection of the "status of maintenance management" confirmed that special maintenance plan for Unit 3 had developed, maintenance activities were carried out accordingly, maintenance activities were carried out for Units 1 and 2 during suspension/storage condition. Moreover, the long-maintenance management policy was developed based on the aging technical evaluation and was reflected in a maintenance plan. Inspection of the "status of management review" confirmed that the input data of management reviews in 2011 was properly consolidated, and that as a result of management reviews, the company president provided an instruction to add an item of "making efforts to gain new knowledge and actively working on necessary safety measures to improve the nuclear safety" to the quality policy for nuclear safety as a measure in response to the accidents at Fukushima Daiichi Nuclear Power Station. The added quality policy was established as FY 2012 quality target. It was reflected in the action plan that by getting information on troubles in and out of Japan, confirming whether there is any knowledge from the obtained information, and fostering cooperation in information with the interested parties if required. Inspection of the "status of operational management" confirmed that regarding the operational management of plants during cold shutdown, the plant storage policy was established for Units 1 and 2 while the equipment storage and management methods based on the special maintenance plan for Unit 3, and that based on notices of operation communication sheet, etc., the shift chief carried it out properly. In addition, to ensure the operators and the operation management system, in the education/training plan, offering special plant startup trainings and trainings in consideration of severe accidents was planned as an important item. On-site programs for new employees was planned to make them get the specified operational techniques certificate by giving special programs in consideration of the influences of plant shutdown. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests , and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

Ikata Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon) to Sept. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (2)Status of nonconformity management, corrective measures, and preventive measures (3) Status of fuel management (4) Status of measures for abnormal events (4) Status of radioactive waste management (6) Status of wear of alarm personal dosimeter (7) Status of storage of combustible and hazardous materials (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." , the "status of compliance and safety culture development activities," the "status of nonconformity management, corrective measures, and preventive measures" and etc. at the power station. Basic inspections of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that measures developed by the licensee was steadily carried out according to plan, and that inspections and management of materials and equipment for emergency were properly carried out in accordance with materials and equipment management manual for emergency, etc. Inspection of the "status of nonconformity management, corrective measures, and preventive measures" confirmed that nonconformities occurring in and after the previous operational safety inspection were properly carried out based on the nonconformity management bylaw. In addition, they were registered and managed in nucia as preventive measure information and trouble information obtained by interested parties were in the integrated maintenance system (hereinafter "EAM"). It was judged whether any preventive measures should be required for the trouble or not. Preventive measures, if necessary, were properly carried out in accordance with the preventive measures management bylaw. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests , and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

Ikata Power Station

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<tr><th></th><th>Third inspection</th></tr>
<tr><td>Period of inspection</td><td>Inspection period: Dec. 3 (Mon) to Dec. 14 (Fri), 2012</td></tr>
<tr><td>Inspection items</td><td>1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy)
(1)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u>
(2)<u>Status of maintenance management</u>
(3) Status of internal audits (including inspection at the head office)
(4) Status of maintenance management based on the long-term maintenance management policy for Unit 1 reactor
(5) Status of quality goal in the first half of FY 2012
(6) Status of inspection tours in nuclear facilities (surprise inspection)
(7) Status of maintenance and check related to alarm records (surprise inspection)
2) Additional inspection items
None</td></tr>
<tr><td>Outline of inspection results</td><td>Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.”, the “status of maintenance management.” and etc. at the power Station.
Basic inspection of the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that the measures developed by the licensee were steadily carried out according to plan, that trainings related to emergency safety measures were carried out and their effectiveness was evaluated, and that deployed materials and equipment for emergency were inspected and managed according to management manuals for materials and equipment for emergency.
Inspection of the “status of maintenance management” confirmed that maintenance activities based on special maintenance plans were properly carried out at Units 3 and 1 while as for the shutdown and storage conditions of Unit 2, the maintenance activities during the extended suspension were properly carried out in accordance with the maintenance bylaw.
The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified.
The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests , and so forth. No particular issues were identified.
In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.</td></tr>
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Ikata Power Station

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<tr><th></th><th>Fourth inspection</th></tr>
<tr><td>Period of inspection</td><td>Inspection period: Feb.25 (Mon.) to Mar.8 (Fri.), 2013</td></tr>
<tr><td>Inspection items</td><td>1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy)
(1)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u>
(2)<u>Status of nonconformity management, corrective measures, and preventive measures</u>
(3) <u>Status of quality assurance activities</u>
(4) Status of safety culture development activities
(5) Status of radiation management
(6)Status of document management (surprise inspection)
(7) Status of procurement management (surprise inspection)
2) Additional inspection items
None</td></tr>
<tr><td>Outline of inspection results</td><td>Operational safety inspections were conducted at the power station on basic inspection items such as the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” the “status of nonconformity management, corrective measures, and preventive measures,”, the “status of quality assurance activities.” and etc. at the power Station.
Basic the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that the measures developed by the licensee were steadily carried out according to plan, that trainings related to emergency safety measures were carried out and their effectiveness was evaluated, and that deployed materials and equipment for emergency were inspected and managed according to management manuals for materials and equipment for emergency.
Inspection of the “status of nonconformity management, corrective measures, and preventive measures” confirmed that nonconformity management, corrective measures, and preventive measures were carried out in accordance with the nonconformity and the preventive measures management bylaws, corrective measures effectiveness review at the quality assurance committee and preventive measures effectiveness review at the preventive measures study group.
Inspection of the “status of quality assurance activities” confirmed that the status of FY 2012 action plan of Ikata Power Station, which was a quality target based on the quality policy, was reviewed and evaluated, and that the results of power station reviews related to the data input in management reviews were discussed at the quality assurance committee, etc.
The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified.
The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified.
In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.</td></tr>
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(14) Kyushu Electric Power Co. Inc. Genkai Nuclear Power Station

	First inspection
Period of inspection	Inspection period: June 11 (Mon.) to June 22 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of setting quality targets and activities to improve evaluation</u> (2)<u>Status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (3)<u>Status of corrective measures for the damage to the main rod of the charging pump in Unit 3 at Genkai Nuclear Power Station</u> (4)<u>Status of remedial actions in response to past violations (observation)</u> (5) Status of inspection tours in nuclear facilities (surprise inspection)
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of setting quality targets and activities to improve evaluation,” the “status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.”, the “status of corrective measures for the damage to the main rod of the charging pump in Unit 3 at Genkai Nuclear Power Station.,” and etc.. Basic inspection of “status of setting quality targets and activities to improve evaluation” confirmed that the data collected for management reviews properly reflect the actual status of operational safety activities in power station organizations, that the necessary information was reported to the company president as a result of data analysis and evaluation as management review input data, and that as for the quality target, important activities, etc. this year were properly established. Inspection of the “status of safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that the mid-and-long term measures including emergency safety measures were carried out according to plan, that improvements were surely worked on to further improve the safety and the reliability, and that the maintenance management of facilities, materials and equipment were properly carried out. Inspection of the “status of corrective measures for the damage to the main rod of the charging pump in Unit 3 at Genkai Nuclear Power Station” confirmed that corrective measures were properly carried out as recurrence prevention measures, that similar measures were carried out as preventive measures at Unit 4, where a same type of pump as Unit 3 was installed, and that the stricter monitoring was given to the operation status such as the increase of frequency of pump vibration measurement. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Genkai Nuclear Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon) to Sept. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of management review (including inspection at the head office)</u> (2)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.)</u> (3)<u>Status of remedial actions in response to past violations (observation)</u> (4)<u>Status of maintenance management</u> (5) Status of fire prevention measures (8) Status of subcontractor's employees' wear of alarm personal dosimeter (7) Status of radioactive liquid waste control (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of management review,” the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” , the “status of maintenance management. ” and etc.. Basic inspection of the “status of management review” confirmed that the input data collected by the power station and the head quarter for the management review was management review was collected, analyzed, and evaluated, that necessary information was reported to the company president with an approval from General Manager, Nuclear Power Division, and the company president reviewed it. Inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that the mid-and-long term plans including emergency safety measures were developed mainly by the head office, that improvements were steadily made to enhance safety and reliability, and that the maintenance management of facilities, materials and equipment were properly conducted. Inspection of the “status of maintenance management” confirmed that maintenance plans were developed and carried out properly such as planning and implementation of additional inspections, etc. according to studies suitable for conditions of units of reactors as operational safety activities based on a special maintenance plan for plants experiencing suspended shutdown. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Genkai Nuclear Power Station

	Third inspection
Period of inspection	Inspection period: Nov. 26 (Mon.) to Dec. 7 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (2)Status of continuous improvement (3) Status of fuel management (4) Status of radiation management (5) Status of operational safety education (6) Status of radioactive gaseous waste control (surprise inspection) (7) Maintenance and check of alarm recording device (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.”, the “status of continuous improvement,” the “status of fuel management,” the “status of radiation management,” the “status of operational safety education.” and etc.. Basic inspection of the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that the mid-and-long term plans including emergency safety measures were developed mainly by the head office, that improvements were steadily made to enhance safety and reliability, and that facilities, materials and equipment were properly maintained and managed. Inspection of the “status of continuous improvement” confirmed that based on quality assurance activities in FY2011, the section controlling the activities steadily and properly conducted studies and trials to improve the objectivity of nonconformity management. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Genkai Nuclear Power Station

	Fourth inspection
Period of inspection	Inspection period: Feb.25 (Mon.) to Mar.8 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (2)Status of continuous improvement (3)Status of maintenance management (4) Status of periodic safety reviews (5) Status of radioactive solid waste management (6)Status of remedial actions in response to past violations (observation) (7) Status of work management related to radioactive waste management (surprise inspection) (8) Status of record management (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” the “status of continuous improvement,” the “status of maintenance management,” the "status of remedial actions in response to past violations (monitoring item)." and etc.. Basic inspections of the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that the measures would be sequent proceeding based on the basic policy for 30 measures obtained from the technical experiences in the accidents and that further measures were taken to reinforce measures. Inspection of the “status of continuous improvement” confirmed that the (mid-term) evaluation of the activities in the entire power station organization, for the purpose of achieving the quality targets, concluded that they were conducted properly following the evaluation of the achievement of quality targets (mid-term), based on the achievements of operational safety activities, response to nonconformity, and other improvement activities. Inspection of the “status of maintenance management” confirmed the status of “special maintenance plans.” In addition, in response to the inadequate maintenance management at “Monju,” inspections of the electric/measurement control equipment after the development of “special maintenance plans” were properly carried out. If inspection plans were changed beyond the inspection frequency specified in inspection plans, nonconformity management based on guidance, etc. was properly conducted. Inspection of the “status of remedial actions in response to past violations (monitoring item)” confirmed the steady implementation of recurrence prevention measures related to the automatic reactor shutdown due to the reduced degree of vacuum in the condenser of Genkai Nuclear Power Station Unit 4, Kyushu Electric Power Co. Inc.” The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(15) Kyushu Electric Power Co. Inc. Sendai Nuclear Power Station

	First inspection
Period of inspection	Inspection period: Jun. 4 (Mon) to Jun. 15 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures of other power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2)<u>Status of work management</u> (3)<u>Status of maintenance management</u> (4) Status of new fuel and spent fuel management (surprise inspection) (5) Status of routine tests (surprise inspection)
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures of other power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” the “status of work management,” , the “status of maintenance management.”, and etc.. Basic inspection of the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that the licensee's mid-and-long term measures were properly planned or carried out and that improvement activities were worked on to enhance safety. Inspection of the “status of work management” confirmed that fire recurrence prevention measures during the 20th periodic inspection of Unit 2 such as prevention of ignition, static electricity suppression, reinforcement of ventilation, specifications in company .regulations, and communication to workers, were carried out, and that in order to reduce risk of fire, information on dangerous goods were organized while the possibility of fire at works were evaluated, etc. In the future, such mechanism was to be improved to seek sustainability. As for the Confirmation of integrity of equipment during suspension in the “status of maintenance management,” it was confirmed with records, etc. that maintenance measures associated with equipment storage and plant's extended shutdown (periodic performance confirmation, etc.) were compiled and that the integrity of equipment was maintained properly accordingly. In addition, as for special maintenance plans for Unit 1, selection of equipment subject to be additional inspection, inspection methods, implementation of additional maintenance, etc. were reviewed. It was confirmed that they were properly developed in accordance with company .regulations. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

Sendai Nuclear Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1) Status of management review (including inspection at the head office) (2)<u>Status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (3)<u>Status of maintenance management</u> (4)Status of nonconformity management (5) Status of radiation management (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of management review,” the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” the “status of maintenance management,” the “status of nonconformity management.”, and etc.. Basic inspection of the “status of management review” confirmed that the input data collected by the power station and the head quarter for the management review was collected, analyzed, and evaluated, that necessary information was reported to the company president with an approval from General Manager (manager), Nuclear Power Division, and that the company president reviewed it. In addition, inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that the mid-and-long term plans including emergency safety measures were developed mainly by the head office, that improvements were steadily made to enhance safety and reliability, and that the maintenance management of facilities, materials and equipment were properly conducted. Moreover, as for the Confirmation of integrity of equipment during suspension in the “status of maintenance management,” it was confirmed with records, etc. that maintenance measures associated with equipment storage and plant's extended shutdown (periodic performance confirmation, etc.) were compiled and that the integrity of equipment was maintained properly accordingly. In addition, as for special maintenance plans for Unit 2, selection of equipment subject to be additional inspection, inspection methods, implementation of additional maintenance, etc. were reviewed. It was confirmed that they were properly developed in accordance with company .regulations. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

Sendai Nuclear Power Station

	Third inspection
Period of inspection	Inspection period: Dec. 3 (Mon) to Dec. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)Status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (2)Status of maintenance management (related to civil engineering and construction) (3) Status of operational safety education (4) Status of radioactive (gaseous/liquid) waste management (5) Status of confirming influence of radioactive fallout caused by the accident (6) Status of inspection tours (surprise inspection) (7) Status of maintenance and check related to alarm records (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” the “status of maintenance management (related to civil engineering and construction),” the “status of operational safety education,” the “status of radioactive (gaseous/liquid) waste management,” and so on. Basic inspection of the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that the mid-and-long term measures related to emergency safety measures, etc. were carried out sequentially and that related .regulations, etc. were revised and trainings were given. Inspection of the “status of maintenance management (related to civil engineering and construction)” confirmed that maintenance inspections were properly carried out based on the program and that works were properly carried out with a view to fostering cooperation with related offices. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

Sendai Nuclear Power Station

	Fourth inspection
Period of inspection	Inspection period: March 4 (Mon.) to March 15 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1) Status of procurement management (2)Status of maintenance management (3) Status of shipment out of the power plant (4) Status of exposure management (5) Status of radioactive solid waste control (surprise inspection) (6) Status of record management (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of procurement management,” the “status of maintenance management,” and etc.. Basic inspection of the “status of procurement management” confirmed that the procurement process, evaluation and selection of suppliers, procurement requirement items, communication with suppliers, verification of procured products, and audit of suppliers were properly carried out according to regulations, etc. Inspection of the “status of maintenance management” confirmed that daily maintenance, cooperation with offices in the power station and subcontractors, status of electric/measurement control inspections, equipment functions, etc. were properly carried out according to guidelines. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, attending routine tests, and so forth. No particular issues were identified. In consideration of the above, it is judged that the operational safety activities selected for examination in this inspection were conducted properly.

(16) The Japan Atomic Power Company, Tokai No. 2 Power Station

	First inspection
Period of inspection	Inspection period: June 4 (Mon.) to June 15 (Tue.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1) Status of compliance and safety culture development activities (2)Status of nonconformity management, corrective measures, and preventive measures (3)Status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (4)Status of fire prevention measures (5)Status of operational safety activities based on special maintenance plan (6) Status of takeover (surprise inspection)
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of compliance and safety culture development activities," the "status of nonconformity management, corrective measures, and preventive measures," the "status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.," and etc.. Inspection of the "status of compliance and safety culture development activities" confirmed that the committee for promotion of the activities evaluated FY 2011 activities, extracted challenges, and developed the FY 2012 implementation plan. In addition, it was confirmed that FY 2012 compliance and safety culture development activity policy continued the contents up to FY 2011. Activity policies were examined based on the instructions of the company president. In 2010, results of the safety diagnosis questionnaire survey were studied in detail. In 2011, questions on opinions after accidents at Fukushima Daiichi Nuclear Power Station were added to conventional questions. In 2012, it was planned that the survey would be used by active use of external diagnosis to study improvement measures. Inspection of the "status of nonconformity management, corrective measures, and preventive measures" confirmed that the horizontal deployment of nonconformities and preventive measures were carried out. In addition, the system related to nonconformity management and nonconformities were handled more swiftly. Moreover, as for the status of remedial actions in response to past violations, measures were carried out. Inspection of the "status of emergency safety measures at the power station in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed the progress of the mid- to long-term measures almost as planned. These include measures related to hardware, such as deployment of high-voltage power-supply cars, installation of an alternative seawater supply system, making the buildings water-tight, and soft solutions such as preparation of operation manuals for these pieces of equipment. Low-voltage power-supply cars were changed from 700kVA leased cars to 500kVA cars owned by the nuclear power plant. Education and trainings were given by staffs in responsible for tsunami. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tokai No. 2 Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon) to Sept. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy). (1) Status of procurement management (2)Status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. (3)Status of fire prevention measures (including inspection at the head office) (4) Status of management review and internal audits (including inspection at the head office) (5) Status of emergency measures (6) Status of subcontractor's employees' wear of alarm personal dosimeter (7) Status of compliance with amendments of the operational safety measures (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of procurement management," the "status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." , the "status of fire prevention measures." and etc.. Inspection of the "status of procurement management" confirmed that based on procurement management requirements, individual specifications were developed according to the classification of importance at the reactor facility, conducted on-site review to see if the business implemented by contractors were carried out according to procurement documents of the individual specifications, and that by using records for Confirmation, the licensee verifies the fact. Inspection of the "status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed the progress of the mid- to long-term measures almost as planned. These include measures related to hardware, or tangibles, such as alternative injection system, fuel tank for high-voltage power-supply cars, deployment of high-voltage power-supply cars, installation of a reactor building hydrogen detector and soft intangible solutions such as preparation of operation manuals for these pieces of equipment. In addition, it was confirmed that intake training with large-capacity fire engine with large capacity by using water storage tank. As for the "status of fire prevention measures," in order to reinforce the fire control system, the head quarter established the fire prevention meeting, and actively worked on the fire prevention measures such as developing action plans in response to the root cause analysis of the past fire incidents. The fire prevention meeting was reorganized into the disaster prevention committee. It was confirmed the committee would work on the nuclear emergency preparedness. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tokai No. 2 Power Station

	Third inspection
Period of inspection	Inspection period: Dec. 3 (Mon) to Dec. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1) Status of radioactive solid waste management (2) Status of operational safety education (3)<u>Status of emergency safety measures of power Stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (4)<u>Status of fire prevention measures</u> (5) Status of fuel management (6) Status of maintenance and check related to alarm records (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.,” the “status of fire prevention measures,” and so on. Inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that the mid-and-long term plans were properly studied such as the installation of reactor building hydrogen vent equipment and blowout panel opening device, and that the measures were proceeding almost according to plan since the 2nd operational safety inspection in 2012.. In addition, it was confirmed that night training for connection of high-voltage power-supply cars as well as nuclear disaster countermeasure drills. Inspection of the “status of fire prevention measures” confirmed that the implementation plan for fire prevention activities and the fire plan clarifying compiling/implementation sections, the head office's disaster prevention committee monitored the status of progress semiannually, properly followed it up, and steadily promoted fire prevention measures. since the 2nd operational safety inspection in 2012.. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tokai No. 2 Power Station

	Fourth inspection
Period of inspection	Inspection period: Mar.4 (Mon.) to Mar.15 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of operational safety activities based on special maintenance plan</u> (2) Status of radiation management (3)<u>Status of emergency safety measures of power Stations in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (4)<u>Status of fire prevention measures</u> (5)<u>Status of nonconformity management, corrective measures, and preventive measures</u> (6) Status of record management (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of operational safety activities based on special maintenance plan, the “status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” the “status of fire prevention measures” the “status of nonconformity management, corrective measures, and preventive measures,” and so on. Inspection of the “status of operational safety activities based on special maintenance plan” confirmed the storage of extracted systems and equipment based on special maintenance plans and the integrity testing by continuous periodic operation. In addition, it was confirmed that the systems and equipment including the electric/measurement control equipment described in the inspection plan were properly managed the system, etc. so that omission of necessary inspections can be omitted. Inspection of the “status of emergency safety measures of power Stations in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” confirmed that since the previous operational safety inspection, tsunami response guidelines had been revised with the reactor building vent operation procedure added, and that as a further improvement measure, a portable diesel power pump was deployed. Inspection of the “status of fire prevention measures” confirmed that since the previous operational safety inspection, fire prevention measures were steadily implemented based on the action plan targeting at exterminating fires. The head office's disaster prevention committee monitored the status of progress semiannually, properly followed it up, and steadily promoted fire prevention measures. Inspection of the “Status of nonconformity management, corrective measures, and preventive measures” confirmed that nonconformity management sheets were issued based on the nonconformity management requirement and that the validity of nonconformity measures were discussed at CPA meeting. In addition, the root cause analysis was conducted for the leak of cleaning liquid waste out of the controlled are in November 2012, recurrence prevention measures were developed, and the measures were pursued. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(17) The Japan Atomic Power Company, Tsuruga Power Station

	First inspection
Period of inspection	Inspection period: May 28 (Mon.) to June 8 (Fri.), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2) <u>Inspection associated with extended shutdown of the plant</u> (3) Status of procurement management (4) Status of maintenance management (5) Status of fuel management (6) Status of operational safety education (7) Status of inspection tours (surprise inspection)
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.", the "inspection associated with extended shut down of the plant." and etc.. Basic inspection of the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that as a result of confirming measures since the previous operational safety inspection, hard/tangible infrastructures such as the deployment of alternative emergency generator at Unit and the deployment of large-capacity seawater pump and soft/intangible safety improvement measures such as the establishment of support system by plant manufacturers' engineers, review of severe accident manuals, and clarification of the chain of command. "Inspection associated with extended shutdown of the plant" confirmed that the operational safety activities based on special maintenance plans maintained the safety of plant during extended suspension. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tsuruga Power Station

	Second inspection
Period of inspection	Inspection period: Sept. 3 (Mon) to Sept. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2) <u>Status of management review and internal audits (including inspection at the head office)</u> (3)<u>Status of fire prevention measures (including inspection at the head office)</u> (4) Status of radioactive waste management (5) Status of remedial actions in response to past violations (monitoring item) (6) Status of procurement management (7) Status of maintenance management (8) Status of subcontractor's employees' wear of alarm personal dosimeter ("APD") (9) Status of the maintenance and repair team and the generator room training (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." the "status of management review and internal audits," the "status of fire prevention measures." and etc.. Basic inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that as a result of Confirmation of emergency safety measures, etc. implemented in and after the previous operational safety inspection, safety improvement measures such as the deployment of large-capacity seawater pump and emergency power supply for monitoring a pool of spent fuel at Unit 1 Inspection of the "status of management review and internal audits "confirmed that the management review in FY 2011 and the internal audit in FY 2010 and FY 2011 were properly conducted. It was confirmed that among them, as a proposal to improve FY 2011 management review, recurrence prevention measures against input error in reports and implementation of fire prevention measures were output and distributed in FY 2012. As for the "status of fire prevention measures," in order to reinforce the fire control system, the head quarter established the fire prevention meeting, and actively worked on the fire prevention measures such as developing action plans in response to the root cause analysis of the past fire incidents. The fire prevention meeting was reorganized into the disaster prevention committee. It was confirmed the committee would work on the nuclear emergency preparedness. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tsuruga Power Station

	Third inspection
Period of inspection	Inspection period: Dec. 3 (Mon) to Dec. 14 (Fri), 2012
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2) <u>Inspection associated with extended shutdown of the plant</u> (3)<u>Status of nonconformity management</u> (4) Status of measures for abnormal events (5) Status of radiation management (6) Status of routine tests (surprise inspection) (7) Status of maintenance and check related to alarm records (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc., "the "inspection associated with extended shut down of the plant," the "status of nonconformity management." and etc.. Basic inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that as a result of Confirmation of emergency safety measures, etc., implemented in and after the previous operational safety inspection, safety improvement measures were steadily carried out such as the completion of 6 out of 13 replacement points of water-tight doors, increase of satellite phones and outdoor antennas, and the completion of portable monitoring post maintenance. As for the "inspection associated with extended shutdown of the plant," it was expected that the plant's shutdown would be extended longer than the original expectation. All reactor pressure vessels were blown, naturally dried, and stored for a long time. The storage of systems and equipment were carried out at Units 1 and 2 according to plans per environment. Inspection of the "status of nonconformity management" confirmed he role of CPA meeting which managers or higher ranking officials attend in the nonconformity treatment flow. In addition, nonconformity management, corrective and preventive measures were carried out for 5 selected nonconformities occurring this year. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tsuruga Power Station

	Fourth inspection
Period of inspection	Inspection period: Mar.4 (Mon.) to Mar.15 (Fri.), 2013
Inspection items	1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) (1)<u>Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.</u> (2) Status of compliance and safety culture development activities (3) Status of record and reporting (4) Status of radiation management (5) Status of measures to prevent recurrence of the damage to the transmission cable of the outlet monitor (6) Status of maintenance management (7) Status of routine tests (surprise inspection) (8) Status of retention of operation safety record (surprise inspection) 2) Additional inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.," the "status of compliance and safety culture development activity," and so on. Basic inspection of the "status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc." confirmed that by reviewing emergency safety measures, etc. since the previous operational safety inspection, it was found that nuclear disaster countermeasure drills and safety improvement measures including replacement of the existing doors with the water-tight ones on the assumption of stricter conditions were steadily implemented. Inspection of the "status of compliance and safety culture development activity" confirmed that the evaluations of activities in FY 2011 were reflected in FY 2012 plan and that the compliance and safety culture development activities were properly carried out. The inspections confirmed that operational safety activities for other inspection items were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(18) The Japan Atomic Power Company, Tokai Power Station

	First inspection
Period of inspection	Inspection period: May 14 to May 18, 2012
Outline of inspection	The nuclear safety inspector conducted safety inspections by entering the facility, examining certain objects such as records, and questioning concerned parties with regard to the status of operational safety activities in accordance with the operational safety program. (Inspection items) ・Status of nonconformity management and trouble-shooting measures ・Status of maintenance management ・Witnessed inspection of safe storage and isolation ・Witnessed inspection of decommissioning work ・Witnessed inspection of the inspection tours and maintenance of the maintenance management equipment ・Witnessed inspection of maintenance management of the equipment in environmental monitoring areas ・Witnessed inspection of maintenance management of the radiation management equipment
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of nonconformity management and trouble-shooting measures," the "status of maintenance management." and etc.. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily management during the safety inspection period was examined by interviewing the licensee on decommissioning management of the facilities, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tokai Power Station

	Second inspection
Period of inspection	Inspection period: Aug. 20 (Mon.) to Aug. 24 (Fri.), 2012
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties to confirm the status of compliance with the operational safety program. Operational safety inspections of the daily interview of decommissioning management of the facilities, review of records, and inspection tours of the facilities, and so on were also conducted. 1) Safety inspection items (1) Status of emergency measures (2) Status of operational safety education (3) Status of revisions of the operational safety program (4) Witnessed inspection of decommissioning work (5) Status of the inspection tours and maintenance of the maintenance management equipment (6) Witnessed inspection of management of the equipment in environmental monitoring areas 2) Priority inspection items (1) Status of emergency measures (2) Status of operational safety education 3) Clause-by-clause inspection items Status of revisions of the operational safety program 4) Follow-up inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of emergency measures," the "status of operational safety education." and etc.. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily management during the safety inspection period was examined by interviewing the licensee on decommissioning management of the facilities, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tokai Power Station

	Third inspection
Period of inspection	Inspection period: Nov. 12 (Mon.) to Nov. 16 (Fri.), 2012 Additional inspection: Dec. 27 (Thurs.), 2012
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties to confirm the status of compliance with the operational safety program. Operational safety inspections of the daily interview of decommissioning management of the facilities, review of records, and inspection tours of the facilities, and so on were also conducted. 1) Safety inspection items (1) Status of procurement management (2) Status of nonconformity management (3) Status of management of the instrumentation for release management and radiation measuring devices (4) Monitoring of the implementation status, etc. of facilities in the decommissioning stage (5) Monitoring of the status of safety storage and isolation (6) Monitoring of the status of management of the equipment in environmental monitoring areas (7) Monitoring of the implementation status of measures to prevent recurrence of incorrect entry of calculation data in an application document for decommissioning plan 2) Priority inspection items (1) Status of procurement management (2) Status of nonconformity management 3) Clause-by-clause inspection items None 4) Follow-up inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “status of procurement management,” the “status of nonconformity management,” the “status of management of the instrumentation for release management and radiation measuring devices,” “monitoring of the implementation status, etc. of facilities in the decommissioning stage,” “monitoring of the status of safety storage and isolation” and “monitoring of the status of management of the equipment in environmental monitoring areas.” In addition, in response to data input error related to the decommissioning plan for Tokai Power Station, whose final report was in August 2012, the status of recurrence prevention measures was confirmed. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily management during the safety inspection period was examined by interviewing the licensee on decommissioning management of the facilities, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Tokai Power Station

	Fourth inspection
Period of inspection	Feb. 18 (Mon.) to Feb. 22 (Fri.), 2013
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties to confirm the status of compliance with the operational safety program. Operational safety inspections of the daily interview of decommissioning management of the facilities, review of records, and inspection tours of the facilities, and so on were also conducted. 1) Safety inspection items (1) Status of decommissioning work (2) Status of radioactive waste management (liquid/gaseous waste) (3) Monitoring of the status of safety storage and isolation (4) Status of management of the equipment in environmental monitoring areas (5) Status of preventive measures (surprise inspection) 2) Priority inspection items (1) Status of decommissioning work 3) Clause-by-clause inspection items None 4) Follow-up inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “Status of decommissioning work.”, and etc.. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily management during the safety inspection period was examined by interviewing the licensee on decommissioning management of the facilities, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

(19) Japan Atomic Energy Agency, Tsuruga Head Office,

Fugen Decommissioning Engineering Center

	First inspection
Period of inspection	Inspection period: June 11 to June 15, 2012
Outline of inspection	The nuclear safety inspector conducted safety inspections by entering the facility, examining certain objects such as records, and questioning concerned parties with regard to the status of operational safety activities in accordance with the operational safety program. (Inspection items) ・Status of operational safety related to waste management ・Status of internal audits ・Status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. ・Status of nonconformity management, corrective measures, and preventive measures
Outline of inspection results	Inspection was conducted on section items such as the “status of emergency safety measures in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.,” the “status of nonconformity management, corrective measures, and preventive measures,” and so on. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, and making inspection tours of the facilities. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Fugen Decommissioning Engineering Center

	Second inspection
Period of inspection	Inspection period: Sept. 18 (Tue.) to Sept. 21 (Fri.), 2012
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties. The status of daily operational management during the safety inspection period was also examined by conducting interviews on daily operational management, reviewing operation records, making inspection tours of the reactor facilities, and so forth. 1) Safety inspection items (1) Status of preventive measures (2) Status of subcontractor's employees' wear of alarm personal dosimeter (3) Status of compliance with operational safety program related to the decommissioning plan 2) Priority inspection items (3) Status of compliance with operational safety program related to the decommissioning plan 3) Clause-by-clause inspection items None 4) Follow-up items None
Outline of inspection results	The safety inspections in this quarter focused on the "status of compliance with operational safety program related to the decommissioning plan," and etc.. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, and making inspection tours of the facilities. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Fugen Decommissioning Engineering Center

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<tr><th></th><th>Third inspection</th></tr>
<tr><td>Period of inspection</td><td>Inspection period: November 26 (Mon.) to November 30 (Fri.), 2012</td></tr>
<tr><td>Outline of inspection</td><td>Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties. The status of daily operational management during the safety inspection period was also examined by conducting interviews on daily operational management, reviewing operation records, making inspection tours of the reactor facilities, and so forth.
1) Safety inspection items
(1) Status of operational safety activities related to revisions of the operational safety program approved on August 10, 2012 (Confirmation of influence of radioactive fallout caused by the accident)
(2) Status of compliance with operational safety program related to investigations and research programs using nuclear power reactors
(3) Status of compliance with operational safety program related to the decommissioning plan
(4) Status of nonconformity management, corrective measures, and preventive measures
2) Priority inspection items
(3) Status of compliance with operational safety program related to the decommissioning plan
(4) Status of nonconformity management, corrective measures, and preventive measures
3) Clause-by-clause inspection items
(1) Status of operational safety activities related to revisions of the operational safety program approved on August 10, 2012 (Confirmation of influence of radioactive fallout caused by the accident)
4) Follow-up items
None</td></tr>
<tr><td>Outline of inspection results</td><td>The inspection was conducted on inspection items such as the “status of operational safety activities related to changes of operational safety program which change was approved on August 10, 2012 (Confirmation of influence of radioactive fallout caused by the accident),” the “status of compliance with the operational safety program related to investigations and R&D using nuclear reactors,” the “compliance with the operational safety program related to decommissioning plans,” and the “status of nonconformity management, corrective measures, and preventive measures.”
The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified.
The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, and making inspection tours of the facilities. No particular issues were identified.
In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.</td></tr>
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Fugen Decommissioning Engineering Center

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<tr><th></th><th>Fourth inspection</th></tr>
<tr><td>Period of inspection</td><td>Inspection period: Feb. 25 (Mon.) to Mar. 1 (Fri.), 2013</td></tr>
<tr><td>Outline of inspection</td><td>Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties. The status of daily operational management during the safety inspection period was also examined by conducting interviews on daily operational management, reviewing operation records, making inspection tours of the reactor facilities, and so forth.
1) Safety inspection items
(1) Status of nonconformity management, corrective measures, and preventive measures
(2) Status of compliance with operational safety program related to the decommissioning plan
(3) Status of management of radioactive waste transportation
(4) Status of operational safety activities related to radiation management
(5) Status of compliance with operational safety program related to fuel and heavy water
2) Priority inspection items
(1) Status of nonconformity management, corrective measures, and preventive measures
(2) Status of compliance with operational safety program related to the decommissioning plan
3) Clause-by-clause inspection items
None
4) Follow-up items
None
5) Surprise inspection item
(3) Status of management of radioactive waste transportation</td></tr>
<tr><td>Outline of inspection results</td><td>Inspection was conducted on section items such as the “status of nonconformity management, corrective measures, and preventive measures,” and etc..
The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified.
The status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, and making inspection tours of the facilities. No particular issues were identified.
In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.</td></tr>
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(20) Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center

	First inspection
Period of inspection	Inspection period: June 4 to June 15, 2012
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties to confirm the status of compliance with the operational safety program. In addition, questioning on operation management status during the operational safety inspection period, reviewing records, and making inspection tours of the reactor facilities were carried out as operational safety inspections. I. Status of equipment integrity testing (1) Status of development of special maintenance plan related to extended shutdown and ageing degradation suppression/monitoring (2) Status of inspection in accordance with special maintenance plans for the water and steam system and maintenance plans for primary and secondary system equipment, etc. II. Status of special maintenance plan (related to in-vessel transfer machine) (1) Status of restoration of the in-vessel transfer machine (2) Status of prevention of recurrence of the fall accident involving the in-vessel transfer machine and feedback to other installations (3) Status of implementation of expanded measures of root cause analysis related to the fall accident involving the in-vessel transfer machine III. Status of nonconformity management, corrective measures, and preventive measures (1) Status of prevention of recurrence of malfunction of control rod driving mechanism (2) Status of nonconformity management, corrective measures, and preventive measures IV. Status of emergency safety measures (1) Status of emergency safety measures and maintenance management of facilities, and so on V. Status of management review (1) Status of output from management reviews (2) Status of development of action plans based on output VI. Status of safety culture development activities (1) Status of development of safety culture development plan VII. Surprise inspection (1) Status of performance test after the backup shutdown rod drives inspection
Outline of inspection results (continued)	The operational safety inspection confirmed the following emergency safety measures, etc. as items based on the basic inspection policy: status of equipment integrity Confirmation based on the maintenance plan related to extended shutdown, status of special maintenance plan related to the restoration of the in-vessel transfer machine (hereinafter "IVTM"), status of special maintenance plan related to the restoration, status of nonconformity management, corrective measures, and preventive measures, and status of emergency safety measures, etc. In addition, as for the status related to the output of management reviews and the status of safety culture development plan, a series of operational safety activities complied with the operational safety program and was properly carried out. Inspection of equipment integrity testing confirmed evaluation of the specific tendency toward deterioration and status of deterioration suppression/monitoring measures in accordance with special maintenance plan related to the extended shutdown identified in the previous operational safety inspection. In addition, as a result of selection of equipment and specific status of maintenance based on the maintenance plan, it was confirmed that inspections/monitoring measures, etc. were properly carried out in accordance with predetermined procedures.
Outline of inspection results	Regarding the status of special maintenance plan (related to IVTM), work/procurement management, etc. was properly carried out according to the special maintenance plan. To confirm the fuel replacement function, functions of auxiliary handling machine (hereinafter "AHM"), IVTM, and fuel handling machine (hereinafter "FHM") were confirmed according to the predetermined procedures. In the future, comprehensive functional testing would be carried out and the works related to restoration would complete. The status should be confirmed by pre-use inspections, etc. Regarding the status of recurrence management of IVTM fall accident reported on March 9, 2013, measures directly related to the cause are equipment measures such as the modification of AHM gripping mechanism and enhancement of suspension/suspension judgment function, and procurement management and mechanism improvement measures such as design management. Measures related to root cause analysis including actions such as sharing of trouble cases with an aim of development of my plant consciousness and the impact assessment of connection among different types of equipment were carried out according to plan. In addition, as for recurrence prevention measures related to the delay in information communication, measures to strengthen education on information communication, the development of strengthening workforce plan as measures to enhance the system of the fuel and environment division. The system would be strengthened. If measures were ongoing, they were to be continuously monitored in the future operational safety inspections. As for the enhancement of root cause analysis instructed on April 2, 2013, it was confirmed that the information necessary to enhance the root cause analysis was collected and studied: the communication in the organization and the establishment of the system for review were swiftly established, and more than one external organization could be investigated. Details of plans and measures to be developed in the future were to be monitored in the future operational safety inspections, etc. Inspection of the status of nonconformity management, corrective measures, and preventive measures confirmed that Units 1 and 2 of backup shutdown rod drives after the measures of replacement of electromagnetic brakes (hereinafter "BCRD") had been installed on site and other units were being installed sequentially. The inspection also confirmed verification tests to quantitatively investigate causes, and the effectiveness evaluation of such measures were given according to plan. Regarding LCO deviation event caused by suspension of the secondary system gas sampling sodium leakage detection system (hereinafter called "RID"), measures for equipment requesting a function at a low temperature shutdown in the horizontal deployment had completed and measures for other equipment would be finished by the end of FY2013. Regarding the continuous improvement of nonconformity management and corrective measure process, improvement of operators responsible for root cause analyses was planned. In the nonconformity management committee in the month, it was confirmed the operation improvements such as the addition of reporting of the status of every item for recurrence prevention measures in case of important nonconformities. Inspection of status of emergency safety measures confirmed that the power connecting board was being modified so that flexible use of power-source cars from other licensees could be achieved. Regarding the management of materials and equipment, divisions responsible for equipment were properly conducting them. Inspections of the status of management review and safety culture development activities confirmed that top management instructed items in response to previous year's assessment of results, and that specific actions were carried out. In addition, the status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

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<tr><th></th><th>Second inspection</th></tr>
<tr><td>Period of inspection</td><td>Inspection period: Sept. 3 (Mon.) to Sept. 14 (Fri.), 2012</td></tr>
<tr><td>Outline of inspection</td><td>Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties to confirm the status of compliance with the operational safety program. In addition, questioning on operation management status during the operational safety inspection period, reviewing records, and making inspection tours of the reactor facilities were carried out as operational safety inspections.
1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy)
I. Status of radiation management
(1) Status of radioactive waste management as stipulated in Chapter 7 of the operational safety program
II. <u>Status of measures related to the fall accident involving the in-vessel transfer machine</u>
(1) Status of prevention of recurrence of the fall accident involving the in-vessel transfer machine and feedback to other installations
(2) Status of measures in response to root cause analysis related to the in-vessel transfer machine
III. <u>Status of nonconformity management, corrective measures, and preventive measures</u>
(1) Status of nonconformity management, corrective measures, and preventive measures
IV. <u>Status of emergency safety measures</u>
(1) Status of emergency safety measures and maintenance management of facilities, and so on
V. Status of activities to prepare for plant testing at 40-percent output
(1) Status per challenge
VI. Surprise inspection
(1) Status of maintenance based on a maintenance plan</td></tr>
<tr><td>Outline of inspection results</td><td>Operational safety inspections were conducted on items based on the basic inspection policy such as the status of measures for the fall accident involving the in0vessel transfer machine, nonconformity management, status of corrective measures and preventive measures, and the status of emergency safety measures. In addition, inspections of the status of activities to prepare for plant testing at 40-percent output and the status of radiation management confirmed that a series of operational safety activities complied with the operational safety program and were properly carried out.
As a result of the inspection, it was found that regarding measures related to the fall accident involving the in-vessel transfer machine, the prevention of recurrence of the fall accident involving the in-vessel transfer machine and horizontal deployment consisted of 41 items. Confirming the status, 36 items were finished and 5 were being carried out. They were proceeding according to plan. Regarding measures in response to the root cause analysis result related to the fall accident, action plans were developed and the measures were carried out according to plan.
Inspection of the status of nonconformity management, corrective measures, and preventive measures confirmed that the armband fall accident into a pit filled with cask during the periodic inspection of cask crane, deviation from operational limits due to Confirmation of alarm from EVST system gas sampling sodium leakage detection system (DPD), and trip event due to “high” pressure of air conditioning freezer condenser A were properly handled.
Inspection of the status of emergency safety measures confirmed that equipment was added/improved, procedures were established, and trainings were given according to plan.
Inspection of status of radiation management confirmed that the radiation management in Chapter 7 of the operational safety program was reviewed per article, and the management was properly carried out.
Improvement measures for the remaining 9 items of major challenges to be handled by the 40 % test (challenge extracted at the core verification test) were proceeding.
In addition, the status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified.
In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.</td></tr>
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	Third inspection
Period of inspection	Inspection period:Nov.26 (Mon.) to Dec. 11 (Fri.), 2012 It took time to confirm the facts related to the “status of nonconformity management (nonconformities in the maintenance and management).” The inspection period was extended by 2 days.
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties to confirm the status of compliance with the operational safety program. In addition, questioning on operation management status during the operational safety inspection period, reviewing records, and making inspection tours of the reactor facilities were carried out as operational safety inspections. 1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) I. <u>Status of equipment integrity testing</u> (1) Status of maintenance based on special maintenance plans for the water and steam system, etc. (2) Status of maintenance based on special maintenance plans for primary and secondary system equipment, etc. II. <u>Status of special maintenance plan (related to in-vessel transfer machine)</u> (1) Status of prevention of recurrence of the fall accident involving the in-vessel transfer machine and feedback to other installations (2) Status of implementation of expanded measures of root cause analysis related to the fall accident involving the in-vessel transfer machine III. <u>Status of nonconformity management, corrective measures, and preventive measures</u> (1) Status of prevention of recurrence of LCO deviation event of the secondary system gas sampling sodium leakage detection system (RID) (2) Status of corrective and preventive measures related to events of defect instruction from the primary main cooling system sodium leakage detection system (SID) around a reactor vessel and event of partial reactor trip signals (3) Status of nonconformity management, corrective measures, and preventive measures (4) Status of nonconformity management (nonconformities in the maintenance and management) IV. <u>Status of emergency safety measures</u> (1) Status of emergency safety measures and maintenance management of facilities, and so on V. Status of radioactive waste management (1) Status of review of radioactive waste management related to the confirmation of influence of radioactive fallout caused by the accident VI. Surprise inspection (1) Status of maintenance and check related to alarm records
Outline of inspection results (continued)	(1) Defects in maintenance management Nonconformity reports related to inadequate maintenance management during the operational safety inspection period reported there were a lot of nonconformities of overdue inspection periods. The inspection schedule was extended by 2 days and the inspection items were added to verify if there was any violation of the operational safety program related to this nonconformity. a) Three pieces of equipment that required safety functions and whose compliance with the predetermined frequency had not been selected were selected as representative pieces to confirm the maintenance status and related records. As a result, it was found that the inspection frequency specified in the maintenance plan and the compliance of the timing had not been inspected. The inspection frequency or the period had not been properly reviewed based on results of maintenance effectiveness evaluations. As the inspection frequency was not fully recognized as a business requirement to be complied with, a nonobservance of it was not detected as a nonconformity and the nonconformity management was not performed including a concession treatment.

Outline of inspection results	b) In response to the results of a), among 9,679 pieces of equipment reported by the licensees, 82 pieces (Class 1 (63 pieces) and Class 2 and 3 (19 pieces in total)) were selected from the equipment list with function request during the shutdown (476) and confirmed the following: Other than equipment whose excess was reported, equipment with higher safety importance (Class 1) was included. At present, the licensees' information was not arranged. The specific number of overdue equipment, a degree of effects, and other specific details of the event were not finalized. In addition, inspection intervals were changed without any proper assessment. It was found that 4 pieces of equipment had not been inspected as of now. Therefore, it was judged that this violates Article 3 (Quality Assurance) and Article 103 (Maintenance Management Plan in the Design Phase). In consideration of the identified facts, the authority judged that this violated Article 35-1 (Maintenance of Reactor Facility) and Article 37-4 (Compliance with the Operational Safety Program) and that the reactor facility was not properly maintained, and issued orders of necessary measures according to Article 36-1 and orders of collection of reports according to Article 67-1. Final decisions on operational safety program Violation categories were made after verification of reports from the licensee. (2) Other inspection items Inspection confirms the status of equipment integrity testing, the status of special maintenance plan (related to in-vessel transfer machine), the status of nonconformity management, corrective measures, and preventive measures, and status of emergency safety measures. In addition, inspections of the status of radioactive wastes management confirmed a series of operational safety activities complied with the operational safety program and were properly carried out. Inspection confirmed that as for the status of equipment integrity testing, equipment selected from the water and steam system and the primary and secondary system were inspected in accordance with the predetermined maintenance plan. Inspection of status of the special maintenance plan (related to in-vessel transfer machine) confirmed that as the prevention of recurrence of the fall accident involving the in-vessel transfer machine and the horizontal deployment, the items required in the design phase such as validity Confirmation were proceeding according to plan. Regarding measures in response to the root cause analysis result related to the fall accident, action plans were developed and the measures were carried out according to plan. As items related to the status of nonconformity management, corrective measures, and preventive measures other than (1), regarding recurrence prevention measures of LDO deviation event caused by suspension of the secondary system gas sampling sodium leakage detection system (RID), measures for equipment requiring a function of a low temperature shutdown were going on. It was scheduled to be completed by the end of FY2013. The status was to be monitored in the future operational safety inspections, etc. Inspection of events of defect instruction from the primary main cooling system sodium leakage detection system (SID) around a reactor vessel confirmed that equipment and operative measures had been completed. Inspection of the event of partial reactor trip signals confirmed that measures related to management and equipment were carried out as measures against human errors and the company .regulations were revised as measures against the delay in external communications. Inspection of status of emergency safety measures confirmed the status of measures since the previous inspection. The measures were carried out according to plan. Planned education and trainings were steadily given. Management of materials and equipment were properly carried out. Inspection of the status of radioactive wastes management confirms that as a result of confirming management status of radioactive fallout caused by the accident, the operational safety program was revised and related secondary and tertiary documents were being revised. In addition, the status of daily operational management during the safety inspection period was also examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the reactor facilities, and so forth. No particular issues were identified. As a surprise inspection, the status of alarm typer was confirmed and the past alarm contents were surely saved. In consideration of the confirmed facts so far, the operational safety inspection can be summarized as follows: ・As for inadequacy in maintenance management, maintenance inspections were not carried out according to the maintenance plan, and inspection of some components became overdue. Class 1 equipment with higher safety importance was included. The inadequacy violates Article 35-1of the Nuclear Reactor .regulation Act (Maintenance of Reactor Facility) and Article 37-4 (Compliance with the Operational Safety Program). It was judged that the maintenance of the reactor facility was not properly carried out. ・Necessary actions would be continuously taken in response to reports from licensees. ・As for operational safety activities for other inspection items, no issues were identified within the scope of the inspection.

	Fourth inspection
Period of inspection	Inspection period: June 11 (Mon.) to June 22 (Fri.), 2012 (Additional inspections to be conducted on 17, 19, 21, and 22)
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties to confirm the status of compliance with the operational safety program. In addition, questioning on operation management status during the operational safety inspection period, reviewing records, and making inspection tours of the reactor facilities were carried out as operational safety inspections. 1) Basic inspection items (the underlined items indicate inspection items in accordance with the safety inspection basic policy) <u>I. Status of emergency safety measures</u> (1) Status of emergency safety measures and maintenance management of facilities, and so on <u>II. Status of equipment integrity testing</u> (1) Status of maintenance based on special maintenance plans for the water and steam system, etc. <u>III. Status of special maintenance plan (related to in-vessel transfer machine)</u> (1) Status of prevention of recurrence of the fall accident involving the in-vessel transfer machine and feedback to other installations (2) Status of implementation of expanded measures of root cause analysis related to the fall accident involving the in-vessel transfer machine IV. Status of quality assurance, etc. (1) Confirmation of management review input information (2) Status of safety culture development activities V. Surprise inspection (1) Status of maintenance management 2) Additional inspection items Status of measures to prevent recurrence in response to direct and root cause analysis related to inadequate maintenance management
Outline of inspection results (continued)	Operational safety inspections were conducted on items based on basic inspection policy such as the status of emergency safety measures, the status of equipment integrity testing, and the special maintenance plan (related to in-vessel transfer machine). In addition to them, the status of quality assurance, etc. was confirmed and as surprise test, it was checked whether a series of operational safety activities complied with the operational safety program and were properly carried out. Moreover, in response to inadequate maintenance management occurring last year, the "recurrence prevention measures and their implementation status in response to the direct and the root cause analysis related to inadequacy in maintenance management" was carried out as an additional inspection. As a result, summarizing the operational safety inspection from facts confirmed in the accidents are as follows: ・As for inadequacy in maintenance management, just like the previous inspection time, maintenance inspections were not carried out according to the maintenance plan, and inspection of some equipment became overdue. Class 1 equipment with higher safety importance was included. The inadequacy violates Article 35-1 of the Nuclear Reactor .regulation Act (Maintenance of Reactor Facility) and Article 37-4 (Compliance with the Operational Safety Program). It was judged that the maintenance of the reactor facility was not properly carried out. ・As for operational safety activities for other inspection items, no issues were identified within the scope of the inspection.

Outline of inspection results	Details of inspection results: (1) As for status of emergency safety measures, etc., hard/tangible and soft/intangible safety improvement measures were steadily proceeding. Candidate sites of the second crisis center were being selected. Basic information of equipment introduced by emergency safety measures, etc., was organized and entered into the management record and managed. (2) As for the status of equipment integrity testing, the Confirmation of maintenance status based on special maintenance plan related to the extended shutdown of the water and steam system led to the clarification of work process, test inspection details, etc., and based on them, inspections, Confirmation and evaluation of inspection results were properly carried out. (3) Inspection of special maintenance plans (related to in-vessel transfer machine) confirmed that as prevention of recurrence of the fall accident involving the in-vessel transfer machine and feedback to other installations, validity Confirmation of requirements in the design phase and inspections and investigations of the joint were being conducted, and as for the status of enhancement measures of root cause analysis, ongoing action plans were to be imported into the new action plans, which were developed in response to the inadequate maintenance management. (4) Inspection of the status of quality assurance, etc. confirmed the input information of management reviews and the status of safety culture development activities. As a result of confirming input information of management reviews, it was found that as sufficient information on problems and challenges on site could not be provided as input information of management reviews, the top management failed to understand the necessity of improvement, and that Article 3 of the operational safety program "5. Top Management Responsibility" was not discussed, etc. As a result of confirming the status of safety culture development activities, it was found that the organization failed to detect the sign of deterioration of its safety culture and that the safety culture development activities should be improved. (5) A surprise inspection was carried out to see if other divisions have similar matters in response to inadequate maintenance management at Electric Repair Division. Inspection confirmed that equipment exceeding the inspection time limits (including Class 1) was included in equipment of departments which had no overdue inspection time according to a report submitted on January 31, 2013 from the Japan Atomic Energy Agency to the Committee on Nuclear Regulatory Activities. At present, the licensee was investigating the inspection history of the equipment possessed by the department other than Electric Repair Division. (6) The additional inspection, as a result of a series of investigation and Confirmation of the overdue inspection time limits identified in the previous operational safety inspection, confirmed that the maintenance plan had not been reviewed in response to the inspection of uninspected equipment with overdue inspection time limit and the effectiveness evaluation of the maintenance.

(21) Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station Reactors 1 and 2

	First inspection
Period of inspection	Inspection period: June 11, 19, 20, and 26 to 29, 2012
Outline of inspection	The nuclear safety inspector conducted safety inspections by entering the facility, examining certain objects such as records, and questioning concerned parties with regard to the status of operational safety activities in accordance with the operational safety program. (Inspection items) ・Status of the quality management system ・Status of emergency measures ・Revisions of the operational safety program implemented in and after the first operational safety inspection in FY 2011 ・Status of decommissioning management
Outline of inspection results	Operational safety inspections were conducted on inspection items such as the "status of maintenance and improvement of the quality management system." and etc.. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Hamaoka Nuclear Power Station Reactors 1 and 2

	Second inspection
Period of inspection	Inspection period: September 10 (Mon.) - 14 (Fri.), 2012
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties. The status of daily operational management during the safety inspection period was also examined by conducting interviews on daily operational management, reviewing operation records, making inspection tours of the reactor facilities, and so forth. 1) Safety inspection items (1) Status of maintenance management (2) Status of fuel management (3) Status of radioactive wastes management (radioactive liquid/gaseous waste) 2) Priority inspection items (1) Status of maintenance management 3) Clause-by-clause inspection items None 4) Follow-up inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of nonconformity management and corrective measurement," and so on. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Hamaoka Nuclear Power Station Reactors 1 and 2

	Third inspection
Period of inspection	Inspection period: Nov. 26(Mon.) to 28 (Wed.), 2012 Dec. 10 (Mon.) to Dec. 12 (Wed.), 2012
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties. The status of daily operational management during the safety inspection period was also examined by conducting interviews on daily operational management, reviewing operation records, making inspection tours of the reactor facilities, and so forth. 1) Safety inspection items (1) Status of decommissioning management (2) Status of compliance with the revised provisions of the operational safety program approved on September 6, 2011 (3) Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. 2) Priority inspection items (3)Status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc. 3) Clause-by-clause inspection items (2) Status of compliance with the revised provisions of the operational safety program approved on September 6, 2011 4) Follow-up inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the “witnessed inspection of decommissioning management,” the “status of amendments of the operational safety measures approved on September 6, 2012,” and the “status of emergency safety measures in response to the accidents at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. Inc.” The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

Hamaoka Nuclear Power Station Reactors 1 and 2

	Fourth inspection
Period of inspection	Inspection period: First half: Feb. 25 (Mon.), 26 (Tue.), and 28 (Thurs.), 2013 Second half: Mar. 11 (Mon.) to 13 (Wed.), 2013
Outline of inspection	Operational safety inspections were conducted on the following inspection items by on-site inspection, object inspection, and questioning concerned parties. The status of daily operational management during the safety inspection period was also examined by conducting interviews on daily operational management, reviewing operation records, making inspection tours of the reactor facilities, and so forth. 1) Safety inspection items (1) Status of nonconformity management and corrective actions (2) Status of radiation management (3) Status of operational safety education (4) Status of operators' witness activities (surprise inspection) 2) Priority inspection items (1) Status of nonconformity management and corrective actions 3) Clause-by-clause inspection items None 4) Follow-up inspection items None
Outline of inspection results	Operational safety inspections were conducted on basic inspection items such as the "status of nonconformity management and corrective measurement," and so on. The inspections confirmed that operational safety activities were properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by questioning the licensee on operational management of the facilities, reviewing operation records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it was judged that the operational safety activities selected for examination in this inspection were conducted properly.

VI STATUS OF APPROVALS AND INSPECTIONS FOR CONSTRUCTION PLANS AND FUEL ASSEMBLY DESIGNS OF NUCLEAR POWER PLANTS

VI-1 Status of Approvals and Inspections for Construction Plans and Fuel Assembly Designs of Nuclear Power Plants

With respect to installation or modification work for commercial electrical structures that are of particular importance in ensuring public safety, the plans require approval under the provisions of Article 47-1 of the Electricity Utilities Industry Act. With respect to decommissioning work, the plans require approval under the provisions of Article 27-1 of the Nuclear Reactor Regulation Act.

Designs of nuclear fuel materials (nuclear fuel assemblies), which are used as fuel for nuclear power reactors, also require approval under the provisions of Article 51-2 of the Electricity Utilities Industry Act.

By March 31, 2013, nine construction plans and eight fuel assembly designs have been approved. Their details are described in VI-2 and 3.

The purpose of pre-operation inspection is to ensure that the work has been carried out in accordance with the regulations in the planning stages regarding permission and notification of construction plans under the provisions of Article 49-1 of the Electricity Utilities Industry Act.

The fuel assembly inspection is conducted to verify whether each stage of the fuel assembly process is performed in accordance with the design approved by the minister, pursuant to Article 51-1 of the Electricity Utilities Industry Act.

By March 31, 2013, certificates for 35 pre-operation inspections* and 36 fuel assembly inspections have been issued. VI-4 and 5 contain the relevant lists.

* A pre-operation inspection was conducted for the Nuclear power reactor facilities in the R&D stage which was in a decommissioning stage pursuant to Article 28-1 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors, and its completion was certified.

VI-2 Approval of Construction Plans for Power Reactors

(1) Tsuruga Power Station Unit 1

1. Application date	February 29, 2012
2. Approval date	April 9, 2012
3. Outline of approval (1) Approval subject	Nuclear equipment Fuel equipment
(2) Details of approval	(1) Application grounds and details In order to transfer 9 × 9 fuel assemblies from the spent fuel pool of Unit 1 to the spent fuel storage facility (common to Units 1 and 2) in Unit 2 to secure storage capacity for the spent fuel pool, the 9 × 9 fuel assembly is to be added to the capacity of the spent fuel transportation cask installed in Unit 1 and the radioactivity durability of the cask is increased. (2) Decision criteria Article 9 (materials and structures) and Article 26 (fuel handling equipment) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	None

(2) Hamaoka Nuclear Power Station Unit 3

1. Application date	October 24, 2012
2. Approval date	November 28, 2012
3. Outline of approval (1) Approval subject	Nuclear equipment Fuel equipment
(2) Details of approval	(1) Application grounds and details In order to promote decommissioning of Unit 2, which was shut down in January 2011, and ensure operational flexibility in the transfer of spent fuel from Units 3, 4 and 5, the number of spent fuel transportation casks (NFT-22B) in Unit 3 is to be increased from the current one to two, and their specification is changed to make them available for storing the 9 × 9 fuel assembly. (2) Decision criteria Paragraph 3, Article 26 (fuel handling equipment) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	None

(3) Hamaoka Nuclear Power Station Unit 5

1. Application date	October 24, 2012
2. Approval date	November 28, 2012
3. Outline of approval (1) Approval subject	Nuclear equipment Fuel equipment
(2) Details of approval	(1) Application grounds and details In order to transfer the failed fuel stored in Hamaoka Nuclear Power Station Unit 1, which was shut down in January 2009, to Unit 5, the spent fuel pit is to be made common to Units 1 and 5. (2) Decision criteria Paragraph 1, Article 25 (fuel storage equipment) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	None

(4) Hamaoka Nuclear Power Station Unit 5

1. Application date	November 7, 2012
2. Approval date	November 30, 2012
3. Outline of approval (1) Approval subject	Nuclear equipment Disposal equipment
(2) Details of approval	(1) Application grounds and details The desalting equipment 「reverse osmotic membrane system」 in the waste disposal facility is about to expire the four-month service time, and an application for approval of nuclear power generation equipment technical standards for specially designed facilities is required. (2) Decision criteria Paragraph 3, Article 9 (materials and structures) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	None

(5) Takahama Power Station Unit 1

1. Application date	February 22, 2012
2. Approval date	April 3, 2012
3. Outline of approval (1) Approval subject	Nuclear equipment Fuel equipment
(2) Details of approval	(1) Application grounds and details A spent fuel transportation cask has been installed in Unit 1 (shared with Unit 2) in preparation for transporting spent fuel from Units 1 and 2 to the spent fuel storage facility common to Units 3 and 4. The capacity of the transportation cask (enrichment of storable spent fuel, average burnup, decay heat, radioactivity durability) is to be modified to allow the transportation of high burnup fuel (maximum fuel assembly burnup of 55,000MWd/t).
	(2) Decision criteria Article 9 (materials and structures) and Article 26 (fuel handling equipment) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	None

(6) Ohi Power Station Unit 1

1. Application date	February 22, 2012
2. Approval date	April 3, 2012
3. Outline of approval (1) Approval subject	Nuclear equipment Fuel equipment
(2) Details of approval	(1) Application grounds and details Two spent fuel transportation casks have been installed in Unit 1 (shared with Unit 2) in preparation for transporting spent fuel from Units 1 and 2 to the spent fuel storage facility common to Units 3 and 4. The capacity of these casks (enrichment of storable spent fuel, average burnup, radioactivity durability) is to be modified to allow the transportation of high burnup fuel (maximum fuel assembly burnup of 55,000MWd/t).
	(2) Decision criteria Article 9 (materials and structures) and Article 26 (fuel handling equipment) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	None

(7) Ikata Power Station Unit 1

1. Application date	February 22, 2012
2. Approval date	April 3, 2012
3. Outline of approval (1) Approval subject	Nuclear equipment Fuel equipment
(2) Details of approval	(1) Application grounds and details A spent fuel transportation cask has been installed in Unit 1 (shared with Unit 2) in preparation for transporting spent fuel from Units 1 and 2 to the spent fuel storage facility common to Units 3 and 4. The capacity of the cask (enrichment of storable spent fuel, cooling period, average burnup, radioactivity durability) is to be modified to allow the transportation of high burnup fuel (maximum fuel assembly burnup of 55,000MWd/t). (2) Decision criteria Article 9 (materials and structures) and Article 26 (fuel handling equipment) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	None

(8) Genkai Nuclear Power Station Unit 2

1. Application date	February 27, 2012
2. Approval date	April 3, 2012
3. Outline of approval (1) Approval subject	Nuclear equipment Fuel equipment
(2) Details of approval	(1) Application grounds and details A spent fuel transportation cask has been installed in Unit 2 (shared with Unit 1) in preparation for transporting spent fuel from Units 1 and 2 to the spent fuel storage facility shared with 4. The capacity of the cask (enrichment of storable spent fuel, average burnup, decay heat, radioactivity durability) and tolerable temperature are to be modified to allow the transportation of high burnup fuel (maximum fuel assembly burnup of 55,000MWd/t). (2) Decision criteria Article 9 (materials and structures) and Article 26 (fuel handling equipment) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	None

(9) Genkai Nuclear Power Station Units 3 and 4

1. Application date	July 31, 2012 (Application of partial correction on August 10, 2012)
2. Approval date	September 5, 2012
3. Outline of approval (1) Approval subject	Replacement of seawater pumps
(2) Details of approval	(1) Application grounds and details (Note)
	(2) Decision criteria (Note)
4. Result	(Note)
5. Related permission items	(Note)
6. Other remarks	(Note)

(Note) No description is found in the document published by the former Nuclear and Industrial Safety Agency.

VI-3 Approval for Fuel Assembly Designs for Power Reactors

(1) Global Nuclear Fuel-Japan Co., Ltd.

1. Application date	March 14, 2012 (Application of partial correction on July 26, 2012)
2. Approval date	September 7, 2012
3. Outline of approval (1) Power station using fuel assemblies	Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station Units 6 and 7
(2) Details of approval	(1) Fuel to be approved 9 × 9 (A-type) fuel assembly
	(2) Application details A debris filter with enhanced capturing performance and support grid composed of corrosion resistive material (high-iron zircalloy) are to be adopted.
	(3) Decision criteria (Note)
4. Result	(Note)
5. Related permission items	(Note)
6. Other remarks	(Note)

(Note) No description is found in the document published by the former Nuclear and Industrial Safety Agency.

(2) Global Nuclear Fuel-Japan Co., Ltd.

1. Application date	December 21, 2012
2. Approval date	March 4, 2013
3. Outline of approval (1) Power station using fuel assemblies	Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station Unit 2
(2) Details of approval	(1) Fuel to be approved 9 x 9 (A-type) fuel assembly
	(2) Application details A lower support plate with a built-in debris filter is to be adopted for 9 x 9 (A-type) fuel assemblies loaded in Unit 2 as the refueling.
	(3) Decision criteria Article 4 (uranium dioxide fuel material), Article 7 (zircalloy fuel cladding material), Article 10 (zircalloy end plug) and Article 13 (other components) of the Ordinance of Establishing Technical Standards on Nuclear Fuel Material for Power Generation (MITI Ordinance No. 63, 1965)
4. Result	Approval was granted because it was considered to have met the technical standards.
5. Related permission items	-
6. Other remarks	

(3) Mitsubishi Nuclear Fuel Co., Ltd.

1. Application date	March 12, 2012
2. Approval data	April 9, 2012
3. Outline of approval (1) Power station using fuel assemblies	The Japan Atomic Power Company, Tsuruga Power Station Unit 2
(2) Details of approval	(1) Fuel to be approved 17 × 17 (A-type) fuel assembly
	(2) Application details 17 × 17 (A-type) fuel assemblies (changes in the end shape of the lower-end plug and the ratio of length by diameter of pellet) are to be adopted as refueling for Unit 2.
	(3) Decision criteria Article 13 (core, etc.) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standard.
5. Related permission items	-
6. Other remarks	

(4) Mitsubishi Nuclear Fuel Co., Ltd.

1. Application date	March 12, 2012
2. Approval date	April 3, 2012
3. Outline of approval (1) Power station using fuel assemblies	The Kansai Electric Power Co., Inc., Takahama Power Station Units 3 and 4
(2) Details of approval	(1) Fuel to be approved 17 × 17 (A-type) fuel assembly
	(2) Application details 17 × 17 (A-type) fuel assemblies (changes in the structure using a debris filter bottom nozzle with skirt, the end shape of the lower-end plug, and the ratio of length by diameter of pellet) are to be adopted as refueling for Units 3 and 4.
	(3) Decision criteria Article 13 (core, etc.) of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment (MITI Ordinance No. 62, 1965)
4. Result	Approval was granted because it was considered to have met the technical standard.
5. Related permission item	-
6. Other remarks	

(5) Mitsubishi Nuclear Fuel Co., Ltd.

1. Application date	June 4, 2012
2. Approval date	July 3, 2012
3. Outline of approval (1) Power station using fuel assemblies	The Kansai Electric Power Co., Inc., Takahama Power Station Units 1 and 2, and Mihama Power Station Unit 3
(2) Details of approval	(1) Fuel to be approved 15 × 15 (A-type) fuel assembly
	(2) Application details (Note)
	(3) Decision criteria (Note)
4. Result	(Note)
5. Related permission items	(Note)
6. Other remarks	(Note)

(Note) No description is found in the document published by the former Nuclear and Industrial Safety Agency.

(6) Mitsubishi Nuclear Fuel Co., Ltd.

1. Application date	April 27, 2012
2. Approval date	July 3, 2012
3. Outline of approval (1) Power station using fuel assemblies	Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station Units 3 and 4
(2) Details of approval	(1) Fuel to be approved 17 × 17 (A-type) fuel assembly
	(2) Application details (Note)
	(3) Decision criteria (Note)
4. Result	(Note)
5. Related permission items	(Note)
6. Other remarks	(Note)

(Note) No description is found in the document published by the former Nuclear and Industrial Safety Agency.

(7) Mitsubishi Nuclear Fuel Co., Ltd.

1. Application date	December 20, 2012
2. Approval date	March 4, 2012
3. Outline of approval (1) Power station using fuel assemblies	The Kansai Electric Power Co., Inc., Ohi Power Station Units 1 to 4
(2) Details of approval	(1) Fuel to be approved 17 × 17 (A-type) fuel assembly (2) Application details 17 × 17 uranium dioxide fuel assemblies and gadolinium-uranium dioxide fuel assemblies are to be adopted as refueling for Units 1 to 4. (3) Decision criteria Article 4 (uranium dioxide fuel material), Article 10 (zircalloy end plug) and Article 13 (other components) of Ordinance No. 63, and Paragraph 1, Article 13 (core, etc.) of Ordinance No. 62
4. Result	Approval was granted because it was considered to have met the technical standard.
5. Related permission items	-
6. Other remarks	(Special processing approval March 4, 2013) "MDA" and "ZIRLO" are used as fuel cladding materials.

(8) Nuclear Fuel Industries, Ltd.

1. Application date	December 11, 2012
2. Approval date	February 19, 2013
3. Outline of approval (1) Power station using fuel assemblies	Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station Units 1 to 5
(2) Details of approval	(1) Fuel to be approved 9 x 9 fuel (B-type) assembly (2) Application details A lower plate with a built-in debris filter is to be adopted for 9 x 9 (B-type) fuel assemblies as refueling for Units 1 to 5. (3) Decision criteria Article 4 (uranium dioxide fuel material), Article 7 (zircalloy fuel cladding material), Article 10 (zircalloy end plug) and Article 13 (other components) of the Ordinance of Establishing Technical Standards on Nuclear Fuel Material for Power Generation (MITI Ordinance No. 63, 1965), and Paragraph 1, Article 13 (core, etc.) of Ordinance No. 62.
4. Result	Approval was granted because it was considered to have met the technical standard.
5. Related permission items	-
6. Other remarks	None

VI-4 Record of Pre-Operation Inspection for Nuclear Power Plants

• The first quarter

(1) Related to construction plan approval

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Kashiwazaki-Kariwa Nuclear Power Station Unit 6 Nuclear equipment Instrumentation and control system equipment Instrumentation Instrument to measure hydrogen gas concentration in the reactor containment	E	(1) System operation (2) Performance	June 15, 2012
Tokai No. 2 Power Station Incidental equipment Emergency power generation equipment Other power supplies Power storage units	E	(1) Structure (2) Function and performance	April 3, 2012
Mihama Power Station Unit 2 Incidental equipment Emergency power generation equipment Other power supplies Uninterruptible power supplies	E	(1) Appearance (2) Alarm protection device inspection (3) System operation inspection	April 6, 2012
Takahama Power Station Unit 3 Incidental equipment Emergency power generation equipment Other power supplies Uninterruptible power supplies	E	(1) Visual inspection (2) Alarm protection device inspection (3) System operation inspection	April 26, 2012
Genkai Nuclear Power Station Unit 4 Nuclear equipment Reactor cooling system equipment Primary coolant circulation equipment Main piping Residual heat removal system Main piping Chemical volume control system Main valves, pain pining	A	(1) Material inspection (2) Dimensional inspection (3) Appearance (4) Installation (5) Pressure resistance (6) Leakage (7) Support structure	May 15, 2012
	E	(1) Performance (water flow)	
Hamaoka Nuclear Power Station Unit 5 Nuclear equipment Disposal equipment Liquid waste treatment equipment Low conductivity liquid waste system Desalting equipment Reverse osmotic membrane system Vessel Filters Main piping Evaporators Heat exchangers Vessels Filters Main piping Dams, etc.. Leakage detectors or automatic alarm devices	A	(1) Material (2) Structure (dimensions, appearance, installation) (3) Pressure resistance and leakage	June 14, 2012
	E	(1) Low conductivity liquid waste system desalting equipment a. System function b. System operation performance (2) Dams, etc. a. Function (appearance) (3) Leakage detectors/ automatic alarm devices a. Function	
Ohi Power Station Unit 1 Nuclear equipment Radiation management equipment Biological shield equipment (aux. shield) Disposal equipment Liquid waste treatment equipment Systems (radioactive waste evaporator), heat exchangers, vessels, main piping vessels (boric acid aux. tank) Main piping Dams, etc. Leakage detectors, automatic alarm devices	A	(1) Material (2) Structure (dimensions, appearance, installation) (3) Strength and leakage	May 23, 2012
	E	(1) Performance (2) Function	
Takahama Power Station Unit 1 Nuclear equipment Disposal equipment Liquid waste treatment equipment Systems (Cleaning water treatment equipment) Vessels, main piping, other major equipment Vessels Filters Main piping Solid waste treatment equipment Asphalt solidification facility Vessels Main piping	A	(1) Material (2) Structure (dimensions, appearance, installation) (3) Strength and leakage (pressure resistance, leakage)	May 31, 2012
	E	(1) Function (water flow) (2) Performance (operation performance) (3) Function and performance (interlock, retaining performance)	

Note) "A" indicates the phase in which strength or leak related tests can be conducted. "E" indicates the phase in which all construction has been finished (Table for Article 69-1 in the Electricity Utilities Industry Act).

(2) Related to construction plan submission

Subject to inspection	Inspection Phase (Note)	Inspection	Date of certificate issuance
Kashiwazaki-Kariwa Nuclear Power Station Unit 6 Nuclear equipment Instrumentation and control system equipment Instrumentation Instruments to measure oxygen gas concentration in the reactor containment	E	(1) System operation (2) Performance	June 15, 2012

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Shimane Nuclear Power Station Unit 1 Nuclear equipment Auxiliary boilers Oil burning appliances Conveyors Fuel oil transfer pumps Fuel equipment for auxiliary boilers Fuel storage facilities Oil tanks Heavy oil tanks	B	(1) General items (2) Material (3) Structure (dimensions, appearance, assembly, installation) (4) Pressure resistance and leakage	June 14, 2012
	E	(1) Function	
Genkai Nuclear Power Station Unit 4 Nuclear equipment Reactor cooling system equipment Primary coolant circulation equipment Main piping Residual heat removal system Main valves Chemical volume control system Main valves, main piping	A	(1) Material (2) Dimensions (3) Appearance (4) Installation (5) Pressure resistance (6) Leakage (7) Pressure resistance equivalent (8) Support structure	May 15, 2012
	E	(1) Performance (valve operation, water flow)	

(Note) "A" indicates the phase in which structure, strength and leakage related tests can be conducted, "B" indicates the phase in which the main structure has been assembled, and "E" indicates the phase in which all construction has been finished (Table in Article 69-1 of the Electricity Utilities Industry Act).

• The second quarter (no indication for the classification of approval and submission)

Plant name	Inspection phase (Note1)	Inspection item	Date of certificate issuance
Kashiwazaki-Kariwa Nuclear Power Station Unit 5 Nuclear equipment Reactor cooling system equipment Reactor isolation cooling system piping	A	(Note 2)	August 1, 2012
	E	〃	
Ohi Power Station Unit 3 Nuclear equipment Reactor cooling system equipment Pressurizer pipe stubs, etc.	A	〃	August 3, 2012
	E	〃	
Ohi Power Station Unit 3 Nuclear equipment Steam turbines	B	〃	August 3, 2012
	E	〃	
Ohi Power Station Unit 4 Nuclear equipment Reactor cooling system equipment Pressurizer pipe stubs, etc.	A	〃	August 16, 2012
	E	〃	
Ohi Power Station Unit 4 Nuclear equipment Steam turbines	B	〃	August 16, 2012
	E	〃	

Plant name	Inspection phase (Note1)	Inspection item	Date of certificate issuance
Kashiwazaki-Kariwa Nuclear Power Station Unit 4 Nuclear equipment Reactor Reactor pressure vessel structures	A	(Note 2)	August 24, 2012
	E		

(Note 1) "A" indicates the phase in which structure, strength and leakage related tests can be conducted, "B" indicates the phase in which the main structure has been assembled, and "E" indicates the phase in which all construction has been finished (Table in Article 69-1 of the Electricity Utilities Industry Act).
(Note 2) The inspection phase is not indicated in the document published by the former Nuclear and Industrial Safety Agency.

Plant name	Inspection phase	Inspection item	Date of certificate issuance
Fugen Decommissioning Engineering Center, Tsuruga Head Office Reactor equipment (Advanced Thermal Reactor Prototype Reactor Facility) Radioactive waste disposal facility Liquid waste treatment equipment (part of main piping)	(Note 3)	(1) Material (2) Dimensions (3) Appearance (4) Pressure resistance and leakage (5)Installation	August 28, 2012

(Note 3) The inspection phase is not indicated in the document published by the former Nuclear and Industrial Safety Agency.

• The third quarter

(1) Related to construction plan approval

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Higashidori Nuclear Power Station Unit 1 Nuclear equipment Exhaust stack	E	(1) Appearance	November 21, 2012

(2) Related to construction plan submission

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Shika Nuclear Power Station Unit 1 Nuclear equipment Radiation management equipment Radiation management instrumentation Mobile perimeter monitoring systems	A	(1) Appearance	November 7, 2012
	E	(1) Performance	
Ohi Power Station Unit 1 Nuclear equipment Disposal equipment Solid waste disposal equipment (Miscellaneous solid waste incinerator) Main piping	A	(1) Material (2) Structure	November 7, 2012
	E	(1) Operation performance	

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Higashidori Nuclear Power Station Unit 1 Nuclear equipment Radiation management equipment Biological shield equipment Auxiliary shields	A	(1) Material (2) Structure	December 5, 2012
	A	(1) Material (2) Structure	
Disposal equipment Solid waste disposal equipment Waste storage facility	5	(1) Appearance (2) Capacity check	

(Note) "A" indicates the phase in which structure, strength and leakage related tests can be conducted, and "E" and "5" indicate the phase in which all construction has been finished.

• The fourth quarter

(1) Related to construction plan approval

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Hamaoka Nuclear Power Station Unit 3 Nuclear equipment Fuel equipment Fuel handling equipment Spent fuel transportation casks	1	(1) Material (2) Structure (3) Strength and leakage	January 10, 2013
	1	(1) Material (2) Structure (3) Strength and leakage	
	5	(1) Function	
Shimane Nuclear Power Station Unit 1 Nuclear equipment Fuel equipment Fuel handling equipment Reactor building ceiling cranes	1	(1) Material (2) Structure	January 8, 2013
	5	(1) System function (2) System operation performance	
Hamaoka Nuclear Power Station Unit 3 Nuclear equipment Fuel equipment Fuel handling equipment Spent fuel transportation casks	1	(1) Material (2) Structure (3) Strength and leakage	March 13, 2013
	5	(1) Functional inspection	

(2) Related to construction plan submission

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Higashidori Nuclear Power Station Unit 1 Nuclear equipment Disposal equipment Liquid waste treatment equipment Liquid waste treatment system Suppression pool water storage system Suppression pool water storage tank Dams, etc.	A	(1) Material (2) Structure (3) Strength and leakage	February 1, 2013
	5	(1) Function	

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Higashidori Nuclear Power Station Unit 1 Nuclear equipment disposal equipment Liquid waste treatment equipment Liquid waste treatment system Suppression pool water storage system Main piping	A	(1) Material (2) Structure (3) Strength and leakage	February 1, 2013
	5	(1) Function	
Fukushima Daini Nuclear Power Station Unit 1 Nuclear equipment Exhaust stack Exhaust stack	5	(1) Appearance (2) Quake control equipment performance	February 19, 2013
Fukushima Daini Nuclear Power Station Unit 2 Nuclear equipment Exhaust stack Exhaust stack	5	(1) Visual inspection (2) Quake control equipment performance	February 19, 2013
Fukushima Daini Nuclear Power Station Unit 3 Nuclear equipment Exhaust stack Exhaust stack	5	(1) Visual inspection (2) Quake control equipment performance	February 19, 2013
Fukushima Daini Nuclear Power Station Unit 4 Nuclear equipment Exhaust stack Exhaust stack	5	(1) Visual inspection (2) Quake control equipment performance	February 19, 2013
Hamaoka Nuclear Power Station Unit 3 Nuclear equipment Disposal equipment Gas, liquid or solid waste disposal equipment Vessels Main piping Major components Dams, etc. Leakage detectors or automatic alarm devices for fluid radioactive waste from waste storage or treatment equipment other than the reactor containment vessels	A	(1) Material (2) Structure (3) Strength and leakage	February 19, 2013
	5	(1) System operation performance (2) Function	
Onagawa Nuclear Power Station Unit 2 Nuclear equipment Exhaust stack	5	(1) Appearance (2) Quake control equipment	March 4, 2013
Onagawa Nuclear Power Station Unit 3 Nuclear equipment Exhaust stack	5	(1) Appearance (2) Quake control equipment	March 4, 2013

Plant name	Inspection phase (Note)	Inspection item	Date of certificate issuance
Ikata Nuclear Power Station Nuclear equipment Fuel equipment Spent fuel storage tank coolant purification equipment Heat exchangers	1	(1) Material (2) Dimensions (3) Appearance (4) Assembly and installation check (5)Pressure resistance (6)Leakage	March 28, 2013
	5	(1) Performance (water flow)	

(Note) "A," "1" indicates the phase in which structure, strength and leakage related tests can be conducted, and "5" indicates the phase in which all construction has been finished.

VI-5 Record of Fuel Assembly Inspection for Nuclear Power Plants

• The first quarter

(1) Inspection of domestically manufactured fuel assemblies

Facility	Plant name	Inspected fabrication process (Note)	Date of certificate issuance
Mitsubishi Nuclear Fuel, Co., Ltd.	Takahama Power Station Units 1 and 2 Mihama Power Station Unit 3 52 replacement fuel assemblies (15 × 15 fuel)	A B C	May 15, 2012
	Tomari Power Station Unit 3 36 replacement fuel assemblies (17 × 17 fuel)	A B C	June 1, 2012
	Tomari Power Station Units 1 and 2 28 replacement fuel assemblies (14 × 14 fuel)	A B C	June 7, 2012
	Ikata Nuclear Power Station Unit 2 10 replacement fuel assemblies (14 × 14 fuel)	A B C	June 14, 2012
	Ikata Nuclear Power Station Unit 1 8 replacement fuel assemblies (14 × 14 fuel)	A B C	June 14, 2012
Nuclear Fuel Industries, Ltd. Kumatori Works	Takahama Power Station Units 1 and 2 28 replacement fuel assemblies (15 x 15 fuel)	A B C	May 15, 2012
	Ikata Nuclear Power Station Unit 1 4 replacement fuel assemblies (14 × 14 fuel)	A B C	June 11, 2012
	Ikata Nuclear Power Station Unit 2 4 replacement fuel assemblies (14 × 14 fuel)	A B C	June 11, 2012
	Ikata Nuclear Power Station Unit 1 18 replacement fuel assemblies (14 × 14 fuel)	A B C	June 11, 2012
	Ikata Nuclear Power Station Unit 2 22 replacement fuel assemblies (14 × 14 fuel)	A B C	June 11, 2012
	Tomari Power Station Unit 3 12 replacement fuel assemblies (17 × 17 fuel)	A B C	June 14, 2012
	Tomari Power Station Units 1 and 2 12 replacement fuel assemblies (14 × 14 fuel)	A B C	June 14, 2012
Global Nuclear Fuel-Japan Co., Ltd.	Higashidori Nuclear Power Station Unit 1 280 replacement fuel assemblies (9 x 9 fuel)	A B C (A and B were skipped)	April 26, 2012
	Shika Nuclear Power Station Unit 2 52 replacement fuel assemblies (9x9 fuel)	A B C (A and B were skipped)	April 26, 2012

(Note) "A" indicates the phase in which tests related to composition, structure, or strength can be conducted on the fuel materials, fuel cladding materials, and other parts. "B" indicates the phase in which fabrication of the fuel elements for the fuel assembly (i.e., a set of fuel elements) has been finished. "C" indicates the phase in which fabrication has been finished. (Table for Article 74 in the Electricity Utilities Industry Act)

(2) Inspection of imported fuel assemblies

None

• The second quarter

(1) Inspection of domestically manufactured fuel assemblies

Facility	Plant name (Note1)	Inspected fabrication process	Date of certificate issuance
Mitsubishi Nuclear Fuel Co., Ltd.	Ikata Nuclear Power Station Unit 1 12 fuel assemblies	(Note 2)	July 3, 2012
	Ikata Nuclear Power Station Unit 1 4 fuel assemblies	〃	July 3, 2012
	Ikata Nuclear Power Station Unit 2 8 fuel assemblies	〃	July 3, 2012
	Ikata Nuclear Power Station Unit 2 4 fuel assemblies	〃	July 3, 2012
	Takahama Power Station Units 3 and 4 76 fuel assemblies	〃	September 12, 2012
Nuclear Fuel Industries, Ltd.	Ohi Power Station Units 1 to 4 68 fuel assemblies	〃	August 20, 2012
	Ohi Power Station Units 1 to 4 76 fuel assemblies	〃	September 12, 2012

(Note 1) The type of fuel is not indicated in the document published by the former Nuclear and Industrial Safety Agency.
(Note 2) The fabrication process is not indicated in the document published by the former Nuclear and Industrial Safety Agency.

(2) Inspection of imported fuel assemblies

None

• The third quarter

(1) Inspection of domestically manufactured fuel assemblies

Facility	Plant name	Inspected fabrication process (Note)	Date of certificate issuance
Mitsubishi Nuclear Fuel Co., Ltd.	Genkai Nuclear Power Station Unit 1 16 fuel assemblies (14 × 14 fuel)	A B C	November 12, 2012
	Ohi Power Station Units 1 to 4 16 fuel assemblies (17 × 17 fuel)	A B C	November 12, 2012
	Ohi Power Station Units 1 to 4 32 fuel assemblies (17 × 17 fuel)	1 2 3	November 12, 2012
	Genkai Nuclear Power Station Units3 and 4 50 fuel assemblies (17 × 17 fuel)	1 2 3	December 4, 2012
	Genkai Nuclear Power Station Unit 2 24 fuel assemblies (14 × 14 fuel)	1 2 3	December 27, 2012
Nuclear Fuel Industries, Ltd. Tokai Works	Shika Nuclear Power Station Unit 1 84 fuel assemblies (9 × 9 fuel)	C	November 1, 2012
	Shimane Nuclear Power Station Unit 2 136 fuel assemblies (9 × 9 fuel)	3	November 12, 2012
Nuclear Fuel Industries, Ltd. Kumatori Works	Ohi Power Station Units 1 to 4 28 fuel assemblies (17 × 17 fuel)	A B C	November 20, 2012
	Genkai Nuclear Power Station Units 3 and 4 Sendai Nuclear Power Station Units 1 and 2 12 fuel assemblies (17 × 17 fuel)	3	November 27, 2012
	Genkai Nuclear Power Station Unit 1 20 fuel assemblies (14 × 14 fuel)	1 2 3	December 12, 2012

(Note) “A” and “1” indicate the phase in which tests related to composition, structure, or strength can be conducted on the fuel materials, fuel cladding materials, and other parts. “B” and “2” indicate the phase in which fabrication of the fuel elements for the fuel assembly (i.e., a set of fuel elements) has been finished. “C” and “3” indicate the phase in which fabrication has been finished.

(2) Inspection of imported fuel assemblies

None

• The fourth quarter

(1) Inspection of domestically manufactured fuel assemblies

Facility	Plant name	Inspected fabrication process (Note)	Date of certificate issuance
Mitsubishi Nuclear Fuel Co., Ltd.	Tsuruga Nuclear Power Station Unit 2 60 fuel assemblies (17 x 17 fuel)	A B C	March 4, 2013
Nuclear Fuel Industries, Ltd. Tokai Works	Fukushima Daini Nuclear Power Station Units 3 and 4 Kashiwazaki-Kariwa Nuclear Power Station Units 1 to 5 104 fuel assemblies (9 x 9 fuel)	3	March 18, 2013
Nuclear Fuel Industries, Ltd. Kumatori Works	Ohi Power Station Units 1 to 4 68 fuel assemblies (17 x 17 fuel)	1 2 3	March 28, 2013
Global Nuclear Fuel-Japan Co., Ltd.	Shimane Nuclear Power Station Unit 2 92 fuel assemblies (9 x 9 fuel)	3	February 1, 2013
	Kashiwazaki-Kariwa Nuclear Power Station Units 6 and 7 200 fuel assemblies (9 x 9 fuel)	1 2 3	March 4, 2013

(Note) “A” and “1” indicate the phase in which tests related to composition, structure, or strength can be conducted on the fuel materials, fuel cladding materials, and other parts. “B” and “2” indicate the phase in which fabrication of the fuel elements for the fuel assembly (i.e., a set of fuel elements) has been finished. “C” and “3” indicate the phase in which fabrication has been finished.

(2) Inspection of imported fuel assemblies

None

Ⅶ OPERATIONAL PLANS FOR NUCLEAR POWER PLANTS

Table Ⅶ-1 FY2013 Operational Plan

(As of Mar.31,2013)

Establisher	Plant Name		Licensed Output (MW)	FY2013 Shutdown Days	FY2013 Operation Days	FY2013 Electric Energy Generated (1,000,000 kWh)	FY2013 Capacity Factor (%)
Hokkaido Electric Power Co., Inc.	Tomari	1	579	365	0	0	0
		2	579	365	0	0	0
		3	912	365	0	0	0
Tohoku Electric Power Co., Inc.	Onagawa	1	524	365	0	0	0
		2	825	365	0	0	0
		3	825	365	0	0	0
	Higashidori	1	1,100	365	0	0	0
Tokyo Electric Power Co., Inc.	Fukushima Daiichi	5	784	365	0	0	0
		6	1,100	365	0	0	0
	Fukushima Daini	1	1,100	365	0	0	0
		2	1,100	365	0	0	0
		3	1,100	365	0	0	0
		4	1,100	365	0	0	0
	Kashiwazaki-Kariwa	1	1,100	365	0	0	0
		2	1,100	365	0	0	0
		3	1,100	365	0	0	0
		4	1,100	365	0	0	0
		5	1,100	365	0	0	0
		6	1,356	365	0	0	0
		7	1,356	365	0	0	0
Chubu Electric Power Co., Inc.	Hamaoka	3	1,100	365	0	0	0
		4	1,137	365	0	0	0
		5	1,380	365	0	0	0
Hokuriku Electric Power Co.	Shika	1	540	365	0	0	0
		2	1,358	365	0	0	0
The Kansai Electric Power Co., Inc.	Mihama	1	340	365	0	0	0
		2	500	365	0	0	0
		3	826	365	0	0	0
	Takahama	1	826	365	0	0	0
		2	826	365	0	0	0
		3	870	365	0	0	0
		4	870	365	0	0	0
	Ohi	1	1,175	365	0	0	0
		2	1,175	365	0	0	0
		3	1,180	211	154	※	※
		4	1,180	198	167	※	※
The Chugoku Electric Power Co., Inc.	Shimane	1	460	365	0	0	0
		2	820	365	0	0	0
		3	1,373	365	0	0	0
Shikoku Electric Power Co., Inc.	Ikata	1	566	365	0	0	0
		2	566	365	0	0	0
		3	890	365	0	0	0
Kyushu Electric Power Co., Inc.	Genkai	1	559	365	0	0	0
		2	559	365	0	0	0
		3	1,180	365	0	0	0
		4	1,180	365	0	0	0
	Sendai	1	890	365	0	0	0
		2	890	365	0	0	0
The Japan Atomic Power Company	Tokai No. 2		1,100	365	0	0	0
	Tsuruga	1	357	365	0	0	0
		2	1,160	365	0	0	0
Total			47,673	18,294	321	※	※

※ : Not published by the Nuclear Regulation Authority

Figure Ⅶ-1 Diagram of FY2013 Reactor Shutdown Schedule

(As of Mar.31,2013)

Establisher	Plant Name		Licensed Output (MW)	Periodical Inspection /Shutdown Start Date	FY2013 Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Remarks
Hokkaido Electric Power Co., Inc.	Tomari	Unit 1	579	2011/4/22													Undecided
	Tomari	Unit 2	579	2011/8/26													Undecided
	Tomari	Unit 3	912	2012/5/5													Undecided
Tohoku Electric Power Co., Inc.	Onagawa	Unit 1	524	2011/9/10													Undecided
	Onagawa	Unit 2	825	2010/11/6													Undecided
	Onagawa	Unit 3	825	2011/9/10													Undecided
	Higashidori	Unit 1	1,100	2011/2/6													Undecided
Tokyo Electric Power Co., Inc.	Fukushima Daiichi	Unit 5	784	2011/1/3													Undecided
	Fukushima Daiichi	Unit 6	1,100	2010/8/14													Undecided
	Fukushima Daini	Unit 1	1,100	2011/3/11													Undecided
	Fukushima Daini	Unit 2	1,100	2011/3/11													Undecided
	Fukushima Daini	Unit 3	1,100	2011/3/11													Undecided
	Fukushima Daini	Unit 4	1,100	2011/3/11													Undecided
	Kashiwazaki-Kariwa	Unit 1	1,100	2011/8/6													Undecided
	Kashiwazaki-Kariwa	Unit 2	1,100	2007/7/5													Undecided
	Kashiwazaki-Kariwa	Unit 3	1,100	2007/9/19													Undecided
	Kashiwazaki-Kariwa	Unit 4	1,100	2008/2/11													Undecided
	Kashiwazaki-Kariwa	Unit 5	1,100	2012/1/25													Undecided
	Kashiwazaki-Kariwa	Unit 6	1,356	2012/3/26													Undecided
	Kashiwazaki-Kariwa	Unit 7	1,356	2011/8/23													Undecided
Chubu Electric Power Co., Inc.	Hamaoka	Unit 3	1,100	2010/11/29													Undecided
	Hamaoka	Unit 4	1,137	2012/1/25													Undecided
	Hamaoka	Unit 5	1,380	2012/3/22													Undecided
Hokuriku Electric Power Co.	Shika	Unit 1	540	2011/10/8													Undecided
	Shika	Unit 2	1,358	2011/3/11													Undecided

Figure Ⅶ-1 Diagram of FY2013 Reactor Shutdown Schedule

(As of Mar.31,2013)

Establisher	Plant Name		Licensed Output (MW)	Periodical Inspection /Shutdown Start Date	FY2013 Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Remarks
The Kansai Electric Power Co., Inc.	Mihama	Unit 1	340	2010/11/24													Undecided
	Mihama	Unit 2	500	2011/12/18													Undecided
	Mihama	Unit 3	826	2011/5/14													Undecided
	Takahama	Unit 1	826	2011/1/10													Undecided
	Takahama	Unit 2	826	2011/11/25													Undecided
	Takahama	Unit 3	870	2012/2/20													Undecided
	Takahama	Unit 4	870	2011/7/21													Undecided
	Ohi	Unit 1	1,175	2011/9/20													Undecided
	Ohi	Unit 2	1,175	2011/12/16													Undecided
	Ohi	Unit 3	1,180						02								Undecided
	Ohi	Unit 4	1,180							15							Undecided
The Chugoku Electric Power Co., Inc.	Shimane	Unit 1	460	2010/11/8													Undecided
	Shimane	Unit 2	820	2012/1/27													Undecided
	Shimane	Unit 3	1,373														
Shikoku Electric Power Co., Inc.	Ikata	Unit 1	566	2011/9/4													Undecided
	Ikata	Unit 2	566	2012/1/14													Undecided
	Ikata	Unit 3	890	2011/4/29													Undecided
Kyushu Electric Power Co., Inc.	Genkai	Unit 1	559	2011/12/1													Undecided
	Genkai	Unit 2	559	2011/1/29													Undecided
	Genkai	Unit 3	1,180	2010/12/11													Undecided
	Genkai	Unit 4	1,180	2011/12/25													Undecided
	Sendai	Unit 1	890	2011/5/10													Undecided
	Sendai	Unit 2	890	2011/9/1													Undecided
The Japan Atomic Power Company	Tokai No. 2		1,100	2011/5/21													Undecided
	Tsuruga	Unit 1	357	2011/1/26													Undecided
	Tsuruga	Unit 2	1,160	2011/8/29													Undecided

Ⅷ STATUS OF OPERATIONAL MANAGEMENT OF NUCLEAR POWER PLANTS

VIII-1 Operational Management at Nuclear Power Plants

For the operational management of nuclear power plants, basic concepts include: ① making certain of all possible measures to ensure safety and stable operation, ② gaining the trust of local residents and the community, and ③ promoting plant efficiency. And in order to more effectively implement these values in striving for operational management system preparedness and enrichment, various measures have been taken such as those outlined below.

(1) Safety and reliability improvement measures

1) Accident prevention measures
- (i) Age deterioration preventative measures
- (ii) Equipment improvements based on the lessons of accidents in Japan and other countries
- (iii) Survey and review of accident information in Japan and other countries

2) Planned development of operation and maintenance staff
- (i) Securing and fostering of human resources based on long-term development plan
- (ii) Enhancement of training facilities and enrichment of training content

3) Improvement of security management systems

4) Quality management systems
- (i) The president establishes the principle of quality as top management, and the general managers of power plants and headquarter divisions develop this quality objective. In order to accomplish this, the nuclear power division implements quality assurance activities.
- (ii) The nuclear quality audit division, independent of the nuclear power division, performs audits and follow-ups.
- (iii) The president conducts management reviews based on the quality assurance activities of the nuclear power division and audit reports by the nuclear power audit division and conducts reviews of quality policies and continuous improvements.

5) Measures for emergencies
- (i) Establishment of communication network among the national and local governments, power plants and others
- (ii) Enhancement of monitoring facilities

(2) Exposure reduction measures

1) Establishment of a contractors' center

2) Radiation management education
- (i) Implementation of simulation drills of work under radiation
- (ii) Outfitting of teaching aids and learning materials and the utilization of external training institutions

3) Automation of inspection instruments

4) Environmental radioactivity reduction measures

VIII-2 Education and Training of Operation Staff

(1) Organization of a nuclear power plant

An organization related to the safety of reactor facilities in a nuclear power plant and its major tasks are outlined below as an example.

[Headquarters]

- **President**
  As top management, it exerts control over operational safety activities concerning the establishment, implementation, maintenance and improvement of a quality management system.
  - **Manager, Nuclear Power Quality Auditing Division**
    Administrates audits concerned with quality assurance activities.
    - **Nuclear Power Quality Auditing Division**
      - **Quality Auditing Division at Each Nuclear Power Plant**
      Performs audits of quality assurance activities.
  - **General Manager, Nuclear Power Division**
    Administrates the safety activities performed by the materials division, Nuclear Power Site Management Division, Nuclear Power Quality and Safety Division, Nuclear Power Management and Control Division, Nuclear Power Facility Management Division, Nuclear Fuel Cycle Division and power plant general managers.
    - **Materials Division**
      Performs tasks related to the assessment and selection of procurement sources.
    - **Nuclear Power Site Management Division**
      Performs tasks related to the promotion of quality management and planning, management training of staff.
    - **Nuclear Power Quality and Safety Division**
      Performs tasks related to the improvement and standardization of work process and safety management.
    - **Nuclear Power Management and Control Division**
      Performs tasks related to the operation and maintenance of the nuclear power plant.
    - **Nuclear Power Facility Management Division**
      Performs tasks related to the modification and design control of nuclear power facilities.
    - **Nuclear Fuel Cycle Division**
      Performs tasks related to the procurement of nuclear fuels.
    - **Nuclear Power Generation Safety Committee**
      Deliberates on matters related to the safety of nuclear facilities (changes to license applications for the establishment of reactors and changes to operational safety program).

Representative example taken from the operational safety program for boiling water reactors

[Nuclear Power Plant]

- **General Manager of the Plant** — Exerts control over tasks related to security at power plants.
  - **Chief Engineer of Nuclear Reactor** — Supervision of security related to the operation of nuclear reactor facilities
  - **Nuclear Power Plant Safety Management Committee** — Deliberative body for matters related to security management at nuclear reactor facilities at power plants
  - **Clerical Section** — Tasks related to general affairs, procurement, occupational safety, training and public relations
  - **Quality and Safety Section** — Tasks related to quality control, security education, quality management and to nuclear power safety
  - **Technology Section** — Tasks related to operational standards, operational plans, fuel management and so forth
    Tasks related to radiation management, chemical management and environmental radioactivity measurement
    Tasks related to emergency measures
  - **Operations Section** — Tasks related to service operation and so forth (see attached chart)
  - **Maintenance Section** — Implementation of checks of periodical inspections, periodical inspection staff and so on, and tasks related to the design and implementation of maintenance, repair and other work

Representative example taken from the operational safety program for boiling water reactors

Breakdown of operating staff

Operations Section		
Person Responsible for Operation (shift chief)	(1 person)	Monitors overall operation and directs and supervises operators.
Assistant Shift Chief	(1 person)	Assists the person responsible for operation and instructs and helps operators.
Operator	(multiple)	Supervises and operates the reactor, turbine and generator.
Assistant Operator	(multiple)	Conducts site inspections and operates auxiliaries.

(2) Education and training of operating staff

In Japan, education and training to maintain and improve operating staff capabilities is conducted by the dispatch of staff to training facilities and in-house education at each electricity utility.

Concerning training facilities, operating staff were dispatched to the training facilities of US manufacturers between 1967 and 1973 to receive necessary training. However, due to the domestic founding of the Nuclear Power Training Center (NTC) and BWR Operator Training Center (BTC), it became possible from 1974 to receive more comprehensive education and training in Japan. These operational training centers offer primary training, retrainining, team work training and other training courses according to the skill level of the operators and had administered training to a total of 39,315 persons and 13,501 teams as of the end of FY2012.

To gain basic knowledge about nuclear power, the training course at the Japan Atomic Energy Agency is also available.

Moreover, each electric utility performs an in-house accident simulation operational drill, a case study of Japanese and foreign accidents and other OJT (on-the-job training) in a planned manner in an effort to maintain and improve the capability of its operating staff.

Operation of a nuclear power plant is achieved through shifts consisting of these trained operators and the members of a shift generally comprise a person responsible for operation (shift chief), shift sub-chiefs, operators and assistant operators.

Operators first receive introductory education about nuclear power through in-house training by the electricity utility and are dispatched to the field as trainees where they learn field knowledge through inspections and other practices under the direction and leadership of experienced personnel. They are then assigned to the field where they learn basic knowledge and techniques about electricity, turbine and nuclear reactors while receiving leadership and supervision. They are dispatched to primary training or other courses at an operational training center where they attend lectures and simulator-aided training about the basic principles and techniques necessary for reactor operation. After they have gained practical experience as assistant operators, they are assigned as operators of electricity, turbine and nuclear reactors. After being assigned as operators, they are each dispatched to an operation training center to attend a retraining course consisting mainly of simulator-aided training. The members of a shift are dispatched to an operation training center as a unit to receive simulator-aided training in the teamwork training course to check their teamwork as a shift and to improve their skills.

In the field, the members of a shift not only receive education in technology, safety and management, but also participate in an accident simulation operation drill.

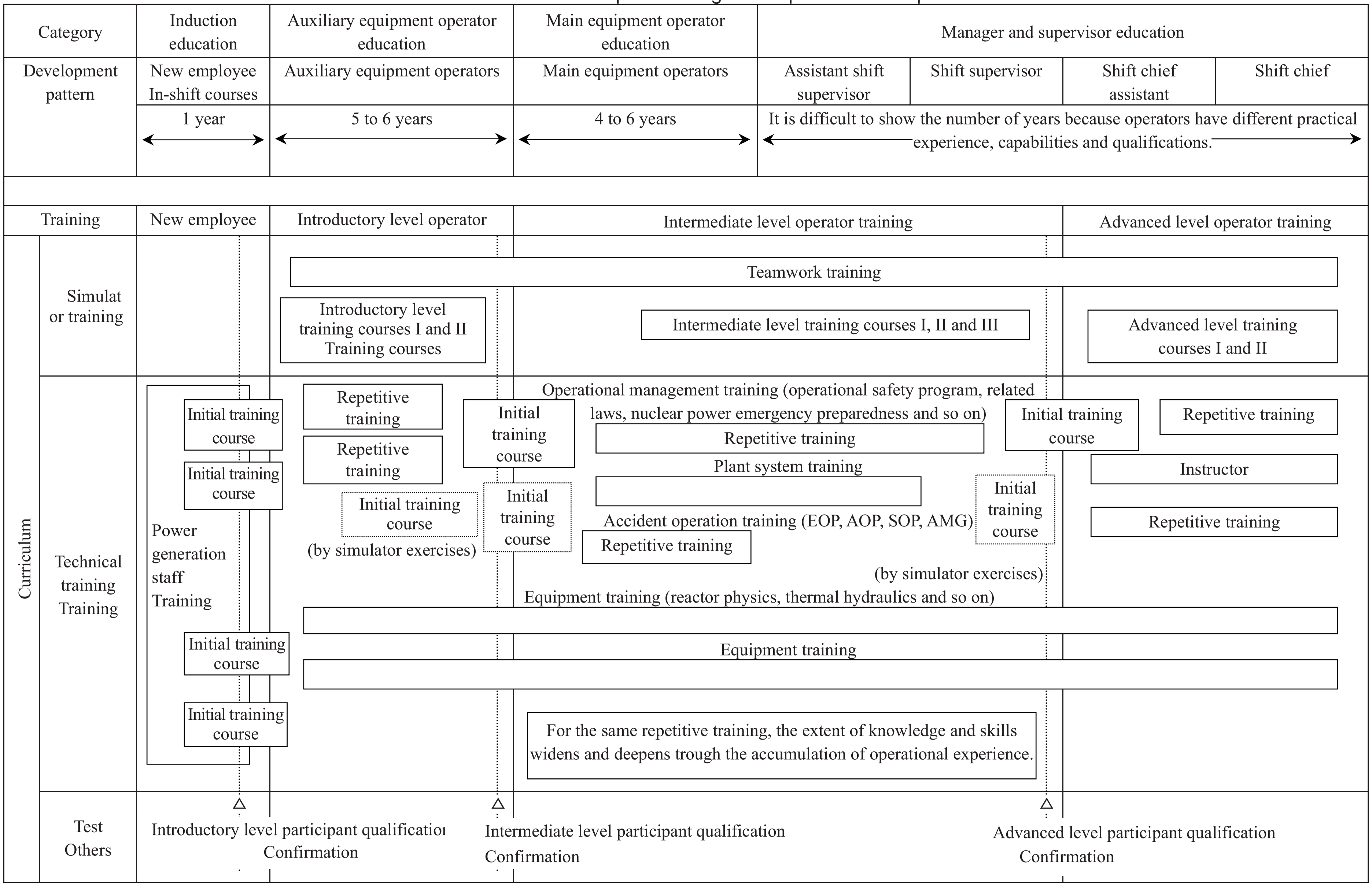
The electricity utility appoints, as staff responsible for operation, individuals who have been through the abovementioned education and training, who have practical expertise in unit operation and who have cultivated their superior work management, personnel and labor management abilities through a wealth of experience.

(3) Outline of operational training centers

The operational training centers aim to develop operators at nuclear power plants. In Japan, the BWR Operator Training Center (Okuma Town, Futaba County, Fukushima Prefecture) and the Nuclear Power Training Center (Tsuruga City, Fukushima Prefecture) have both been conducting operator training since 1974. In June, 1993, the BWR Operator Training Center opened its Niigata Center (Kariwa Village, Niigata Prefecture), which commenced operator training in October of the same year.

The distinctive feature of the operational training centers is that they possess operation training simulation equipment which simulates the central control panel of a nuclear power plant. The simulators consist of a simulation control panel and a computer. The computer calculates the actions of the power plant from shutdown to full output status in real time and displays the results on the simulation control panel. The operations performed by the operator on the control panel are read in the computer and the equipment actions in response to these operations are displayed on the control panel. Operators can therefore train themselves in the very same way as operating actual equipment. Besides normal operations such as the startup and shutdown of a plant, operators can repeatedly train themselves in measures to be taken in various emergencies.

Table VIII-2-1 Examples of Long-term Operator Development Plans



Source: Japan Electric Association "Guidelines for Education and Training of Nuclear Power Plant Operators (JEAG4802-2002)"

Table VIII-2-2 Outline of Operator Training Centers in Japan (BTC)

(As of March 31, 2013)

Item		Training center	BTC
Name			BWR Operator Training Center
Location			651 Chuodai, Ottozawa, Okuma Town, Futaba County, Fukushima Prefecture (Niigata Center: 4161-8 Aza-Nishiura, Oaza-Kariwa, Kariwa Village, Kariwa County, Niigata Prefecture)
Establishment			April, 1971
Number of instructors			33 persons
Outline of simulator installations	Simulator 1	1. Start of training	April, 1974
		2. Model plant	Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station Unit 3 (784,000 kW)
		3. Control panel	Main control panel in central control room (Nuclear reactor and turbine power generator; Emergency core cooling system and others) Instructor console EWS type
		4. Computer	TOSBAC G-8065 (1 set), G-8045 (1 set)
	Simulator 2	1. Start of training	October, 1983
		2. Model plant	Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station Unit 3 (1.10 million kilowatts)
		3. Control panel	Main control panel in central control room (Nuclear reactor and turbine power generator; Emergency core cooling system and others) Instructor console PC type
		4. Computer	AS7000 (1 set), S2000-S (2 sets)
	Simulator 3	1. Start of training	October, 1989
		2. Model plant	Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station Unit 4 (784,000 kW)
		3. Control panel	Main control panel in central control room (Nuclear reactor and turbine power generator; Emergency core cooling system and others) Instructor console PC type
		4. Computer	H-7780 (1 set), H-7765 (1 set)
	Simulator 4	1. Start of training	October, 1993
		2. Model plant	Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station Unit 4 (1.10 million kilowatts)
		3. Control panel	Main control panel in central control room (Nuclear reactor and turbine power generator; Emergency core cooling system and others) Instructor console PC type
		4. Computer	RS90-150 (2 sets)
	Simulator 5	1. Start of training	August 1994
		2. Model plant	Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station Unit 6 (1.356 million kilowatts)
		3. Control panel	Main control panel in central control room (Nuclear reactor and turbine power generator; Emergency core cooling system and others) Instructor console PC type
		4. Computer	UX7000 (1 set)

(note) The operator training by simulators 1 to 3 has not been conducted since March 11, 2011.
The Simane Temporary Centre opened in July, 2011 and the operator training by the Simane simulator is being conducted.

Table VIII-2-3 Outline of Operator Training Centers in Japan (NTC)

(As of July 12, 2013)

Training center Item			NTC
Name			Nuclear Power Training Center
Location			129-1-1 Kutsumi, Tsuruga City, Fukui Prefecture
Establishment			June 1972
Number of instructors			34
Outline of simulator installations	Simulator 1	1. Start of training	March 1997
		2. Model plant	Hokkaido Electric Power Co., Inc., Tomari Power Station Unit 1 (579,000 kW, 2 Loops)
		3. Control panel	Main control panel in central control room With touch panel VDU Instructor console With touch panel VDU (Main panel, turbine power generator auxiliary panel, reactor auxiliary panel (including emergency core cooling)
	Simulator 2	1. Start of training	March 1984
		2. Model plant	The Kansai Electric Power Co., Inc., Takahama Power Station Unit 3 (870,000 kW, 3 Loops)
		3. Control panel	Main control panel in central control room With touch panel VDU Instructor console With touch panel VDU (Reactor panel (including emergency core cooling system), turbine power generator panel and others)
	Simulator 3	1. Start of training	March 1990
		2. Model plant	The Kansai Electric Power Co., Inc., Ohi Power Station Unit 3 (1.18 million kW, 4 Loops)
		3. Control panel	Main control panel in central control room With touch panel VDU Instructor console With touch panel VDU (Main panel, turbine power generator auxiliary panel, reactor auxiliary panel (including emergency core cooling)
	Simulator 4	1. Start of training	November 2008
		2. Model plant	Hokkaido Electric Power Co., Inc., Tomari Power Station Unit 3 (912,000 kW, 3 Loops) Shikoku Electric Power Co., Inc., Ikata Power Station Unit 2 (566,000 kW, 2 Loops) } Switching
		3. Control panel	Main control panel in central control room With touch panel VDU Instructor console With touch panel VDU (Operation console, power transmission console, Instruction console, large display and others)
		4. Remarks	Advanced central control panel

Table VIII-2-4 Outline of Training Courses at Operator Training Centers in Japan (BTC)

I. Standard training course

	Course name	Course objectives/outline	Training period	Capacity
Introductory level	Introductory training course I	Master the outline of a BWR plant and basic theories of nuclear engineering, thermal engineering, control engineering and safety engineering. The admission level criterion is mastery of the outline of nuclear plant equipment and operation (Operational experience of about 2 years).	15 days (3 weeks)	8 persons (minimum of 2 persons)
			10 days (2 weeks)	8 persons (minimum of 2 persons)
	Introductory training course II	Acquire comprehensive skills necessary for operating in the central control room. Having acquired knowledge of plant equipment and operational methods, training is conducted in normal operations and actions to be taken in abnormal circumstances. The admission level criteria are completion of the Introductory training course I or possession of equivalent knowledge of basic theory, as well as mastery of the outline of plant equipment and operation.	40 days (8 weeks)	4 persons (minimum of 3 persons)
Intermediate level	Intermediate training course I	Be familiarized with abnormal operating procedures (AOP) and understand EOP entry conditions (RC Scram → Procedure guidelines). The admission level criterion is completion of the Introductory training course II or possession of equivalent or higher knowledge and technical skill.	10 days (2 weeks)	4 persons (minimum of 3 persons)
	Intermediate training course II	Improve knowledge and skills relating to emergency operating procedures (EOP) and acquire comprehensive competence in knowledge and technical skill necessary for a central control room operator. The admission level criteria are being a member of the central control room operation staff or involvement in relevant operations, as well as completion of the Intermediate training course I or possession of equivalent or higher knowledge and technical skill relating to emergency operating procedures (AOP).	10 days (2 weeks)	4 persons (minimum of 3 persons)
	Intermediate training course III	As a superior to central control room operation staff, enhance broad operation management knowledge concerning laws, safety regulations and so forth, and acquire comprehensive abnormal situation handling abilities (AOP, EOP and SOP). The admission level criteria are possession of sufficient experience as a member of the central control room operation staff, as well as completion of the Intermediate training course II or possession of equivalent or higher knowledge and technical skill.	10 days (2 weeks)	4 persons (minimum of 3 persons)

I. Standard training course (continued)

Course name		Course objectives/outline	Training period	Capacity
Advanced level	Advanced Introductory training course	Master the structure of nuclear facilities including knowledge of nuclear engineering and thermal engineering, and managerial knowledge including nuclear facility capabilities, legislation and safety regulations, and case studies, while acquiring the ability to respond (EOP, SOP) to abnormal circumstances as a director. Positioned as a gateway course consistent with JEAG4802 for advanced-level operators. The admission level criteria are planned assignment as an assistant to the person responsible for operation, as well as completion of the Intermediate training course III or possession of equivalent or higher knowledge and technical skill.	9 days (2 weeks)	4 persons (minimum of 3 persons)
	Advanced training course I	A course corresponding to Education and training for advanced-level operators as specified in JEAC4804. This course aims at an all-inclusive mastering of the skills necessary to be a person responsible for operation and is targeted at the following persons. 1. Persons who will take an operation skill test as specified in JEAC4804. 2. Persons who will renew their operator's qualification. 3. Persons who are not qualified operators, but who intend to take the test in the future. * When someone applies for the test, it will be performed as a qualified-operator practical skills test. If the quota is not reached, the electric company may be asked to bring along operators from the site.	11 days (2 weeks)	4 persons (minimum of 3 persons)
	Advanced training course II	A course corresponding to Education and training for advanced-level operators as specified in JEAC4804. The lectures and operational practical tests are the same as in the Advanced training course I, however, because the period is shorter, training in operational accidents is only provided in representative cases. The following persons are targeted. 1. Persons who will renew their operator's qualification. 2. Persons who are not qualified operators, but who intend to take the test in the future. * When someone applies for the test, it can be performed as a qualified-operator practical skills test. If the quota is not reached, the electric company may be asked to bring along operators from the site. Excluding one part, Advanced II and Advanced A may be administered in parallel.	6 days	4 persons (minimum of 3 persons)
	Skill test preparatory course for persons responsible for operation	A course to be provided as an operation skill test as specified in JEAC4804. It consists of a half day of exercise for mastering the control panel and 1.5 days of testing. If the quota is not reached, the electric company may be asked to bring along operators from the site.	2 days	4 persons (minimum of 1 person)

II. Continuing training course (part 1)

Course name		Course objectives/outline	Training period	Capacity
Intermediate level	Intermediate IIA/Exchange I training course	Uses the training content of the standard course as a benchmark and gives priority to training in abnormal operating procedures (AOP). Exchanges information and broadens perspectives about procedures, attitude, experience and so forth through exchange with operators of other electric power companies. The admission level criterion is completion of the Introductory training course II or possession of equivalent or higher knowledge and technical skill.	5 days	4 persons (minimum of 3 persons)
Intermediate level	Intermediate IIB/Exchange II training course	Uses the training content of the standard course as a benchmark and gives priority to familiarization with abnormal operating procedures (AOP) and the basics of emergency operating procedures (EOP). Exchanges information and broadens perspectives about procedures, attitude, experience and so forth through exchange with operators of other electric power companies. The admission level criterion is completion of the Intermediate training course II or possession of equivalent or higher knowledge and technical skill.	5 days	4 persons (minimum of 3 persons)
Intermediate level	Intermediate training course IIC	Uses the training content of the standard course as a benchmark and mainly provides practical training in emergency operating procedures (EOP). The admission level criterion is completion of the Intermediate training course II or possession of equivalent or higher knowledge and technical skill.	5 days	4 persons (minimum of 3 persons)
Intermediate level	Intermediate training course IIIB/C	Uses the training content of the standard course as a benchmark and mainly provides practical training in emergency operating procedure (EOP). The course also covers abnormal situation handling (EOP/SOP and related matters) and includes the Act on Special Measures Concerning Nuclear Emergency Preparedness and communication training. Some of the content is carried out flexibly in consideration of the trainees' course attendance histories and requests. Intermediate IIIB/C and Advanced C training may be administered in teams. The admission level criteria are possession of sufficient experience as a member of the central control room operation staff, as well as completion of the Intermediate training course III or possession of equivalent or higher knowledge and technical skill.	5 days	4 persons (minimum of 3 persons)
Intermediate level	Reactor characteristics course	The objective is to intensively refresh knowledge about the behavioral characteristics of nuclear reactors in a short amount of time, through theoretical reviews and incident confirmation using a simulator. During the five-day course, theoretical reviews of nuclear engineering, thermal engineering, and safety engineering as well as behavior confirmation with a simulator are performed. During the two-day course, the main activity is behavioral confirmation with a simulator. The admission level criterion is completion of the Intermediate training course I or possession of equivalent or higher knowledge and technical skill.	5 days 2 days	4 persons (minimum of 3 persons) 4 persons (minimum of 3 persons)

II. Continuing training course (part 1) (cont.)

Course name		Course objectives/outline	Training period	Capacity
Advanced level	Advanced training course A	Contains all of the lecture material of the standard courses and provides comprehensive operation skill training. Positioned as an advanced preparatory course for Advanced training I for being newly certified as a person responsible for operation. Excluding one part, Advanced II and Advanced A may be administered in parallel. The admission level criteria are being an assistant of the person responsible for operation or a person at a higher position, as well as completion of the Intermediate training course III or possession of equivalent or higher knowledge and technical skill.	5 days	4 persons (minimum of 3 persons)
	Advanced training course B	Uses the training content of the standard course as a benchmark and gives priority to familiarization with abnormal operating procedures (AOP) and the basics of emergency operating procedures (EOP). It also aims for understanding of how to deal with abnormalities by training how to evaluate the situation. The admission level criteria are being an assistant of the person responsible for operation or a person at a higher position, as well as completion of the Advanced course I or possession of equivalent or higher knowledge and technical skill.	5 days	4 persons (minimum of 3 persons)
	Advanced training course C	Uses the training content of the standard course as a benchmark and mainly provides practical training in emergency operating procedure (EOP). The course also covers abnormal situation handling (EOP/SOP and related matters) and includes the Act on Special Measures Concerning Nuclear Emergency Preparedness and communication training. Intermediate IIIB/C and Advanced C training may be administered in teams. The admission level criteria are possession of experience as an advanced-level operator, as well as completion of the Advanced training course or possession of equivalent or higher knowledge and technical skill.	5 days	4 persons (minimum of 3 persons)
	Advanced training course D	Comprehensively summarizes desk-top operational theories about nuclear, thermal and safety engineering, as well as legislation and operational safety program. The admission level criteria are being an advanced-level operator, as well as completion of the Advanced introductory course or possession of equivalent or higher knowledge and technical skill.	5 days	8 persons (minimum of 3 persons)

II. Continuing training course (part 2)

This is a training course to make up for technical deficiencies or weak points of individuals or teams and is given on a continuing basis according to the requests of the dispatching company.

The courses currently being administered are outlined below.

Course name		Course objectives/outline	Training period	Capacity
Intermediate	Operational management during periodical inspections training course	Deepens understanding of plant operation management and equipment management during periodical inspections, understands the safety regulations applicable during periodical inspections and shutdowns, and masters the techniques to be able to perform operational management appropriately during periodical inspections. The admission level criterion for the five-day course is being an onsite operator, a central control room operator, or a person at a higher position who is actually involved in management of operational isolation and management of the system and equipment operations. The admission level criterion for the two-day course is being an operator who already took the five-day course or a person at a chief or assistant manager level with extensive experience of periodical inspections.	5 days	4 persons (minimum of 3 persons)
			2 days	4 persons (minimum of 3 persons)
Refresher training	Intermediate refresher training course	Refreshes the basic items of operational training of the standard courses. Consists mainly of operation skill training. The admission level criterion is being a central control room operator at a nuclear power station who has already taken the Intermediate II or higher.	3 days (In response to requests)	4 persons (minimum of 3 persons)
	Advanced refresher training course	Refreshes the basic items of operational training of the standard courses. Consists mainly of operation skill training. The admission level criteria are possession of experience as an advanced-level operator, as well as completion of the Advanced training course or possession of equivalent or higher knowledge and technical skill.	3 days (In response to requests)	4 persons (minimum of 3 persons)
	Supplemental training course (knowledge)	In response to requests from dispatch companies, strengthens knowledge deficiencies and conducts reassessments.	2 days	1 person or more
	Supplemental training course (skill)	In response to requests from dispatch companies, strengthens knowledge deficiencies and conducts reassessments.	1 day	1 person

III. Team training course

Course name	Course objectives/outline	Training period	Capacity
Team assessment course	For a shift team at a power plant as a unit, the aim is to enhance the collective strength of the team. Judges the strength of the team by team characteristic assessment and team diagnosis. For the one day course, only team characteristic assessment will be used. The curriculum will be prepared by BTC, however, it may be adapted in response to the requests of the dispatching company, except for team characteristic assessment.	2 days	per team
		1 day	per team
Training course for plant diagnosis during earthquakes	Improve team capability for monitoring the state of concurrent incidents at the plant level when a number of alarms and equipment failures take place at the same time, and recovering the plant by prioritizing necessary operations.	1 day	per team
Practical training course for reviewing and responding to the accident at 1F	Deepen the understanding of trainees about the accident happened at Fukushima Dai-ichi as their own practical experiences and familiarize them with the emergency safety measures taken. Consideration is taken to allow trainees to learn the emergency safety measures employed by individual companies to the extent possible on the computer simulator.	1.5 days	per team
Team exchange event	A number of shift teams gather in one place to improve and upgrade their operational techniques and team strength. The strength of the team is evaluated by team characteristic assessment and the teams observe each other through mutual review.	1 day	4 teams (minimum of 2 teams)
Family training course	With a shift team at a power plant, training is administered according to the family training program prepared by the dispatcher.	1 day	per team

IV. Reactor type changeover training course

This is a training course provided for a specific purpose. The training period, content and so forth will be individually established after meetings with the dispatching company.

The courses currently being administered are outlined below.

Course name	Course objectives/outline	Training period	Capacity
800 MWe type reactor changeover training course	Aims at quickly and intensively familiarizing persons who have experience in operating a second- or third-generation control panel with the manual system typical of first-generation plants.	5 days	per team
1,100 MWe type reactor changeover training course	Aims at using a processing computer to quickly and intensively familiarize persons who have experience in operation of first- or third-generation control panels with man-machine interfaces and control systems typical of second-generation plants, such as CRT screen display systems and automated operating systems.	5 days	per team
ABWR type reactor changeover training course	Aims at quickly and intensively familiarizing persons who have experience in operating first- or second-generation control panels with man-machine interfaces and control systems typical of third-generation plants, such a large display panels, touch operation panels, centralized alarm systems and integrated digital control systems.	15 days (3 weeks)	per team
		5 days (In response to requests)	per team

V. Lecture courses

<table>
<tr><th colspan="2">Course name</th><th>Course objectives/outline</th><th>Training period</th><th>Capacity</th></tr>
<tr><td colspan="2">Instructor (qualification) lecture course I</td><td>Aims at helping persons earn qualifications equivalent to instructor qualification L (B-1 area) and the BTC instructor qualification simulator training qualification S(B) by implementing an instructor qualification test, a simulator operation skill confirmation test and an interview at each site, in compliance with the BTC instructor qualification rule for instructors.</td><td>30 days
(6 weeks)</td><td>1 person
(up to 2 persons)</td></tr>
<tr><td colspan="2">Instructor (qualification) lecture course II</td><td>For persons who have finished the “Instructor (qualification) lecture course I” and have provided guidance at each site simulator about for 3 months. This course aims at helping persons earn qualifications equivalent to the BTC instructor qualification S(A) (requirement to be a person in charge of the course) after checking their ability to train.</td><td>5 days</td><td>1 person
(up to 2 persons)</td></tr>
<tr><td rowspan="3">Instructor training</td><td rowspan="2">Instructor lecture course</td><td rowspan="3">Administers training for persons engaged in shift member development training. Trainees personally participate in the preparation of training materials, simulation training, evaluation of the effects of training and other tasks necessary for improvement of skill, in an intensive and effective manner. Training details and duration are set in response to requests. The refresh course is targeted for the persons who have already taken the instructor lecture course.</td><td>10 days
(2 weeks)</td><td>5 persons
(minimum of 2 persons)</td></tr>
<tr><td>5 days</td><td>5 persons
(minimum of 2 persons)</td></tr>
<tr><td>Instructor lecture refresh course</td><td>3 days</td><td>5 persons
(minimum of 2 persons)</td></tr>
<tr><td colspan="2">Intermediate conservation/maintenance lecture course I</td><td rowspan="6">For engineers who are involved in maintenance or repair tasks at nuclear power plants, this course aims at developing a mastery of knowledge of facilities and operations useful for the maintenance of plants.
Trainees also study the basic knowledge required to understand a maintenance program (laws, regulations, safety assessments, etc).
In this course, knowledge of each system facility and its operations is provided in a classroom, and startup and shutdown of plants and abnormal situations are learned through use of a simulator.
The course is provided as a “15-day course,” during which comprehensive learning can be achieved, and as a “3-day course × 5 times,” provided separately by each system facility.</td><td>15 days
(3 weeks)</td><td>8 persons
(minimum of 3 persons)</td></tr>
<tr><td colspan="2">Intermediate conservation/maintenance lecture (reactor) course I</td><td>3 days</td><td>8 persons
(minimum of 3 persons)</td></tr>
<tr><td colspan="2">Intermediate conservation/maintenance lecture (turbine) course I</td><td>3 days</td><td>8 persons
(minimum of 3 persons)</td></tr>
<tr><td colspan="2">Intermediate conservation/maintenance lecture (electric/instrument) course I</td><td>3 days</td><td>8 persons
(minimum of 3 persons)</td></tr>
<tr><td colspan="2">Intermediate conservation/maintenance lecture (safety facility) course I</td><td>3 days</td><td>8 persons
(minimum of 3 persons)</td></tr>
<tr><td colspan="2">Intermediate conservation/maintenance lecture (operation) course I</td><td>3 days</td><td>8 persons
(minimum of 3 persons)</td></tr>
<tr><td colspan="2">Intermediate conservation/maintenance lecture course II</td><td>In this course, trainees learn the laws applicable to the tasks performed in periodical inspections, the regulations for maintaining safety during periodical inspections and their background, process management, which is a major task during periodical inspections (focusing on critical processes), “knowledge and laws relating to the safety maintenance systems” during review of system isolation, and “other broad knowledge.” The purpose of the training is for trainees to gain knowledge required for the tasks performed in periodical inspections and to perform periodical inspections with the plants' safety ensured.
This course is targeted at the following persons who have completed the Intermediate conservation/maintenance lecture course I or are in possession of equivalent knowledge on plant facilities.
(1) Persons at electric companies who are in charge of construction management during periodical inspections (maintenance staff, repair staff)
(2) Persons at manufacturers who are in charge of construction management during periodical inspections, and supervisors</td><td>5 days</td><td>8 persons
(minimum of 3 persons)</td></tr>
<tr><td colspan="2">Public relations lecture course</td><td>Understand the function of a nuclear power plant and other basic knowledge necessary for public relations activities related to nuclear power. The following persons are targeted.
(1) Persons engaged in the public relations of the nuclear power industry
(2) Persons indirectly related to nuclear power departments</td><td>1 day</td><td>12 persons
(minimum of 2 persons)</td></tr>
</table>

V. Lecture courses (cont.)

Course name	Course objectives/outline	Training period	Capacity
Nuclear engineer lecture course	Master knowledge about nuclear plant facilities and operation useful for the tasks of commissioning and design of plants. Execute the startup and abnormal response procedures based on the knowledge, explanations of operational knowledge and procedures of each system facility. Performance of a completion confirmation test on request of the dispatching company. Persons being targeted are those in charge of commissioning and design, examiners and inspectors, persons in charge of periodical inspections, affiliated companies and others. Training details and duration are in response to requests.	20 days (4 weeks)	4 persons (minimum of 3 persons)
		10 days (2 weeks)	4 persons (minimum of 3 persons)
		5 days	8 persons (minimum of 3 persons)
		3 days	8 persons (minimum of 3 persons)
		1 day	per team
Administration official training course	This course is provided to officials of national and municipal governments, independent administrative agencies and the like to master knowledge about nuclear power plants and their operation necessary for nuclear power administration and inspection.	5 days	per team (up to 5 persons)
		3 days (Will respond to requests)	4 persons (minimum of 3 persons)

Table VIII-2-5 Outline of Training Courses at Operator Training Centers in Japan (NTC)

No.	Course name	Outline	Training period	No. of trainees
1	Initial training course	Training of personnel for nuclear reactor control	20 weeks	
		Phase I Basic lecture: Acquisition of basic knowledge about the reactor core of the PWR plant.	6 weeks	Up to 16
		Phase II System lecture: Acquisition of basic knowledge about the system, control and safety of the PWR plant.	6 weeks	Up to 16
		Phase III Simulator training: Acquisition of skills about operations in normal, abnormal and emergency conditions in the shift system.	8 weeks Simulator training: 148 hours	3/team
2	Retraining course	Training according to practical experience of trainees and training purpose.		
	Retraining standard course	Acquisition of knowledge and skills about normal, abnormal and emergency operation procedures. Simulator: 4 hrs/day I: Simulator 4 hrs/day, start/stop + design base II: Simulator 4 hrs/day, design base only	I 10 days Simulator training: 36 hours	3/team
			II 5 days Simulator training: 20 hours	
	Retraining advanced course	Acquisition, maintenance and improvement of knowledge and skills about abnormal and emergency operation procedures. Simulator: 4 hrs/day	5 days Simulator training: 20 hours	3 - 4/team
	Retraining supervisor course	Maintenance and improvement of ability for situation assessment and supervisory operations in abnormal and emergency conditions. I: Simulator: 4 hrs/day II: Simulator: 4 hrs/day, no joint lectures II: Simulator: 4 hrs/day, one-day joint lectures on the 5th day III: Simulator: 4 hrs/day, half-day joint lectures on the 5th day IV: Simulator: 4 hrs/day, qualification renewal courses	I 5 days Simulator training: 20 hours	3 - 4/team
			II 5 days Simulator training: 16 hours	
			III 5 days Simulator training: 20 hours	
			IV 5 days Simulator training: 20 hours	
	Retraining practical skill test course	Preparation for the practical skill test in the qualification of the nuclear power plant operator.	9 days Simulator training: 35 hours	3/team
3	Operating shift cooperative training course	Simulator training for the shift team members to improve systematic collaborative work of the shift team mainly in abnormal plant conditions.	1 day Simulator training: 8 hours	by shift team
			2 days Simulator training: 16 hours	
			3 days Simulator training: 24 hours	
4	Special training course	Training according to the purpose of persons engaged in nuclear power generation.		
		・Main equipment operator course	Period: 3 days	
		・PWR simulator training course for government employees engaged in nuclear related regulations	Period: 5 days	
		・PWR operational application course	Period: 3 days	
		・Short-term simulator training course	Period: 10 days	
		・Nuclear engineer introduction course	Period: 3 days	
		・Instructor training course	Period: 2 - 5 days	
		・Plant behavior intelligibility level enhancement	Period: 1 - 2 days	
		・Other courses provided in response to requests		

Table VIII-2-6 Training Results at Operator Training Centers in Japan (BTC)

(Unit: Persons)

		Fiscal Year / Training course	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand total
CTB	First	Introductory-level training	53	40	39	38	36	32	29	28	20	18	20	20	15	14	20	17	11	19	8	11	1,299
		Intermediate-level training	89	92	129	126	130	120	97	103	97	99	65	87	89	91	78	70	76	72		29	2,799
		Advanced-level training	70	35	54	51	59	58	68	69	58	65	53	44	46	54	42	48	47	43	23	29	1,467
		Refresher training and others	122	159	189	213	178	162	175	162	183	174	19	20	20	47	32	29	24	22		1	3,033
		Family training	112 (teams)	129 (teams)	164 (teams)	169 (teams)	186 (teams)	176 (teams)	140 (teams)	140 (teams)	140 (teams)	140 (teams)	93 (teams)	74 (teams)	79 (teams)	75 (teams)	78 (teams)	96 (teams)	94 (teams)	90 (teams)	15 (teams)	26 (teams)	3,681 (teams)
	Second	Introductory-level training	46	42	43	30	32	29	31	27	23	18	17	19	14	16	15	18	7	15	12	19	846
		Intermediate-level training	71	86	112	128	106	109	109	133	109	179	101	116	106	98	103	102	88	115	53	85	2,481
		Advanced-level training	56	74	50	81	60	68	65	76	72	74	72	83	73	72	59	80	86	77	90	82	1,645
		Refresher training and others	81	94	130	165	129	128	136	133	190	83	64	47	49	41	45	53	14	30	14	7	2,062
		Family training	116 (teams)	181 (teams)	227 (teams)	204 (teams)	232 (teams)	225 (teams)	195 (teams)	200 (teams)	171 (teams)	175 (teams)	144 (teams)	150 (teams)	135 (teams)	130 (teams)	129 (teams)	111 (teams)	117 (teams)	126 (teams)	95 (teams)	93 (teams)	3,726 (teams)
	Third	Introductory-level training		8	16	4	6	9	6	5	6		6	5	7	9	3	3	9	10	3	7	122
		Intermediate-level training			32	15	17	15	24	16	28	16	43	57	43	35	48	46	49	56	45	34	619
		Advanced-level training			8	12	6	9	4	10	4	5	18	25	12	21	20	16	20	31	21	26	268
		Refresher training and others		28	55	28	52	38	31	33	32	90	111	119	53	48	43	53	54	35	29	30	962
		Family training			43 (teams)	34 (teams)	31 (teams)	31 (teams)	49 (teams)	50 (teams)	49 (teams)	48 (teams)	48 (teams)	107 (teams)	143 (teams)	124 (teams)	63 (teams)	79 (teams)	96 (teams)	104 (teams)	88 (teams)	74 (teams)	1,261 (teams)
	Nuclear engineer										9	10	19	15	12	28	56	130	71	86	43	28	507
	Subjects		51	37	84	61	72	66	72	70	80	60	102	77	109	161	137	98	119	131	64	59	2,172
	Maintenance																23	10	15	17		2	67
	Total		639 228 (teams)	695 310 (teams)	941 434 (teams)	952 407 (teams)	883 449 (teams)	843 432 (teams)	847 384 (teams)	865 390 (teams)	911 360 (teams)	891 363 (teams)	710 285 (teams)	734 331 (teams)	648 357 (teams)	735 329 (teams)	724 270 (teams)	773 286 (teams)	690 307 (teams)	759 320 (teams)	405 198 (teams)	449 193 (teams)	20,349 8,668 (teams)

Note: The grand total is the total since the start of operational training. So it may not be consistent with the total by summing the number of each year

Table VIII-2-7 Training Results at Operator Training Centers in Japan (NTC)

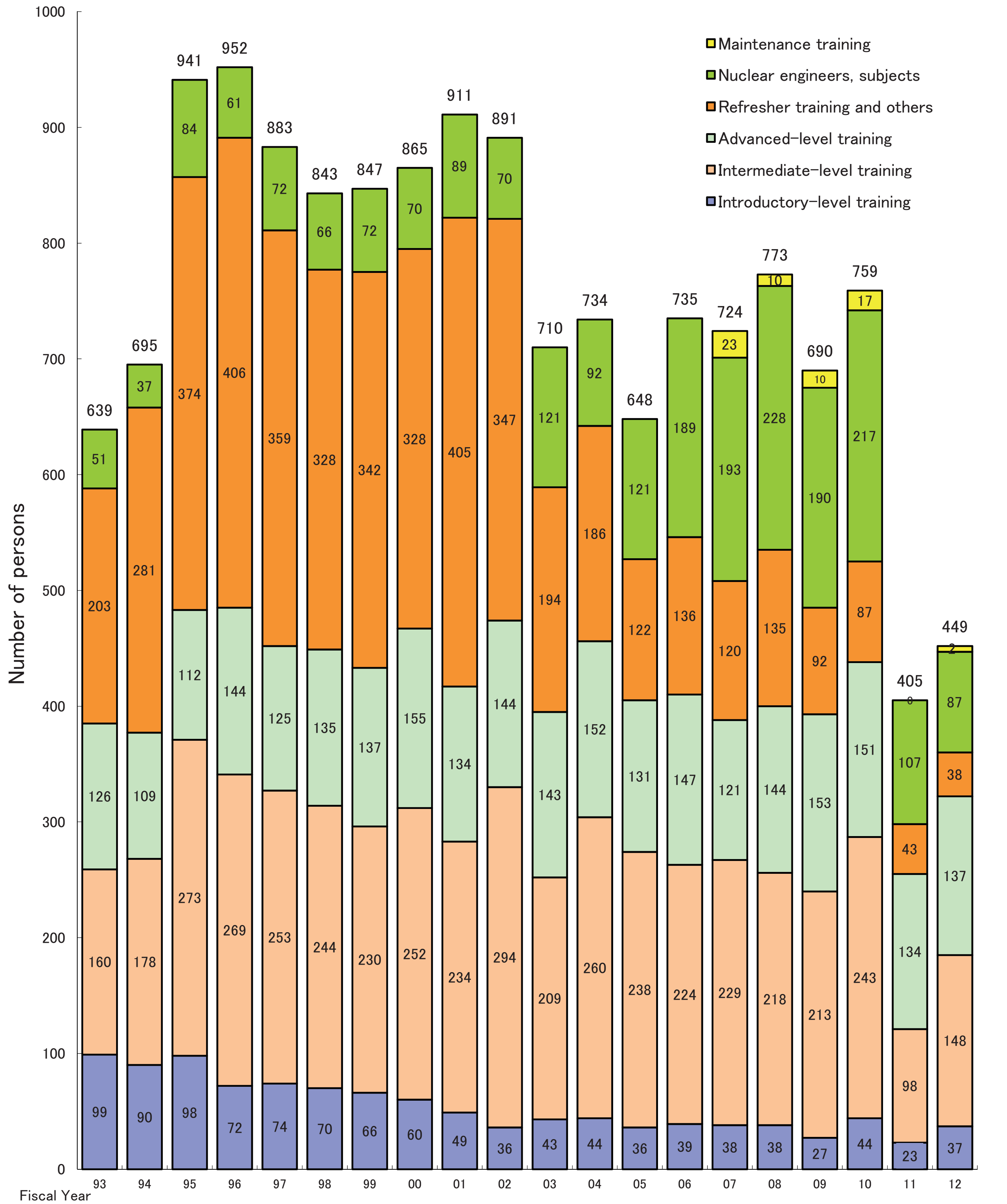
(Unit: Persons)

		FY, training course	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Grand total
NTC		Initial training course	51	50	50	50	47	38	38	36	30	30	27	33	27	30	27	24	30	27	30	36	1,445
NTC	Retraining	General	89	108	117	100	107	97	87	88	76	45	45	43	49	55	37	35	41	38	38	29	3,111
NTC	Retraining	Advanced	220	226	210	216	241	216	233	264	236	245	231	259	258	251	264	240	229	245	244	213	6,212
NTC	Retraining	Supervisor	134	138	144	163	151	180	171	169	175	165	159	180	184	172	187	212	224	194	205	199	4,681
NTC	Retraining	Practical skill test										45	60	27	30	27	30	45	45	39	42	42	432
NTC	Retraining	EOP-II				107	191	188	203														695
NTC	Retraining	Shift members Teamwork	110	115	110	161	276	258	252	252	252	254	246	244	247	222	138	143	140	148	146	133	4,754
			(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams	(teams	(teams)	(teams)	(teams)
NTC		Special training	51	58	53	44	44	42	38	43	75	58	45	59	76	102	161	148	169	199	190	186	2,390
																5	7	6	22	16	16	7	79
																(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)
NTC		Total	545	580	574	680	781	761	770	600	592	588	567	601	624	637	706	704	738	742	749	705	18,966
			110	115	110	161	276	258	252	252	252	254	246	244	247	227	145	149	162	164	162	140	4,833
			(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)	(teams)

Note 1: The grand total is the total since the start of operational training. So it may not be consistent with the total by summing the number of each year

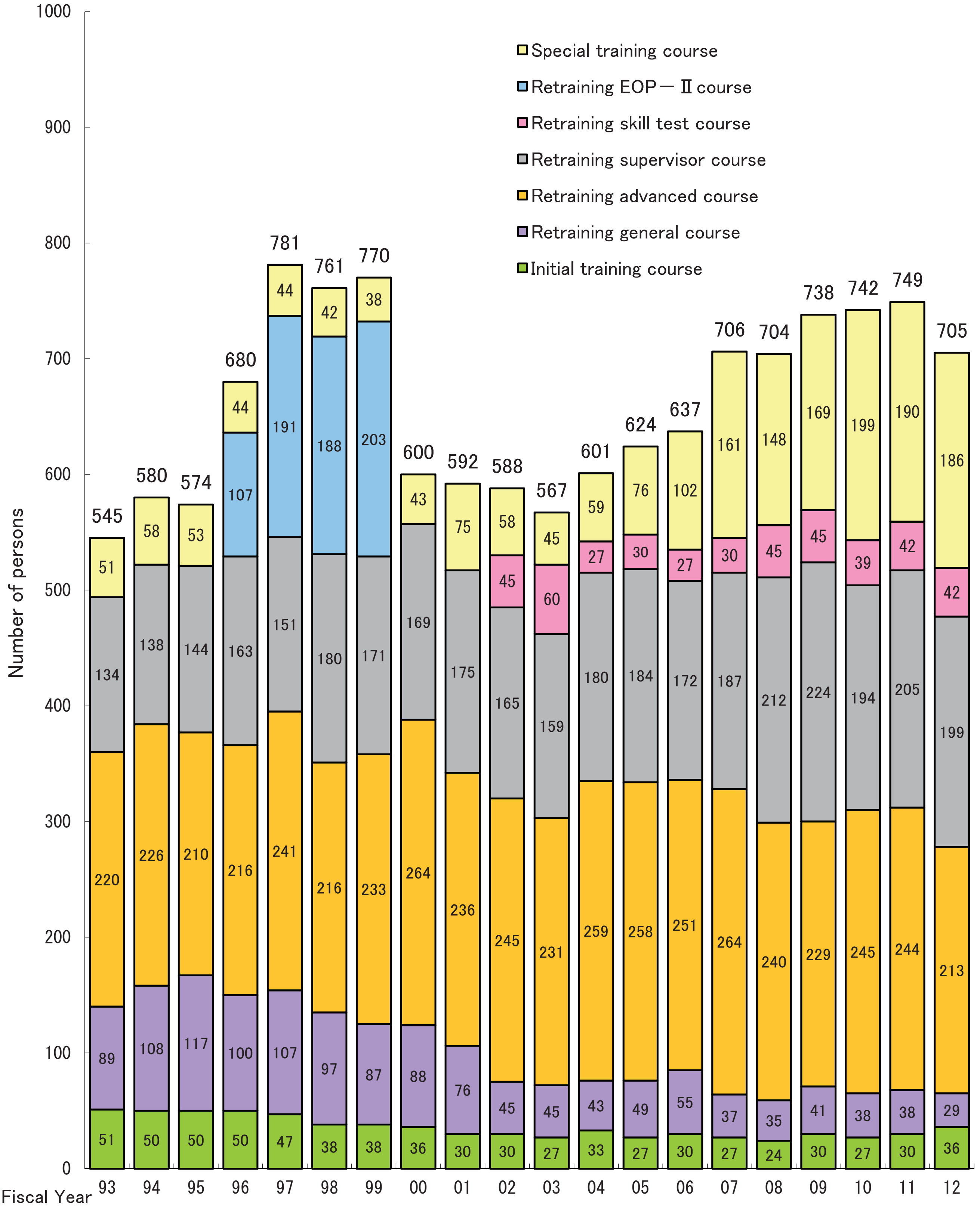
Note 2: The lower berth of special training indicates a plant behavior knowledge reinforcement course.

Figure Ⅷ－２－１ Training Results at Operator Training Centers in Japan (BTC)



Fiscal Year	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12
Family training (Number of teams)	228	310	434	407	449	432	384	390	360	363	285	331	357	328	270	286	307	320	198	193

Figure Ⅷ－2-2 Training Results at Operator Training Centers in Japan (NTC)



	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12
Teamwork training course (Numberofteams)	110	115	110	161	276	258	252	252	252	254	246	244	247	222 5	138 7	143 6	140 22	148 16	146 16	133 7

(Note) Tables 8-2-2 to -7 and 8-2-1 and-2 were prepared based on data obtained from the BWR Operator Training Center Corporation and the Nuclear Power Training Center Ltd.

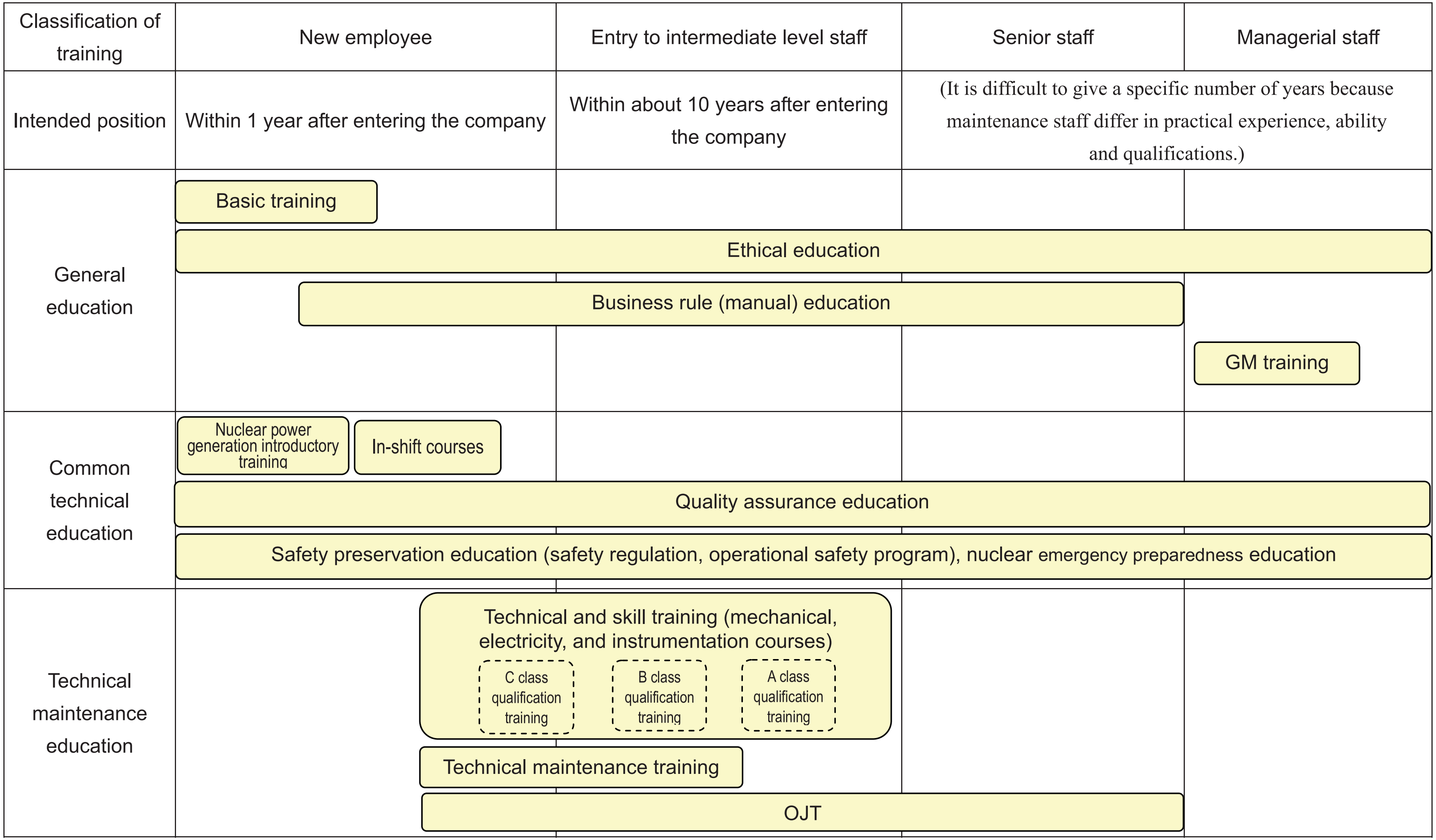
Ⅷ

VIII-3 Education and Training for Maintenance Staff

Education and training for maintenance staff are administered in a structured manner by preparing training implementation procedures and other programs. Implementation consists of classroom education, practical education in daily work and periodical inspections, as shown in Tables VIII-3-1 and VIII-3-2.

As shown in Table VIII-3-3, the utilities with established in-house maintenance training facilities are teaching the necessary skills and techniques for maintenance, via instructors and leaders of employees of their own or other manufacturing companies.

Table VIII-3-1　Maintenance Staff Development Pattern (Example 1)



VIII

Table VIII-3-2 Maintenance Staff Development Pattern (Example 2)

<table>
<tr><th colspan="2">Classification</th><th>Induction stage</th><th>Basic stage</th><th>Application stage</th><th colspan="2">Managerial and supervisory stage</th></tr>
<tr><td colspan="2" rowspan="2">Development pattern</td><td>Power plant work trainee</td><td colspan="3">In charge of maintenance</td><td>Foreman</td><td>Subsection chief</td></tr>
<tr><td>About 1 year</td><td>About 6 years</td><td colspan="3">It is difficult to give a specific number of years because there are variations in experience, ability and qualifications between maintenance staff.</td></tr>
<tr><td rowspan="22">Curriculum</td><td rowspan="7">Nuclear maintenance training</td><td></td><td colspan="2">Family training</td><td></td><td></td></tr>
<tr><td></td><td></td><td>Nuclear power design, assessment and technological</td><td></td><td></td></tr>
<tr><td></td><td>Nuclear maintenance training (rookie course)</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Nuclear maintenance basic training (electricity, instrumentation, and mechanical</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Nuclear maintenance equipment training (electricity, instrumentation, and</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Nuclear maintenance general technique training</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="3">Nuclear power maintenance work training (electricity, instrumentation and</td><td></td></tr>
<tr><td rowspan="6">Technical training</td><td>New employee</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Power generation</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Nuclear emergency preparedness training</td></tr>
<tr><td colspan="5">Operational safety program training</td></tr>
<tr><td>Rookie follow-up training</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>Nuclear power basic training</td><td></td><td></td><td></td></tr>
<tr><td rowspan="9">Common training</td><td></td><td>QA basic training</td><td></td><td></td><td>QA application training</td></tr>
<tr><td></td><td>Safe work training</td><td></td><td></td><td>New director training</td></tr>
<tr><td></td><td>QA intermediate training</td><td></td><td></td><td></td></tr>
<tr><td></td><td colspan="2">QA advanced training</td><td></td><td></td></tr>
<tr><td></td><td>Nuclear power legislation basic training</td><td></td><td></td><td></td></tr>
<tr><td></td><td>Human factor (H/E prevention) training</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="3">ISO 9000 examiner course</td></tr>
<tr><td></td><td></td><td colspan="3">ISO 9000 internal quality auditor development training</td></tr>
<tr><td></td><td></td><td colspan="2">Human factor (safety awareness and moral) training</td><td></td></tr>
</table>

Table VIII-3-3 Outline of Maintenance Training Facilities

Company name	The Japan Atomic Power		Hokkaido
Name	Tokai Comprehensive Training Center	Tsuruga Comprehensive Training Center	Nuclear Education Center
Location	Tokai Village, Naka County, Ibaraki Prefecture	Kutsumi, Tsuruga City, Fukui Prefecture	On the premises of Tomari Power Station
Buildings	Reinforced concrete structure Two-story training building ($3{,}300\ m^2$) Three-story accommodation building ($1{,}800\ m^2$)	Reinforced concrete structure Two-story training building ($7{,}300\ m^2$) Three-story accommodation building ($1{,}600\ m^2$)	Reinforced concrete structure Three stories aboveground and one story underground (approx. $3{,}020\ m^2$)
Established	December 1988	October 2012	October 1993
Equipment	(1) Loop facility consisting of pumps, valves, tanks, instruments, etc. (2) Metal-clad switchgears, large electric motors, electric operated valves, protective relay boards, sequencers for training, and electric and instrumentation systems including nuclear instrument panels and radiation monitors (3) Equipment specific to nuclear power generation including water pressure control devices for driving control rods, relief and safety valves, primary coolant pump mechanical seals (4) Practice equipment for understanding the behavior (water flow, boiling, phase flow, heat conduction) of water and steam (heat) (5) Various meters for magnetic particle and ultrasonic inspections, and instruments for facility diagnosis (6) Arc and TIG welders (7) Cut models, etc. for pumps, valves and other individual components (8) Small simulators for training at Tokai No. 2 NPS, Tsuruga NPS Units 1 and 2	(1) Loop facility consisting of pumps, valves, tanks, heat exchangers, support structures and instruments, etc. (2) High- and low-pressure switchgears, electric motors, electric operated valves, uninterruptible power supply, sequencers for training, ex-core nuclear instrument panels, radiation monitor panels, etc. (3) Practice equipment for understanding the behavior of water and steam (heat), including water flow, boiling, phase flow and heat conduction, pump performance, and cavitation (4) Arc and TIG welders (5) Cut models, etc. for pumps, valves and other individual components (6) Plant models for the full view of power plant, reactor vessel, steam generator and fuel assembly, etc. (7) Ge Semiconductor measuring instruments, scintillation type dose rate survey meters, GM type contamination survey meters (8) pH meters, electric conductivity meters, digital microscopes (9) Various meters for magnetic particle and ultrasonic inspections and instruments for facility diagnosis (vibration, lubricant, infra-red)	(1) Steam generator water chamber, steam generator tube inspection equipment (2) Primary coolant pump shaft seal and primary coolant pump internal models (3) Test loop facility consisting of pumps, valves and measuring instruments, etc. (4) Nondestructive inspection facilities (5) Reactor control and protection system instrument racks, reactor safety protection devices, control rod drive devices, control rod position indicators, ex-core nuclear instrumentation, EH governor control devices, turbine monitoring instruments, control panel for training, radiation monitoring devices (6) Instrument power sources, onsite switchgears, generator transformer protective relays, auxiliary motors, upper bearings of RCP motors, automatic generator voltage regulator, backup protective relay panels (7) Field instruments (transmitters, regulators, control valves, etc.) (8) Sensory experience equipment (9) Comprehensive digital equipment
Inspector status	Full-time and part-time	Full-time and part-time	Full-time and part-time
Intended persons	Employees and affiliate companies	Employees and affiliate companies (partially open to the public)	Employees and affiliate companies

Company name	Tohoku	Tokyo	
Name	Nuclear Power Technical Training Center	Fukushima Nuclear Skill Training Center	Kashiwazaki-Kariwa Nuclear Skill Training Center
Location	On the premises of Onagawa Nuclear Power Station	On the premises of Fukushima Daiichi Nuclear Power Station	On the premises of Kashiwazaki-Kariwa Nuclear Power Station
Buildings	Reinforced concrete structure Two-story building (total 1,138 m^2) Three-story steel framed building (total 1,948 m^2) Total of 3,086 m^2	Reinforced concrete structure Two-story building (2,570 m^2) Expanded training building (730 m^2)	Skill training facilities Two-story steel frame reinforced concrete structure (2,499 m^2) Reactor maintenance training facility Reinforced concrete (partly steel framed) structure Two stories aboveground and six stories underground (4,600 m^2)
Established	December 1982	June 1981	April 1988
Equipment	(1) Training equipment for lower part of nuclear reactor, control rod drive replacing machine, control rod drive disassembly training equipment, main steam relief safety valve training equipment, reactor recirculation pump mechanical seal simulation training equipment, main steam isolation valve actuator simulation equipment, feed water control valve training equipment (2) Control rod driving water pumps and motors (3) Digital electro hydraulic turbine control simulation panel, radiation monitor panel, digital control unit simulation panel, power range monitor panel, generator transformer protective relay panel (4) Water pressure control unit (5) Test loop equipment, various valves, pumps and electric motors (6) Generator brush mock-up device (7) Power distribution devices such as distribution switchgears and chargers (8) Nondestructive inspection facilities (9) Pipe coupling and scaffold installation training equipment (10) Compressor training equipment (11) Sensory experience equipment including equipment to experience tightening of manually controlled valve handles (12) Interactive learning aid (CAI)	(1) Training facilities for various types of pumps, valves, electric motors, etc. (2) Reactor recirculation pump mechanical seal replacement training facility, pump trouble training equipment and other mechanical training facilities (3) Pipe support devices, nondestructive inspection equipment (4) Training facilities for instruments such as feed water and recirculation control devices, neutron counting instruments (5) Training facilities for electric equipment such as circuit breakers, uninterruptible power supplies, transmission lines and generator protective relay panel (6) Training facilities for radiation control equipment such as radiation measuring instruments (7) Training facilities for fuel inspection facilities (8) Air-tightness and leakage test facility for spent fuel transportation casks (9) Nuclear power plant model (10) Reactor simulator (shroud upper grid plate, core support plate, feed water sparger, etc.), and reactor operation training facilities including those for operations in periodical inspections (11) Turbine monitoring instrument panel training equipment (12) In-core shipping training equipment (13) Sensory experience training equipment (fire, dangerous situations, defective installation, etc.) * Facilities and equipment in (1) to (13) are not available due to the accident at the Fukushima Daiichi plants.	(1) Training facilities for various types of pumps, valves, electric motors, etc. (2) Reactor recirculation pump mechanical seal replacement training facility, pump trouble training equipment and other mechanical training facilities (3) Pipe support devices, nondestructive inspection equipment (4) Training facilities for instruments such as feed water and recirculation control devices, neutron counting instruments (5) Training facilities for electric equipment such as circuit breakers, uninterruptible power supplies, transmission lines and generator protective relay panel (6) Training facilities for radiation control equipment such as radiation measuring instruments (7) Training facilities for fuel inspection facilities (8) Control rod drive repair simulation equipment (9) Reactor maintenance training equipment including reactor pressure vessels and shroud simulator (ABWR, and BWR-5) and RIP-FMCRD handling training equipment (10) Turbine monitoring instrument panel training equipment (11) Various digital control unit training equipment (12) In-core shipping training equipment
Inspector status	Full-time and part-time	Full-time and part-time	Full-time and part-time
Intended persons	Employees and affiliate companies	Employees and affiliate companies	Employees and affiliate companies

Company name	Chubu	Hokuriku	Kansai
Name	Nuclear Power Training Center	Nuclear Technical Training Center	Nuclear Power Maintenance Training Center
Location	On the premises of Hamaoka Nuclear Power Station	On the premises of Shika Nuclear Power Station	Takahama-cho, Ohi County, Fukui Prefecture
Buildings	Maintenance training building Two-story steel framed structure (Total 1,530 m^2)	Reinforced concrete structure Two-story building (2,550 m^2)	Reinforced concrete structure Two-story lecture building (Approx. 1,700 m^2) Three-story training building (Approx 2,200 m^2) Three-story accommodation building (Approx. 1,400 m^2) Three-story tour reception building (Approx. 430 m^2)
Established	April 1984	July 1993	October 1983
Equipment	(1) Reactor recirculation pump mechanical seal replacement training facility (2) Lower reactor simulation facility (3) Control rod drive attaching/detaching training facility and disassembly training facility (4) Reactor core simulation facility (5) Main steam isolation valve operator simulation training facility (6) Training facilities for mechanical equipment such as pumps, valves, pipe supporting devices, compressors, welders, nondestructive inspection equipment , rotary machine vibration diagnosis equipment (7) Training facilities for circuit breakers, electric motors, insulation diagnosis equipment, sequencing controllers, digital control units, etc. (8) Training facilities for instrument-controlled model plant, neutron counting panel TIP drive, EHC simulator, regulating valves, CRD water pressure control unit, etc. (9) Pump malfunction response training equipment, belt replacement training facility, pipe and flange sealing training facility and electrical operated valve failure diagnosis training facility	(1) Reactor recirculation pump mechanical seal simulation equipment (2) Main steam isolation valve drive simulation facility (3) Process radiation monitor model control panel, process instrumentation and control circuit test equipment (4) Test loop equipment (consisting of pumps, valves, tanks, measuring instruments, etc.) (5) Metal-clad and power center switchgears and protective relays (6) Various types of valves, pumps and electric motors (7) Nondestructive inspection equipment (8) Control rod drive disassembly training facility (9) Water pressure control unit (10) Nuclear instrumentation and movable in-core instrumentation drive (11) Electro hydraulic control unit (12) Lower reactor simulation facility (13) RIP power source training equipment (14) Digital control unit training equipment	(1) Reactor vessel shell and top head (2) Steam generator primary water chamber, heat transfer tube test equipment, manipulator, manhole handling equipment, nozzle cap (3) Primary coolant pump shaft seal (4) Fuel handling facility (5) System facilities for training (various types of pumps, valves, pipes, instruments, support structures) (6) Switchgears (metal-clad, power center, control center) (7) Primary coolant pump motor (motor flywheel, oil cooler heat transfer tube, upper bearing) (8) Panels in central control room (control rod drive devices, control rod position indicator, reactor protection &control equipment, reactor panel, ex-core nuclear instrumentation, power supplies for instruments, automatic voltage regulator for generator, protective relays, safety protection relay rack, digital control unit) (9) Field instruments (pump vibration monitor, flow rate control simulation facility, water level control simulation facility, pressure gauges thermometer, level meters, transmitters, regulators, solenoid valves, etc.) (10) Automatic diagnosis device for electric operated valves (11) Rotary machine vibration diagnosis equipment (12) Nondestructive inspection equipment (13) Environmental simulator (14) Nuclear power generation see-through plant model (PWR type) (15) Sensory experience training equipment (16) Engineering Model （Ohi-3 Model）
Inspector status	Full-time and part-time	Full-time and part-time	Full-time
Intended persons	Employees and affiliate companies	Employees and affiliate companies	Employees and affiliate companies

VIII

Company name	Chugoku	Shikoku
Name	Technical Training Center	Nuclear Safety Training Institute
Location	On the premises of Shimane Nuclear Power Station	Matsuyama City, Ehime Prefecture
Buildings	Technical training building Two-story steel framed structure Building 1 (total 783 m^2) Building 2 (total 638 m^2)	Steel framed reinforced concrete structure 6 stories aboveground and 1 story underground (total 8,300 m^2)
Established	February, 1989	November, 1986
Equipment	(1) Lower reactor simulation facility (including neutron counting instrumentation) (2) Control rod drive replacement training facility and disassembly training facility (3) Cut model for reactor pressure vessel (4) Fuel handling equipment (5) Reactor recirculation pump mechanical seal (6) Main steam isolation valve drive (7) Disassembly training equipment for various types of pumps, valves and couplings, valve gland packing tightening devices (8) Nondestructive inspection equipment (9) Training facilities for electrical equipment such as circuit breakers, electric motors, protective relays, sequencers, etc. (10) Training facilities for instruments such as feed water controllers, neutron counting instruments, radiation monitors (11) Automatic voltage regulating facility (12) Pressure transmitters, flow rate transmitters, E/P transducers and other instruments (13) Analog trip setting panel (14) Air compressors (15) Sensory experience equipment (16) Rotary machine vibration diagnosis equipment	(1) Reactor vessel top head (2) Fuel handling facility, fuel replacement crane operation simulator (3) Primary coolant pump shaft seal (4) Steam generator water chamber, steam generator heat transfer tube test equipment, steam generator heat transfer tube repair tools (5) Valves, pumps, blowers (6) Training system equipment (7) Rotary machine vibration diagnosis equipment (8) Welding facility, machining facility (9) Nondestructive inspection equipment, destructive inspection equipment (10) Generator training equipment (11) Electrical wiring facility (12) Electric motors, electric operated valves, switchgears (M/C, P/C, C/C), protective relays, sequencers (13) Automatic generator voltage regulators, instrumentation power supplies (14) General measuring instruments, transmitters, recording instruments, indicators, regulators, analyzers, control valves (15) Reactor control and protective devices, radiation monitors, ex-core nuclear instrumentation, in-core nuclear instrumentation, control rod controller, control rod position indicators, turbine monitoring instruments, turbine protective devices, turbine control devices, digital control devices (16) Sensory experience training equipment
Inspector status	Full-time and part-time	Full-time and part-time
Intended persons	Employees and affiliate companies	Employees and affiliate companies

Company name	Kyushu	
Name	Genkai Nuclear Power Station Nuclear Training Center	Sendai Nuclear Power Station Nuclear Training Center
Location	On the premises of Genkai Nuclear Power Station	On the premises of Sendai Nuclear Power Station
Buildings	Two-story steel framed building (total 5,300 m^2)	Two-story steel framed building (total 4,800 m^2)
Established	July, 1997	November, 1996
Equipment	(1) Reactor vessel top head (2) Steam generator water chamber (3) Primary coolant pump shaft seal (4) Fuel handling facility (5) Steam turbine (6) Various types of pumps, valves (7) Loop facility (8) Nondestructive inspection equipment (9) Ex-core nuclear instrumentation, control rod controller, reactor safety protection devices, radiation monitors, turbine control devices, turbine monitoring instruments, automatic generator voltage controller, reactor control and protection devices, protective relays, instrumentation power supplies, digital control devices (10) Switchgears (M/C, P/C, C/C) (11) Various types of motors (12) Measuring instruments (13) Radiation measuring facility (14) Training facilities for putting-on and taking-off protective gears, decontamination training equipment (15) DC power supplies (16) Sensory experience training equipment	(1) Reactor vessel top head (2) Steam generator water chamber (3) Primary coolant pump shaft seal (4) Fuel replacement crane simulator (5) Various types of pumps, valves (6) Loop facility (7) Nondestructive inspection equipment (8) Ex-core nuclear instrumentation, control rod controller, reactor safety interlock devices, radiation monitoring facility, turbine control devices, turbine monitoring instruments, automatic generator voltage controller, protective relays, digital control units (turbine control, reactor control, secondary-side control) (9) Switchgears (M/C, P/C, C/C) (10) Various types of motors (11) Measuring instruments (12) Radiation measuring facility (13)Training facilities for putting-on and taking-off protective gears, decontamination training equipment (14) Sensory experience training equipment (15) Welding facility
Inspector status	Full-time and part-time	Full-time and part-time
Intended persons	Employees and affiliate companies	Employees and affiliate companies

Note: Tables VIII-3-1 to -3 were prepared based on materials obtained from Tokyo Electric Power Co., Inc., The Kansai Electric Power Co., Inc., and the Federation of Electric Power Companies of Japan as of July, 2013.

REFINING, NUCLEAR FUEL FABRICATION, SPENT FUEL STORAGE, REPROCESSING AND RADIOACTIVE WASTE DISPOSAL FACILITIES

IX LISTS OF REFINING, NUCLEAR FUEL FABRICATION, SPENT FUEL STORAGE, REPROCESSING AND RADIOACTIVE WASTE DISPOSAL FACILITIES

IX-1 Operation and Construction Status of Refining, Nuclear Fuel Fabrication, Spent Fuel Storage, Reprocessing and Radioactive Waste Disposal Facilities

- The facilities in operation at the end of FY2012 were 6 fabrication facilities, 1 reprocessing facility and 4 radioactive waste disposal facilities (2 waste management facilities and 2 waste disposal facilities).
- 1 reprocessing facility, 1 Mixed-Oxide fuel fabrication facility and 1 spent fuel storage facility are under construction.
- There are no facilities that have received a business designation for refining or a business license for spent fuel storage.

As of the end of FY2012

	Nuclear Fuel Fabrication facility	Reprocessing facility	Radioactive Waste Disposal facility		Spent fuel storage facility
			Waste management facility	Waste disposal facility	
In operation	6	1	2	2	0
Under construction	1	1	0	0	1
Being prepared for construction	0	0	0	0	0
Total	7	2	2	2	1

IX-2 List of Operation and Construction Status of Fabrication Facilities

As of the End of FY2012

<table>
<tr><th></th><th>Licensee</th><th>Facility</th><th>Location</th><th colspan="3">Capacity</th><th>Degree of enrichment</th><th>Processing method</th><th>Date of fuel fabrication license</th><th>Date construction started</th><th>Date operation started</th><th>Remarks</th></tr>
<tr><td>In operation</td><td>Global Nuclear Fuel-Japan Co., Ltd.</td><td>Global Nuclear Fuel-Japan Co., Ltd.</td><td>Uchikawa, Yokosuka City, Kanagawa Prefecture</td><td colspan="3">750 t-U / year
(As of 2013-3-31)</td><td>5% or less</td><td>Rod-shaped processing (For BWR)</td><td>1968-8-30</td><td>1969-1-27</td><td>1970-8-29</td><td></td></tr>
<tr><td rowspan="2">In operation</td><td rowspan="2">Mitsubishi Nuclear Fuel Co., Ltd.</td><td rowspan="2">Mitsubishi Nuclear Fuel Co., Ltd.</td><td rowspan="2">Tokai Village, Naka County, Ibaraki Prefecture</td><td colspan="3">475 t-U / year (conversion)
(As of 2013-3-31)</td><td rowspan="2">5% or less</td><td>Conversion processing (For PWR)</td><td rowspan="2">1972-1-11</td><td rowspan="2">1972-1</td><td rowspan="2">1972-7-29</td><td rowspan="2"></td></tr>
<tr><td colspan="3">440 t-U / year (mold)
(As of 2013-3-31)</td><td>Rod-shaped processing (For PWR)</td></tr>
<tr><td rowspan="2">In operation</td><td rowspan="2">Nuclear Fuel Industries, Ltd.</td><td>Kumatori Works</td><td>Kumatori Town, Sen-nan County, Osaka Prefecture</td><td colspan="3">383 t-U / year
(As of 2013-3-31)</td><td>5% or less</td><td>Rod-shaped processing (For PWR)</td><td>1972-9-1</td><td>—
This processing facility was first put into operation by Sumitomo Electric Industries, Ltd. on August 1, 1969, and then was transferred to the present owner.</td><td>1972-9-1</td><td></td></tr>
<tr><td>Tokai Works</td><td>Muramatsu, Tokai Village, Naka County, Ibaraki Prefecture</td><td colspan="3">250 t-U / year
(As of 2013-3-31)</td><td>5% or less</td><td>Rod-shaped processing (For BWR)</td><td>1978-9-29</td><td>1978-11</td><td>1980-1-4</td><td></td></tr>
<tr><td>In operation</td><td>Japan Atomic Energy Agency</td><td>Ningyo-toge Environmental Engineering Center</td><td>Kamisaibara,, Kagamino-cho, Okayama Prefecture</td><td colspan="3">200 t-U / year
(As of 2013-3-31)</td><td>5% or less</td><td>Uranium enrichment (centrifugal separation method)</td><td>1985-10-18</td><td>1985-11</td><td>1988-4-25</td><td>Service, production and operation terminated in March, 2001.</td></tr>
<tr><td rowspan="2">In operation</td><td rowspan="2">Japan Nuclear Fuel Ltd.</td><td rowspan="2">Enrichment and Disposal Office (Uranium Enrichment Plant)</td><td rowspan="2">Rokkasho Village, Kamikita County, Aomori Prefecture</td><td>First term</td><td>1150 t-U / year</td><td rowspan="2">1890 t-U/year or less (as of 2013-3-31)</td><td rowspan="2">5% or less</td><td rowspan="2">Uranium enrichment (centrifugal separation method)</td><td>1988-8-10</td><td>1988-10</td><td>1992-3-27</td><td></td></tr>
<tr><td>First half of second term</td><td>740 t-U / year</td><td>1993-7-12</td><td>1993-9</td><td>1997-10-17</td><td></td></tr>
<tr><td>Under construction</td><td>Japan Nuclear Fuel Ltd.</td><td>MOX fuel fabrication plant</td><td>Rokkasho Village, Kamikita County, Aomori Prefecture</td><td colspan="3">130 t-HM / year</td><td>—</td><td>Rod-shaped MOX fuel</td><td>2010-5-13</td><td>2010-10</td><td>2016-3
(planned)</td><td></td></tr>
</table>

IX-3 List of Operation and Construction Status of Reprocessing Facilities

As of the End of FY2012

	Licensee	Facility	Location	Capacity	Processing method	Date of designation	Date construction started	Date service started	Date operation started	Remarks
In operation	Japan Atomic Energy Agency	Tokai Research and Development Center	Tokai Village, Naka County, Ibaraki Prefecture	210 t-uranium (Maximum of 0.7 t-uranium (metallic uranium equivalent) / day)	Wet method PUREX process	1980-2-23 (Note 1) (1971-6-5)	1971-6		1981-1-17	Hot test: September 1977 Full-scale operation: January 1981
Under construction (Note 2)	Japan Nuclear Fuel Limited	Reprocessing Plant (Reprocessing Facility)	Rokkasho Village, Kamikita County, Aomori Prefecture	800 t-U (Pre-irradiated metallic uranium weight equivalent)	Wet method PUREX process	1992-12-24	1993-4	1999-12-3	Undecided (Note 3)	

(Note 1) With the partial amendments (June 1979) to the Law for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors, this is the day deemed to be when approval was granted. The date in parentheses is the date when approval was given to the design and construction methods.

(Note 2) Use of the facilities related to receiving and storing spent fuel was commenced prior to the start of operation of the reprocessing facilities now under construction.

(Note 3) Japan Nuclear Fuel Limited Press Released 2013-11-1

IX-4 List of Operation and Construction Status of Disposal Facilities

As of the End of FY2012

	Licensee	Facility		Location	Facility type	Type of intended waste and business details	Radioactive material concentration	Burial or Storage Capacity	Date of business (change) license	Date business started
In operation	Japan Nuclear Fuel Ltd.	Enrichment and Disposal Office	Unit 1 Disposal facility	Rokkasho Village, Kamikita County, Aomori Prefecture	A burial facility closed off by artificial structures (concrete pits) from surrounding soil	Disposal of radioactive waste liquids, used resins etc. produced in nuclear power plants after solidification with cement in a container	Low-level radioactive waste	Equivalent to 204,800 200-liter drums	1990.11.15	1992.12.8
			Unit 2 Disposal facility			Disposal of radioactive solid waste produced in nuclear power plants after solidification with cement in a container	Low-level radioactive waste	Equivalent to 207,360 200-liter drums	1998.10.8	2000.10.10 (Date of start of reception)
	Japan Atomic Energy Agency	Tokai Research and Development Center	Waste disposal facility	Tokai Village, Naka County, Ibaraki Prefecture	A burial facility (unlined trench) with no artificial structures installed	Disposal of contaminated concrete and other waste produced by the dismantling of JPDR not solidified in a container	Very low-level radioactive waste	2,520 m^3	1995.6.22	1995.11.27

IX-4 List of Operation and Construction Status of Disposal Facilities

As of the End of FY2012

	Licensee	Facility		Location	Facility type	Type of intended waste and business details	Radioactive material concentration (Note 2)	Burial or Storage Capacity	Date of business (change) license	Date business started
In operation	Japan Nuclear Fuel Ltd.	Reprocessing Plant (Waste Storage Facility)	Waste manage -ment facility	Rokkasho Village, Kamikita County, Aomori Prefecture	Designated waste management facility (Note 1)	Storage of returned vitrified waste from oversea's reprocessing of spent fuel	Hi-level radioactive waste	2,880 vitrified canisters	1992.4.3	1995.4.26
	Japan Atomic Energy Agency	Oarai Research and Development Center, Radioactive Waste Management Facility	Waste manage -ment facility	Oarai town, Higashi-ibaraki County, Ibaraki Prefecture	Designated waste management facility (Note 1)	Chemical treatment or evaporation treatment of liquid waste and the compression, grinding and incineration treatment of solid waste, produced from the operation of nuclear reactors and the use of nuclear fuel material at O-arai Research and Development Center, Japan Atomic Energy Agency, the Material Test Furnace Utilization Facility attached to the Institute for Materials Research, Tohoku University, and Nippon Nuclear Fuel Development Co., Ltd. as well as the storage of treated waste in a solid state.	Low-level radioactive waste and Relatively low concentration of low-level radioactive waste	Equivalent to 42,795 200-liter drums	1992.3.30	1996.3.29

(Note 1) Designated waste management facility: Waste management facility for nuclear fuel material of 3.7 terabecquerel or over or material contaminated with nuclear fuel material

(Note 2) Radioactive material concentration level of intended waste: Classification by concentration level for the sake of convenience based on the upper legal concentration limits applied to the burial of radioactive waste.

IX-5 List of Operation and Construction Status of spent fuel storage facility

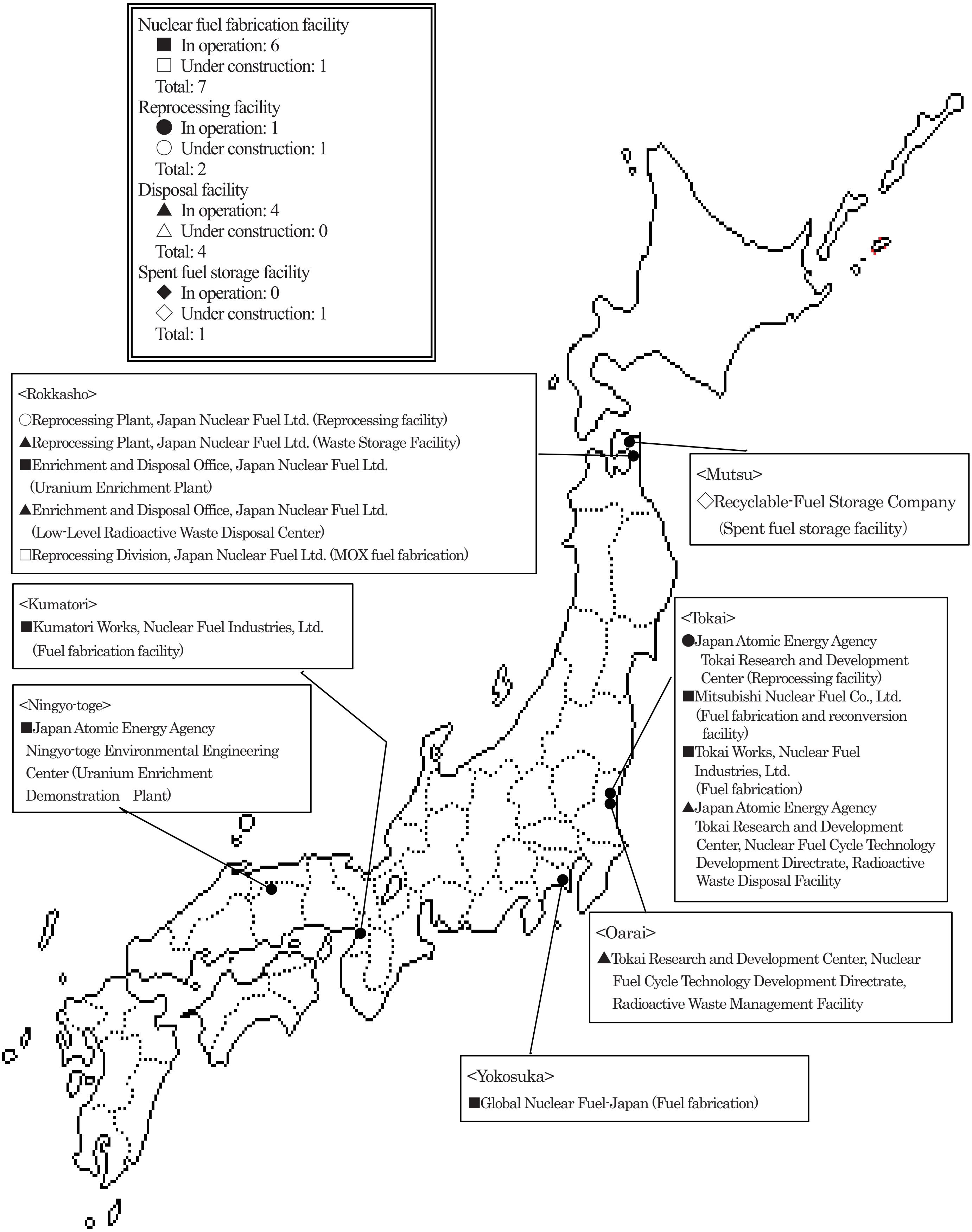
As of the End of FY2012

	Licensee	Facility	Location	Facility type	Storage system	Storage Capacity	Date construction started	Date business started
Under construction	Recyclable - Fuel Storage Company	Recyclable-Fuel Storage Center	Ohaza Sekine, Mutu City, Aomori Prefecture	Spent fuel storage facility	Dry metal cask system	3,000 ton	2010-8	Undecided (Note 3)

(Note 3) Recyclable - Fuel Storage Company Press Released 2013-11-5

IX-6 Location Map of Nuclear Fuel Fabrication, Reprocessing and Radioactive Waste Disposal Facilities

As of the End of FY2012



(Note) Currently there are no refining facilities

X STATUS OF OPERATION OF REFINING, NUCLEAR FUEL FABRICATION, SPENT FUEL STORAGE, REPROCESSING AND RADIOACTIVE WASTE DISPOSAL FACILITIES, AND TRANSPORT CONFIRMATION RESULTS OF NUCLEAR FUEL MATERIAL

X-1 Status of Operation of Refining, Nuclear Fuel Fabrication, Spent Fuel Storage, Reprocessing and Radioactive Waste Disposal Facilities

(1) Nuclear fuel fabrication for light water reactors of electric utilities is being performed at four sites belonging to the three companies of Global Nuclear Fuel-Japan Co., Ltd., Mitsubishi Nuclear Fuel Co., Ltd. and Nuclear Fuel Industries, Ltd., and they now have fabrication facilities with a total maximum throughput of 1,823 t-U per year.

(2) Mitsubishi Nuclear Fuel Co., Ltd. performs conversion for light water reactors belonging to electric utilities and it now has a fabrication facility with a maximum throughput of 475 t-U per year.

(3) Japan Nuclear Fuel Limited performs conversion at its enrichment facility at up to 5% for light water reactors belonging to electric utilities. It now has uranium enrichment equipment with a maximum throughput of 1,890 t-U per year. The Japan Atomic Energy Agency had an Uranium Enrichment Demonstration Plant at its Ningyo-toge Environmental Engineering Center. The facility had uranium enrichment equipment with a maximum throughput of 200 t-U per year, however its service, production and operation were terminated in March 2001.

(4) As for nuclear fuel reprocessing, the Japan Atomic Energy Agency has a reprocessing facility at its Tokai Research and Development Center, Reprocessing Facility and this facility now has processing equipment with a maximum throughput of 210 t-U per year. It performed no reprocessing in FY2012 and the cumulative amount processed is about 1,140 t-U.

(5) At Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center) with a capacity of roughly 200,000 200-liter drums was newly installed in FY2000, increasing the burial capacity to some 400,000 drums. In FY2012, a total of 11,672 200-liter drums were received at the two facilities, and a cumulative total of 251,979 drums have been buried.

At the Radioactive Waste Disposal Facility at the Japan Atomic Energy Agency, Tokai Research and Development Center, waste to the order of 1,670 tons was buried in a 2,520-ton capacity facility in FY1995, though its burial business has now been terminated.

(6) At the waste management facility of Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility), 28 wastes were received in FY2012, while a cumulative total of 1,442 canisters of vitrified waste are stored and managed there.

At the waste management facility of the Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility, waste equivalent to 68 200-liter drums was received in FY2012 and a cumulative total equivalent to 29,429 drums are stored and managed there.

(7) At the reprocessing facility at Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility), the facility itself is now under construction. However, facility related to receiving and storing spent nuclear fuel has begun to be utilized.

19 tons of spent fuel received in FY2012, a cumulative total of 3,362 tons of spent fuel has been received.

(8) Mixed-Oxide fuel fabrication facility of Japan Nuclear Fuel Ltd. obtained business permission in May 2010, and construction work was started in October 2010.

(9) The spent fuel storage facility of Recyclable-Fuel Storage Company obtained business permission in May 2010, and constriction work was started in August 2010.

(10) There are no facilities that have been designated as a refining business or that have received a business license for spent fuel storage.

Table X-1　Trends in Maximum Nuclear Fuel Material Capacity at Fabrication Facilities at the End of Fiscal Years

(Unit: t-U / year)

Licensee	Plant or site name	Fiscal Year									
		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Global Nuclear Fuel-Japan Co., Ltd.	Global Nuclear Fuel Japan Co., Ltd.	490	490	490	490	490	490	490	490	490	750
Mitsubishi Nuclear Fuel Co., Ltd	Mitsubishi Nuclear Fuel Co., Ltd	420	420	420	420	420	420	420	420	420	420
Nuclear Fuel Industries, Ltd.	Kumatori Works	—	—	40	40	40	85	85	85	85	265
	Tokai Works	—	—	—	—	—	—	40	40	40	40
Total		910	910	950	950	950	995	1, 035	1, 035	1, 035	1, 475

Licensee	Plant or site name	Fiscal Year									
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Global Nuclear Fuel-Japan Co., Ltd.	Global Nuclear Fuel Japan Co., Ltd.	750	750	640	640	640	640	640	640	640	640
Mitsubishi Nuclear Fuel Co., Ltd	Mitsubishi Nuclear Fuel Co., Ltd	420	420	420	420	440	440	440	440	440	440
Nuclear Fuel Industries, Ltd.	Kumatori Works	265	265	265	265	265	265	265	265	265	324
	Tokai Works	100	100	100	200	200	200	200	200	200	200
Total		1, 535	1, 535	1, 425	1, 525	1, 545	1, 545	1, 545	1, 545	1, 545	1, 604

Licensee	Plant or site name	Fiscal Year									
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Global Nuclear Fuel-Japan Co., Ltd.	Global Nuclear Fuel Japan Co., Ltd.	750	750	750	750	750	750	750	750	750	750
Mitsubishi Nuclear Fuel Co., Ltd	Mitsubishi Nuclear Fuel Co., Ltd	440	440	440	440	440	440	440	440	440	440
Nuclear Fuel Industries, Ltd.	Kumatori Works	324	324	324	324	324	284	284	284	284	284
	Tokai Works	200	200	200	200	200	200	200	200	200	200
Total		1, 714	1, 714	1, 714	1, 714	1, 714	1674	1, 674	1, 674	1, 674	1, 674

Licensee	Plant or site name	Fiscal Year									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Global Nuclear Fuel-Japan Co., Ltd.	Global Nuclear Fuel Japan Co., Ltd.	750	750	750	750	750	750	750	750	750	750
Mitsubishi Nuclear Fuel Co., Ltd	Mitsubishi Nuclear Fuel Co., Ltd	440	440	440	440	440	440	440	440	440	440
Nuclear Fuel Industries, Ltd.	Kumatori Works	284	284	383	383	383	383	383	383	383	383
	Tokai Works	250	250	250	250	250	250	250	250	250	250
Total		1, 724	1, 724	1, 823	1, 823	1, 823	1, 823	1, 823	1, 823	1, 823	1, 823

(Note) The throughput capacity is for light water reactor fuel.

Table X-2 Trends in Maximum Nuclear Fuel Material Capacity at Fabrication Facilities (Conversion Processing) at the End of Fiscal Years

(Unit: t-U / year)

Licensee	Plant or site name	Fiscal Year									
		1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Mitsubishi Nuclear Fuel Co., Ltd	Mitsubishi Nuclear Fuel Co., Ltd	1. 5t- UO_2/day	1. 5t- UO_2/day	1. 5t- UO_2/day	1. 5t- UO_2/day	2t- UO_2/day	2t- UO_2/day	2t- UO_2/day	2t- UO_2/day	450	450

Licensee	Plant or site name	Fiscal Year									
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Mitsubishi Nuclear Fuel Co., Ltd	Mitsubishi Nuclear Fuel Co., Ltd	450	450	450	450	475	475	475	475	475	475

Licensee	Plant or site name	Fiscal Year									
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Mitsubishi Nuclear Fuel Co., Ltd	Mitsubishi Nuclear Fuel Co., Ltd . (Conversion processing)	475	475	475	475	475	475	475	475	475	475

Licensee	Plant or site name	Fiscal Year									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Mitsubishi Nuclear Fuel Co., Ltd	Mitsubishi Nuclear Fuel Co., Ltd . (Conversion processing)	475	475	475	475	475	475	475	475	475	475

Table X-3 Trends in Maximum Nuclear Fuel Material Capacity at Fabrication Facilities (Uranium Enrichment) at the End of Fiscal Years (Unit: t-U / year)

Licensee	Plant or site name	Fiscal Year									
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Japan Atomic Energy Agency	Ningyo-toge Environmental Engineering Center	400	400	400	400	400	400	200	200	200	200
Japan Nuclear Fuel Limited	Uranium Enrichment Plant	863	1, 150	1, 150	1, 150	1, 397	1, 890	1, 890	1, 890	1, 890	1, 890
Total		1, 263	1, 550	1, 550	1, 550	1, 797	2, 290	2, 090	2, 090	2, 090	2, 090

Licensee	Plant or site name	Fiscal Year									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Japan Atomic Energy Agency	Ningyo-toge Environmental Engineering Center	200	200	200	200	200	200	200	200	200	200
Japan Nuclear Fuel Limited	Uranium Enrichment Plant	1, 890	1, 890	1, 890	1, 890	1, 890	1, 890	1, 890	1, 890	1, 890	1, 890
Total		2, 090	2, 090	2, 090	2, 090	2, 090	2, 090	2, 090	2, 090	2, 090	2, 090

Table X-4 Trends of Reprocessing Amounts by Fiscal Year

Unit: t-U

Licensee	Plant or site name	Fiscal Year									
		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Japan Atomic Energy Agency	Reprocessing facility	5.2	73.5	69.2	51.4	19.0	49.1	85.9	81.7	71.0	37.0

Licensee	Plant or site name	Fiscal Year									
		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Japan Atomic Energy Agency	Reprocessing facility	95.7	51.4	71.5	0	0	0	14.3	33.7	25.0	28.4

Licensee	Plant or site name	Fiscal Year									Total
		2004	2005	2006	2007	2008	2009	2010	2011	2012	
Japan Atomic Energy Agency	Reprocessing facility	37.2	42.1	20.3	3.1	0	0	0	0	0	1140

Notes: 1. Because of the rounding off of fractions, the sum of throughput for each fiscal year may not correspond with the total.
2. The total includes the 79.1 t-U throughput from the hot test.

Table X-5 Trends in the Amount of Radioactive Waste Buried and Managed at Waste Disposal Facilities

(1) Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center)

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Burial capacity (drum equivalent)
Unit 1 disposal facility	Received	1, 216	0	648	136	1, 872	2, 560	2, 240	2, 080	912	840	204, 800
	Buried	1, 216	0	648	136	1, 872	2, 240	1, 600	2, 880	952	640	
	No. of drums buried	135, 899	135, 899	136, 547	136, 683	138, 555	140, 795	142, 395	145, 275	146, 227	146, 867	
Unit 2 disposal facility	Received	11, 832	10, 800	9, 096	8, 960	4, 400	7, 672	6, 896	8, 792	9, 480	10, 832	207, 360
	Buried	10, 080	12, 600	9, 000	8, 152	6, 400	5, 248	9, 000	7, 560	10, 800	10, 440	
	No. of drums buried	25, 912	38, 512	47, 512	55, 664	62, 064	67, 312	76, 312	83, 872	94, 672	105, 112	
Total	Received	13, 048	10, 800	9, 744	9, 096	6, 272	10, 232	9, 136	10, 872	10, 392	11, 672	412, 160
	Buried	11, 296	12, 600	9, 648	8, 288	8, 272	7, 488	10, 600	10, 440	11, 752	11, 080	
	No. of drums buried	161, 811	174, 411	184, 059	192, 347	200, 619	208, 107	218, 707	229, 147	240, 899	251, 979	

Note: The burial capacity indicates the maximum burial capacity of the waste site.

(2) Japan Atomic Energy Agency, Tokai Research and Development Center

Fiscal Year		1995	1996	1997	Burial capacity
Waste disposal facility (Non-solidified concrete and other waste)	Buried (tons)	1, 670	0	0	2, 520
	Cumulative amount buried (tons)	1, 670	1, 670	1, 670	

Note: Burial was terminated in 1995 and shifted to the burial site maintenance level in October 1997.

(3) Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)

Fiscal Year		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Storage capacity
Waste management facility (Returned vitrified waste)	No. of received canisters	276	0	288	130	0	0	28	0	76	28	2, 880
	Cumulative no. of received canisters	892	892	1, 180	1, 310	1, 310	1, 310	1, 338	1, 338	1, 414	1, 442	

(4) Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility

Fiscal Year		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Storage capacity
Waste management facility (Liquid waste, solid waste and Solidified waste from these)	Received (200-liter drum equivalent)	473	561	317	426	517	336	343	239	286	68	42, 795
	Amount in storage (200-liter drum equivalent)	26, 336	26, 897	27, 214	27, 640	28, 157	28, 493	28, 836	29, 075	29, 361	29, 429	

X-2 Transport Confirmation Results of Nuclear Fuel Material

(Number)

Transported material \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Uranium hexafluoride	22	25	22	21	22	21	19	11	13	10
Uranium dioxide	82	55	62	61	55	58	47	49	58	30
New fuel assemblies	57	63	56	50	44	51	51	41	32	32
Spent fuel assemblies	4	24	19	24	29	18	14	5	2	3
High-level radioactive waste	4	2	2	2	0	0	1	0	0	1
Irradiation test pieces and others	1	0	0	0	0	0	0	0	0	0
Total	170	169	161	158	150	148	132	106	105	76

XI STATUS OF PERIODICAL FACILITY INSPECTIONS AT NUCLEAR FUEL FABRICATION, SPENT FUEL STORAGE, REPROCESSING AND RADIOACTIVE WASTE DISPOSAL FACILITIES

XI-1 Outline of Periodical Facility Inspections at Nuclear Fuel Fabrication, Spent Fuel Storage, Reprocessing and Radioactive Waste Disposal Facilities

At fabrication, storage, reprocessing facilities and disposal facilities (designated waste management facilities), periodical facility inspections take place once a year by the Minister of Economy, Trade and Industry to verify that the performance of each facility and of the equipment conforms to the technical standards stipulated in ministerial ordinances.

In FY2012, 6 periodic facility inspections took place at a total of 6 sites; 3 nuclear fuel fabrication facilities, 1 reprocessing facility, and 2 disposal facilities.

A facility that has been granted a business license for spent fuel storage is currently under construction.

XI-2 Status of Periodical Facility Inspections by Plant

(1) Mitsubishi Nuclear Fuel Co., Ltd.

The number of this inspection / Inspection periods	The 12th inspection
1. Outline of plant and facilities	• Fabrication process: Reconversion and molding (for PWR) • Maximum throughput: 475 t-U/year (5% enrichment or less) (conversion) 440 t-U/year (5% enrichment or less) (molding) • Start of business: January 1972
2. Inspection application date	September 22, 2011
3. Period of inspection	November 28, 2011 - April 27, 2012
4. Date of certificate issuance	April 27, 2012
5. Outline of inspection	(1) Facilities subject to inspection • Fabrication facility • Nuclear fuel material storage facility • Radioactive waste disposal facility • Radiation management facility • Nuclear fuel material inspection and measuring equipment • Emergency equipment
6. Inspection results	The performance of the facilities subject to periodical inspections was certified to meet the technical standard in the rules relating to fabrication business. Accordingly, the facilities pass the inspection.
7. Remarks on the issuance of permission certificate	(Reference) 1. Major work on the upgrading and modification of the facility Installation of new uranium recovery equipment (ion exchange equipment) Partial modification of fuel assembly storage stand, etc. 2. Radiation worker dose during periodic facility inspections (period: October 1, 2011 - March 31, 2012) Number of workers: 545 (403 employees, 142 outside workers) Average dose: 0.06 mSv Maximum exposure dose: 2.7 mSv Internal exposure: none

(2) Nuclear Fuel Industries, Ltd., Tokai Works

The number of this inspection / Inspection periods	The 13th inspection
1. Outline of plant and facilities	• Fabrication process: Molding (for BWR) • Maximum throughput: 250 t-U (5% enrichment or less) • Start of business: January 1980
2. Inspection application date	August 28, 2012
3. Period of inspection	October 2012 - January 2013
4. Date of certificate issuance	March 22, 2013
5. Outline of inspection	(1) Facilities subject to inspection • Fabrication facility • Storage facility • Disposal facility • Radiation management facility • Nuclear fuel material inspection and measuring equipment
6. Inspection results	The performance of the facilities subject to periodical inspections pursuant to Article 16-5-1 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Law No. 166, 1957) was certified to conform to Article 16-5-2 of said act. Accordingly, the facilities have passed the inspection.
7. Remarks on the issuance of permission certificate	

(3) Japan Nuclear Fuel Ltd., Kumatori Works

Inspection periods \ The number of this inspection	The 13th inspection
1. Outline of plant and facilities	• Fabrication process: Molding (for PWR) • Maximum throughput: 383 t-U/year (5% enrichment or less) • Start of business: September 1972
2. Inspection application date	August 28, 2012
3. Period of inspection	October 2012 - December 2012
4. Date of certificate issuance	March 22, 2013
5. Outline of inspection	(1) Facilities subject to inspection • Fabrication facility • Disposal facility • Nuclear fuel material inspection and measuring equipment • Major experiment equipment
6. Inspection results	The performance of the facilities subject to periodical inspections pursuant to Article 16-5-1 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Law No. 166, 1957) was certified to conform to Article 16-5-2 of said act. Accordingly, the facilities have passed the inspection.
7. Remarks on the issuance of permission certificate	

(4) Japan Nuclear Fuel Limited, Reprocessing Plant, Reprocessing Facility

Inspection periods \ The number of this inspection	The 12h inspection
1. Outline of plant and facilities	• Reprocessing method: Wet method (PUREX process) • Maximum throughput: 800 t-Upr/year (4.8 t-Upr/day) • Start of business: December 1999 (Facilities related to the reception and storage of spent fuel)
2. Inspection application date	July 26, 2012
3. Period of inspection	August 29, 2012 - November 27, 2012
4. Date of certificate issuance	February 8, 2013
5. Outline of inspection	(1) Facilities subject to inspection • Spent fuel reception and storage facilities • Measurement and control system facility • Radioactive waste disposal facility • Radiation management facility • Facility attached to the reprocessing facility
6. Inspection results	A periodical facility inspection certificate was issued in accordance with Article 7-11 of the Rule for Reprocessing of Spent Fuel (Prime Minister's Office Ordinance No. 10, 1971) which was enacted in accordance with the provisions of Article 46-2-2-1 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Law No. 166, 1957).
7. Remarks on the issuance of permission certificate	

(5) Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)

The number of this inspection / Inspection periods	The 16th inspection
1. Outline of plant and facilities	• Facility type: Specified waste management facility (for managing the high-level radioactive waste (vitrified waste canisters) returned from France and the U.K.) • Start of business: April 1995 • Maximum management capacity: 2,880 vitrified canisters • Storage method: Indirect natural cooling storage
2. Inspection application date	January 16, 2012
3. Period of inspection	February 13, 2012 - June 22, 2012
4. Date of certificate issuance	June 22, 2012
5. Outline of inspection	• Facility subject to inspection (1) Waste receiving facility (2) Waste management facility (3) Measurement and control system facility (4) Radiation management facility (5) Facility attached to the waste management equipment (disposal facility)
6. Inspection results	The operation of alarm devices, radioactive waste processing capacity, and performance of major radiological control facilities were inspected and certified to meet the technical standard in Article 22 of the Rules for Waste Management Business for Nuclear Fuel Materials or Materials Contaminated by Nuclear Fuel Material. Accordingly, a periodical facility inspection certificate was issued for the facilities subject to periodic inspections.
7. Remarks on the issuance of permission certificate	Measurement period: February 13 - June 22, 2012 Number of workers: 189 (41 employees and 148 outside workers) Measuring instrument: Pocket dosimeter with alarm Average dose: 0.00 mSv Maximum exposure dose: 0.00 mSv Internal exposure: None

(6) Japan Atomic Energy Agency. Oarai Research and Development Center, Radioactive Waste Management Facility

The number of this inspection / Inspection periods	The 16th inspection
1. Outline of plant and facilities	• Facility type: Waste management facility • Start of business: March 1996 • Maximum acceptable quantity: Liquid waste 9,400m^3/year Solid waste 845m^3/year • Maximum manageable quantity: Waste 8,559m^3 (equivalent to 42,795 200-liter drums)
2. Inspection application date	December 22, 2011
3. Period of inspection	February 1, 2012 - December 28, 2012
4. Date of certificate issuance	January 18, 2013
5. Outline of inspection	(1) Facilities subject to inspection • Waste receiving facility • Waste management facility • Measurement and control system facility • Radiation management facility • Facility attached to the waste management equipment
6. Inspection results	The performance of the facilities subject to periodical inspections in accordance with to Article 51-10-1 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Law No. 166, 1957) was certified to conform to Article 22 of the Rules for Waste Management Business for Nuclear Fuel Materials or Materials Contaminated by Nuclear Fuel Material enacted in accordance with Article 2 of said act. Accordingly the facilities have passed the inspection.
7. Remarks on the issuance of permission certificate	

XII STATUS OF NUCLEAR FUEL SAFETY INSPECTIONS AT REFINING, NUCLEAR FUEL FABRICATION, SPENT FUEL STORAGE, REPROCESSING AND RADIOACTIVE WASTE DISPOSAL FACILITIES

XII-1 Status of Safety Inspections at Refining, Nuclear Fuel Fabrication, Spent Fuel Storage, Reprocessing and Radioactive Waste Disposal Facilities

Refining, fabrication, storage, reprocessing and disposal facilities are subject to safety inspections by the Minister of Economy, Trade and Industry. These inspections take place four times a year to verify a nuclear operator's compliance with the operational safety program that specifies what to be complied with including work control and operational management.

In FY2013, a total of 48 safety inspections took place at a total of 12 sites including 6 fabrication facilities, 2 reprocessing facilities, and 4 waste disposal facilities.

A facility that has been granted a business license for spent fuel storage is currently under construction. No facilities have been granted a business license for refining.

XII-2 Status of Safety Inspections for Plant

(1) Global Nuclear Fuel-Japan, Co., Ltd.

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	Jun. 4 to 8, 2012	Sept. 18 to 21, 2012	Dec. 3 to 6, 2012	Feb. 25 to 28, 2013
Inspection item	(1) Safety inspection items • Status of remedial actions for violations found in previous inspections • Status of nonconformity management • Status of radiation control • Status of radioactive waste management • Status of fire extinguishers installation in place of removed sprinklers (2) Priority inspection items • Status of remedial actions for violations found in previous inspections • Status of nonconformity management (3) Clause-by-clause inspection items None (4) Follow-up inspection items • Status of remedial actions for violations found in previous inspections • Status of radioactive waste management	(1) Safety inspection items • Status of instructed work on SHUDO VALVE's valves • Status of measures taken for stopping ventilation equipment • Status of procurement management • Status of operation for restarting production (2) Priority inspection items • Status of instructed work on SHUDO VALVE's valves • Status of operation for restarting production (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of management review • Status of internal audits • Status of implementation of emergency measures • Status of maintenance management (2) Priority inspection items • Status of maintenance review • Status of implementation of emergency measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of designated comprehensive safety evaluation (stress tests) • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records • Activities of nuclear fuel chief technician • Status of education and training (2) Priority inspection items •Status of designated comprehensive safety evaluation (stress tests) • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the "status of remedial actions for violations found in previous inspections" and "status of nonconformity management." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of instructed work on SHUDO VALVE's valves," "status of operation for restarting production," "status of procurement management" and "status of measures taken for stopping ventilation equipment." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of management review," "status of internal audits," "status of implementation of emergency measures" and "status of maintenance management." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of designated comprehensive safety evaluation (stress tests)," "status of implementation of reliability improvement measures for recording accidents, etc. and retaining records," "activities of nuclear fuel chief technician" and "status of education and training." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(2) Mitsubishi Nuclear Fuel Co., Ltd.

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	May 15 to 18, 2012	Aug. 14 to 17, 2012	Nov. 13 to 16, 2012	Feb. 29 to 22, 2013
Inspection item	(1) Safety inspection items • Status of education and training • Status of implementation of emergency measures • Status of compliance with the operational safety program regarding amendment and approval • Status of maintenance management (2) Priority inspection items • Status of education and training • Status of implementation of emergency measures • Status of maintenance management (3) Clause-by-clause inspection items • Status of compliance with the operational safety program regarding amendment and approval (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of management review and internal audits • Status of first-aid firefighting activities (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items •Status of designated comprehensive safety evaluation (stress tests) • Status of instructed work on SHUDO VALVE's valves • Status of maintenance management • Status of radioactive waste management (2) Priority inspection items • Status of designated comprehensive safety evaluation (stress tests) • Status of instructed work on SHUDO VALVE's valves (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of radiation control • Status of operation at the fabrication facility • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records (2) Priority inspection items • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the "status of education and training" and "status of implementation of emergency measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures," "status of management review and internal safety audits" and "status of first-aid firefighting activities." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of designated comprehensive safety evaluation (stress tests)," "status of instructed work on SHUDO VALVE's valves," "status of maintenance management" and "status of radioactive waste management." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of radiation control," "status of operation at the fabrication facility" and "status of implementation of reliability improvement measures for recording accidents, etc. and retaining records." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(3) Nuclear Fuel Industries, Ltd., Kumatori Works

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	Jun. 4 to 8, 2012	Aug. 21 to 24, 2012	Dec. 3 to 7, 2012	Mar. 4 to 8, 2013
Inspection item	(1) Safety inspection items • Status of quality assurance activities (achievements in FY 2011 and activity plan for FY 2012) • Status of first-aid firefighting training and emergency drill • Status of radioactive waste management • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures (2) Priority inspection items • Status of quality assurance activities • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of management review • Status of internal audits • Status of operation at the fabrication facility • Status of implementation of measures for abnormal events • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures (2) Priority inspection items • Status of management review • Status of internal audits • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of safety culture development activities • Status of nuclear fuel management • Status of instructed work on SHUDO VALVE's valves • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures (2) Priority inspection items • Status of instructed work on SHUDO VALVE's valves • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of maintenance management • Status of designated comprehensive safety evaluation (stress tests) • Status of implementation of emergency measures • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records • Status of nonconformity management, corrective measures, and preventive measures (2) Priority inspection items • Status of designated comprehensive safety evaluation (stress tests) • Status of implementation of emergency measures • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the "status of quality assurance activities" and "status of nonconformity management, corrective measures, and preventive measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of management review," "status of internal audits," "status of implementation of emergency measures" and "status of nonconformity management, corrective measures, and preventive measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of safety culture development activities," "status of nuclear fuel management," "status of instructed work on SHUDO VALVE's valves," "status of implementation of emergency measures" and "status of nonconformity management, corrective measures, and preventive measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of maintenance management," "status of designated comprehensive safety evaluation (stress tests)," "status of implementation of emergency measures," "status of implementation of reliability improvement measures for recording accidents, etc. and retaining records" and "status of nonconformity management, corrective measures, and preventive measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by making inspection tours of the facilities. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(4) Nuclear Fuel Industries, Ltd., Tokai Works

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	May 28 to 31, 2012	Sep. 11 to 14, 2012	Nov. 19 to 22, 2012	Feb. 26 to Mar. 1, 2013
Inspection item	(1) Safety inspection items • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures • Status of radiation control (2) Priority inspection items • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of education and training • Status of radioactive waste management • Status of nonconformity management, corrective measures, and preventive measures (2) Priority inspection items • Status of education and training • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of designated comprehensive safety evaluation (stress tests) • Status of maintenance management • Status of instructed work on SHUDO VALVE's valves (2) Priority inspection items • Status of designated comprehensive safety evaluation (stress tests) • Status of maintenance management • Status of instructed work on SHUDO VALVE's valves (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of operation at the fabrication facility • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the "status of implementation of emergency measures" and "status of nonconformity management, corrective measures, and preventive measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of education and training," "status of radioactive waste management" and "status of nonconformity management, corrective measures, and preventive measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures," "status of designated comprehensive safety evaluation (stress tests)," "status of maintenance management" and "status of instructed work on SHUDO VALVE's valves." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures," "status of operation at the fabrication facility" and "status of implementation of reliability improvement measures for recording accidents, etc. and retaining records." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(5) Japan Atomic Energy Agency, Ningyo-toge Environmental Engineering Center

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	May 23 to 25, 2012	Aug. 6 to 8, 2012	Nov. 20 to 22, 2012	Feb. 27 to Mar. 1, 2013
Inspection item	(1) Safety inspection items • Status of quality management system • Status of instructed work on SHUDO VALVE's valves • Status of operation at the fabrication facility • Status of periodic facility self-inspections (2) Priority inspection items • Status of quality management system • Status of instructed work on SHUDO VALVE's valves (3) Clause-by-clause inspection items • Status of operation at the fabrication facility (4) Follow-up inspection items None	(1) Safety inspection items • Status of compliance with related laws and regulations and safety culture development activities • Status of licensee's safety assurance activities (patrol, inspection) • Status of radiation control (area and material transfer control) • Status of periodic facility self-inspections (2) Priority inspection items • Status of compliance with related laws and regulations and safety culture development activities • Status of licensee's safety assurance activities (patrol, inspection) (3) Clause-by-clause inspection items • Status of radiation control (area and material transfer control) (4) Follow-up inspection items None	(1) Safety inspection items • Status of designated comprehensive safety evaluation (stress tests) • Status of compliance with the operational safety program regarding amendment and approval • Status of nuclear fuel management • Status of periodic facility self-inspections (2) Priority inspection items • Status of implementation of instructed stress tests • Status of compliance with the operational safety program regarding amendment and approval (3) Clause-by-clause inspection items • Status of nuclear fuel management (4) Follow-up inspection items None	(1) Safety inspection items • Status of quality management system • Status of nonconformity management, corrective measures, and preventive measures • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records • Status of periodic facility self-inspections (2) Priority inspection items • Status of quality management system • Status of nonconformity management, corrective measures, and preventive measures • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the "status of quality management system" and "status of instructed work on SHUDO VALVE's valves." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of compliance with related laws and regulations and safety culture development activities" and "status of licensee's safety assurance activities (patrol, inspection)." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of implementation of instructed stress tests" and "status of compliance with the operational safety program regarding amendment and approval." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of quality management system," "status of nonconformity management, corrective measures, and preventive measures" and "status of implementation of reliability improvement measures for recording accidents, etc. and retaining records." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(6) Japan Nuclear Fuel Ltd., Enrichment and Disposal Office

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	Jun. 4 to 8, 2012	Sep. 4 to 10, 2012	Dec. 5 to 11, 2012	Feb. 20 to 26, 2013
Inspection item	(1) Safety inspection items • Status of operation and maintenance of the new centrifuge • Status of management review • Status of adhered uranium collection • Status of compliance with changes in the operational safety program (2) Priority inspection items • Status of operation and maintenance of the new centrifuge (3) Clause-by-clause inspection items • Status of compliance with changes in the operational safety program (4) Follow-up inspection items None	(1) Safety inspection items • Status of maintenance management relating to facility modification required for upgrade of centrifuge to a new model • Status of nonconformity management, corrective measures, and preventive measures • Status of dose equivalent measurement (surprise inspection) • Status of compliance with changes in the operational safety program (2) Priority inspection items • Status of maintenance management relating to facility modification required for upgrade of centrifuge to a new model • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of maintenance of equipment requiring special management for safety reasons • Status of periodic facility self-inspections (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of maintenance of equipment requiring special management for safety reasons (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of implementation of emergency measures • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records • Status of operations for safety record (2) Priority inspection items • Status of implementation of emergency measures • Status of implementation of reliability improvement measures for recording accidents, etc. and retaining records (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the "status of operation and maintenance of the new centrifuge" and "status of adhered uranium collection." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of maintenance management relating to facility modification required for upgrade of centrifuge to a new model." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of implementation of emergency measures" and "status of implementation of reliability improvement measures for recording accidents, etc. and retaining records." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the fabrication licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(7) Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	Jun. 5 to 18, 2012	Aug. 20 to 31, 2012	Nov. 26 to Dec. 7, 2012	Feb. 4 to 15, 2013
Inspection item	(1) Safety inspection items • Status of implementation of equipment safety and severe accident measures • Status of nonconformity management, corrective measures, and preventive measures • Status of equipment integrity verification after the Tohoku District-off the Pacific Ocean Earthquake • Status of management of controlled areas, etc. (2) Priority inspection items • Status of implementation of equipment safety and severe accident measures • Status of nonconformity management, corrective measures, and preventive measures • Status of equipment integrity verification after the Tohoku District-off the Pacific Ocean Earthquake (3) Clause-by-clause inspection items • Status of management of controlled areas, etc. (4) Follow-up inspection items None	(1) Safety inspection items • Status of implementation of equipment safety and severe accident measures • Status of equipment integrity verification after the Tohoku District-off the Pacific Ocean Earthquake • Status of nonconformity management, corrective measures, and preventive measures • Status of management review • Status of process control • Status of periodic facility self-inspections (2) Priority inspection items • Status of implementation of equipment safety and severe accident measures • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None。 (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of safety preservation activities relating to entrusted work • Status of access to controlled areas and exposure management • Status of management of radioactive management equipment • Status of compliance with changes in the operational safety program • Status of licensee's safety assurance activities (patrol, inspection) (surprise inspection) (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items • Status of compliance with changes in the operational safety program (4) Follow-up inspection items None	(1) Safety inspection items • Status of designated comprehensive safety evaluation (stress tests) • Status of education and training • Status of equipment integrity verification after the Tohoku District-off the Pacific Ocean Earthquake • Status of nonconformity management, corrective measures, and preventive measures • Status of radioactive gaseous waste release control • Status of environmental monitoring of these, the "status of designated comprehensive safety evaluation (stress tests)" and "status of education and training" are to be priority inspection items in operational safety inspections. (2) Priority inspection items • Status of designated comprehensive safety evaluation (stress tests) • Status of education and training (3) Clause-by-clause inspection items •Status of radioactive gaseous waste release control (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the "status of implementation of equipment safety and severe accident measures," "status of nonconformity management, corrective measures, and preventive measures" and "status of equipment integrity verification after the Tohoku District-off the Pacific Ocean Earthquake." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the Nuclear Fuel Cycle Engineering Laboratories on operational management, and reviewing records. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of implementation of equipment safety and severe accident measures" and "status of nonconformity management, corrective measures, and preventive measures," The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the Nuclear Fuel Cycle Engineering Laboratories on operational management, and reviewing records. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures" and "status of safety preservation activities relating to entrusted work." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the Nuclear Fuel Cycle Engineering Laboratories on operational management, and reviewing records. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of designated comprehensive safety evaluation (stress tests)"and "status of education and training." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the Nuclear Fuel Cycle Engineering Laboratories on operational management, and reviewing records. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(8) Japan Nuclear Fuel Ltd., Reprocessing Plant

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	May 23 to Jun. 5, 2012	Sep. 14 to 28, 2012	Dec. 3 to 14, 2012	Feb. 18 to Mar. 1, 2013
Inspection item	(1) Safety inspection items • Status of implementation of equipment safety and severe accident measures • Status of nonconformity management, corrective measures, and preventive measures • Status of safety preservation activities for the high-level liquid waste vitrification equipment • Status of maintenance management for the equipment important to safety • Status of management review (2) Priority inspection items • Status of implementation of equipment safety and severe accident measures • Status of nonconformity management, corrective measures, and preventive measures • Status of safety preservation activities for the high-level liquid waste vitrification equipment • Status of maintenance management for the equipment important to safety (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of safety preservation activities for the high-level liquid waste vitrification equipment • Status of maintenance management for the equipment important to safety • Status of radiation control • Status of design and maintenance management in modification of reprocessing facilities (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of safety preservation activities for the high-level liquid waste vitrification equipment • Status of maintenance management for the equipment important to safety (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of maintenance management for the equipment important to safety • Status of safety preservation activities in preparation for the commercial operation of the reprocessing facility • Status of management review • Status of maintenance management in modification of reprocessing facility (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of maintenance management for the equipment important to safety • Status of safety preservation activities in preparation for the commercial operation of the reprocessing (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of maintenance management for the equipment important to safety • Status of safety preservation activities in preparation for the commercial operation of the reprocessing facility • Status of safety preservation activities for the high-level liquid waste vitrification equipment • Status of systems for station blackout and emergency measures (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of maintenance management for the equipment important to safety • Status of safety preservation activities in preparation for the commercial operation of the reprocessing facility • Status of safety preservation activities for the high-level liquid waste vitrification equipment • Status of systems for station blackout and emergency measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None

Summary of inspection results	Safety inspections were conducted on inspection items such as the “status of implementation of equipment safety and severe accident measures” and “status of safety preservation activities for the high-level liquid waste vitrification equipment.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the reprocessing licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of nonconformity management, corrective measures, and preventive measures,” “status of safety preservation activities for the high-level liquid waste vitrification equipment” and “status of maintenance management for the equipment important to safety.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the reprocessing licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of nonconformity management, corrective measures, and preventive measures,” “status of maintenance management for the equipment important to safety” and “status of safety preservation activities in preparation for the commercial operation of the reprocessing facility.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the reprocessing licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of nonconformity management, corrective measures, and preventive measures,” “status of maintenance management for the equipment important to safety,” “status of safety preservation activities in preparation for the commercial operation of the reprocessing facility,” “status of safety preservation activities for the high-level liquid waste vitrification equipment” and “status of the system to cope with station blackout and emergency measures.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management during the safety inspection period was examined by interviewing the reprocessing licensee on operational management, reviewing records, making inspection tours of the facilities, and so forth. No particular issues were identified within the scope of the inspection. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(9) Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center)

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	Jun. 12 to 14, 2012	Sep. 12 to 14, 2012	Nov. 29 to Dec. 3, 2012	Feb. 28 to Mar. 4, 2013
Inspection item	The nuclear safety inspector conducted safety inspections by entering the facility, examining certain objects such as records, and questioning concerned parties with regard to the status of safety preservation activities in accordance with the operational safety program. (Inspection items) • Status of compliance with changes in the operational safety program • Status of nonconformity management, corrective measures, and preventive measures • Status of management review	(1) Safety inspection items • Status of waste disposal management • Status of compliance with rules related to reception of waste (e.g. cl-36) (2) Priority inspection items • Status of waste disposal management • Status of compliance with rules related to reception of waste (e.g. cl-36) (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of waste disposal and burial site management • Status of compliance with changes in the operational safety program (2) Priority inspection items • Status of waste disposal and burial site management (3) Clause-by-clause inspection items • Status of compliance with changes in the operational safety program (4) Follow-up inspection items None	(1) Safety inspection items • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures • Status of inspection tour (surprise inspection) (2) Priority inspection items • Status of implementation of emergency measures • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the “status of nonconformity management, corrective measures, and preventive measures.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of waste disposal management” and “status of compliance with rules related to reception of waste (e.g. cl-36).” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of waste disposal and burial site management” and “status of compliance with changes in the operational safety program.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of implementation of emergency measures,” “status of nonconformity management, corrective measures, and preventive measures” and “status of inspection tour (surprise inspection).” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(10) Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Science Research Institute, Radioactive Waste Disposal Facility

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	Jun. 20, 2012	Sep. 14, 2012	Dec. 12, 2012	Feb. 27, 2013
Inspection item	The nuclear safety inspector conducted safety inspections by entering the facility, and examining certain objects such as those listed below. (Inspection items) • Status of quality assurance activities • Status of disposal controlled area management	(1) Safety inspection items • Status of compliance with related laws and regulations and safety culture development activities • Status of safety management • Status of nonconformity management, corrective measures, and preventive measures • Status of disposal controlled area management • Status of compliance with the operational safety program regarding amendment and approval (2) Priority inspection items • Status of compliance with related laws and regulations and safety culture development activities • Status of safety management (3) Clause-by-clause inspection items • Status of compliance with the operational safety program regarding amendment and approval (4) Follow-up inspection items None	(1) Safety inspection items • Status of summarization of safety preservation activities in FY 2012 • Status of internal audits • Status of inspections, tests and implementation of measures for abnormal events • Status of disposal controlled area management (2) Priority inspection items None (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of operational safety education and training • Status of disposal controlled area management • Status of recording and reporting • Activities of the radioactive waste chief technician (surprise inspection) (2) Priority inspection items • Status of operational safety education and training (3) Clause-by-clause inspection items None。 (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the “status of quality assurance activities.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of compliance with related laws and regulations and safety culture development activities” and “status of safety management.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of safety preservation activities in FY 2012,” “status of internal audits, etc,” “status of inspections, tests and implementation of measures for abnormal events” and “status of disposal controlled area management.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of operational education and training.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(11) Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	Jun. 8 to 12, 2012	Sep. 10 to 12, 2012	Nov. 26 to 28, 2012	Mar. 4 to 6, 2013
Summary of inspection results	The nuclear safety inspector conducted safety inspections by entering the facility, and examining certain objects such as those listed below. (Inspection items) • Status of nonconformity management, corrective measures, and preventive measures • Status of management review • Status of radioactive solid waste storage management (surprise inspection)	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of operation of the waste management facility and vitrified canister management (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of operation of the waste management facility and vitrified canister management (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of material transport management • Status of maintenance and inspection of alarm records (2) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of implementation of emergency measures • Status of inspection tour (surprise inspection) (3) Priority inspection items • Status of nonconformity management, corrective measures, and preventive measures • Status of implementation of emergency measures (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures" and "status of operation of the waste management facility and vitrified canister management." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures," "status of material transport management" and "status of maintenance and inspection of alarm records." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the "status of nonconformity management, corrective measures, and preventive measures," "status of implementation of emergency measures" and "status of inspection tour." The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

(12) Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility

	First inspection	Second inspection	Third inspection	Fourth inspection
Period of inspection	May 22 to 24, 2012	Jul. 31 to Aug. 2, 2012	Dec. 18 to 20, 2012	Feb. 13 to 15, 2013
Inspection item	The nuclear safety inspector conducted safety inspections by entering the facility, and examining certain objects such as those listed below. (Inspection items) • Status of nonconformity management • Status of implementation of emergency measures • Status of implementation of changes in the operational safety program • Status of operational safety education	(1) Safety inspection items • Status of maintenance management • Status of radioactive waste management (2) Priority inspection items • Status of maintenance management • Status of radioactive waste management (3) Clause-by-clause inspection items None (4) Follow-up inspection items None	(1) Safety inspection items • Status of radioactive solid waste management • Status of recording and retention of alarms generated from alarm devices in the event of accidents • Status of compliance with changes in the operational safety program (2) Priority inspection items Status of radioactive solid waste management (3) Clause-by-clause inspection items Status of compliance with changes in the operational safety program (4) Follow-up inspection items None	(1) Safety inspection items • Status of disposal of radioactive waste • Status of horizontal deployment in response to the nonconformity events that occurred with other licensees • Status of internal audits • Status of confirmation of records for operational safety of the waste management facility (surprise inspection) (3) Priority inspection items • Status of disposal of radioactive waste • Status of horizontal deployment in response to the nonconformity events that occurred with other licensees (3) Clause-by-clause inspection items None (4) Follow-up inspection items None
Summary of inspection results	Safety inspections were conducted on inspection items such as the “status of nonconformity management.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of maintenance management” and “status of radioactive waste management.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of radioactive solid waste management,” “status of recording and retention of alarms generated from alarm devices in the event of accidents” and “status of compliance with changes in the operational safety program.” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.	Safety inspections were conducted on inspection items such as the “status of disposal of radioactive waste” and “status of horizontal deployment in response to the nonconformity events that occurred with other licensees” The inspections confirmed that safety preservation activities for each of the inspection items are properly carried out in line with the operational safety program. No violations of the operational safety program were identified. The status of daily operational management activities during the safety inspection period was also examined by interviewing the licensee on radioactive waste disposal and storage, reviewing records, and making inspection tours of facilities. No items that violate the operational safety program were identified within the scope examined by the inspector. In consideration of the above, it is judged that the safety preservation activities selected for examination in this inspection were conducted properly.

XIII STATUS OF APPROVAL AND INSPECTION OF DESIGN AND CONSTRUCTION METHODS AT NUCLEAR FUEL FABRICATION, SPENT FUEL STORAGE, REPROCESSING AND RADIOACTIVE WASTE DISPOSAL FACILITIES

XIII-1 Status of Approval and Inspection of Design and Construction Methods at Nuclear Fuel Fabrication, Spent Fuel Storage, Reprocessing and Radioactive Waste Disposal Facilities

The design and construction methods of fabrication, storage, reprocessing and disposal facilities are subject to approval by the Minister of Economy, Trade and Industry, and the construction and performance of these facilities are subject to inspection by the Minister of Economy, Trade and Industry according to the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Nuclear Reactors.

In FY 2012, a total of 18 approvals for design and construction methods were granted to 5 fabrication plants, 2 reprocessing plants, 1 disposal plant, and 1 storage plant. As for inspections, 13 pre-service inspections had been completed as of March 31, 2013.

XIII-2 Approvals of Design and Construction Methods

(1) Global Nuclear Fuel-Japan Co., Ltd.

1. Approval application date	November 30, 2012
2. Approval date	February 13, 2013
3. Outline of approval	Installation of additional sensors for the automatic fire alarm system in certain controlled areas on the 1st and 2nd floors of the 1st fabricating building which is classified as one of other fabricating equipment of the plant. There are no sensors for the automatic fire alarm system in these areas (note 1) at present, and installation was decided for improving fire detection performance and replacing the sprinklers which are planned to be removed (note 2). (note 1) According to the Fire Services Act, sensors are not required when sprinklers are installed for early extinction and the main structure of building is fire resisting. (note 2) The purpose of this change is to improve nuclear criticality safety by eliminating possibilities of water pouring down from sprinklers.
4. Review results	Compliance with Items 1 and 2 of Paragraph 3, Article 16-2 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors was confirmed.
5. Related permission items	-
6. Remarks on the approval	-

(2) Japan Nuclear Fuel Ltd., Reprocessing Plant

1. Approval application date	February 24, 2011 (partially revised on February 29, 2012)
2. Approval date	June 26, 2012
3. Outline of approval	(1) Details of approval This is the second application of four applications for approval concerning the design and work method for the installation of a mixed-oxide fuel fabrication facility, and the following are subject to be approved: • Molding equipment：Part of equipment for receiving containers storing raw powder material for mixed plutonium-uranium oxide fuel, mixing and press-molding of raw powder material, grinding of pellet circumference, pellet inspection and inter-process conveyance • Cladding equipment: Part of equipment for pellet insertion, fuel rod inspection and inter-process conveyance • Assembly equipment: Assembling crane • Nuclear fuel material storage equipment: Temporary storage of raw powder material containers, and storage of pre-assembled fuel rods • Other fabricating equipment: Analysis and measuring equipment, part of utility equipment (2) Decision criteria • Compliance with Article 3 (criticality prevention of nuclear fuel materials), Article 4 (preventing damage by fire), Article 5 (earthquake resistance), Article 6 (materials and structure), Article 7 (containment function), and Article 8 (shielding) and Article 10 (prevention of contamination by nuclear fuel materials, etc.) of the Regulations for the Technical Standards of Design and Construction Methods of Fabrication Facilities (Prime Minister's Office Ordinance No. 10, 1987)
4. Review results	Approval was granted because the business is approved and it is confirmed to meet the technical standards.
5. Related permission items	Approval of fabrication business on May 13, 2010
6. Remarks on the approval	None

(3) Japan Nuclear Fuel Ltd., Enrichment and Disposal Office

1. Approval application date	July 17, 2012
2. Approval date	August 31, 2012
3. Outline of approval	The following changes are to be made for upgrading the radioactive liquid waste disposal equipment: • Components (tanks and pumps for flocculation and filtered water) • Liquid level meter (interlocking and alarm functions)
4. Review results	The design and work method submitted by Japan Nuclear Fuel Ltd. in accordance with Paragraph 1, Article 16-2 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors were reviewed pursuant to Paragraph 3 of Article 16-2 of said act, and confirmed to be consistent with the licensed business and meet the technical standards.
5. Related permission items	-
6. Remarks on the approval	-

(4) Japan Nuclear Fuel Ltd.

1. Approval application date	November 16, 2012
2. Approval date	February 28, 2013
3. Outline of approval	• Changes in drawings and related documents listed in the application form, and optimization and modification of relevant descriptions for the facility building, molding equipment, nuclear fuel material storage facility, radioactive waste disposal facility and other fabricating equipment of the mixed-oxide fuel fabrication facility of which the design and work method submitted in the 1st application were approved on October 22, 2010, in association with partial changes in the design, including changes in the layout, of the fuel fabrication building
4. Review results	Compliance with Paragraph 3, Article 16-2 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors was confirmed.
5. Related permission items	-
6. Remarks on the approval	-

(5) Japan Nuclear Fuel Ltd., Reprocessing Plant

1. Approval application date	December 6, 2011 (partially revised on December 21, 2011 and March 15, 2012)
2. Approval date	April 3, 2012
3. Outline of approval	(1) Details of approval • Installation of the equipment (switchgear, transformer, HV main bus, etc.) for receiving electricity from the existing power receiving switchgear in the 2nd utility building (2) Decision criteria • Compliance with Article 4 (preventing damage by fire) and other related provisions of the Regulations for Technical Standards for Design and Construction Methods of Reprocessing Facilities (Prime Minister's Office Ordinance No. 12, 1987) • Subject to approvals listed in "Related permission items"
4. Review results	Approval was granted because the business is approved and it is confirmed to meet the technical standards.
5. Related permission items	Reprocessing business license on December 24, 1992
6. Remarks on the approval	None

(6) Japan Nuclear Fuel Ltd., Reprocessing Plant

1. Approval application date	June 27, 2012
2. Approval date	August 6, 2012
3. Outline of approval	• Installation of gate valves, etc. on the fuel gas piping for improving maintenance performance by stopping the safety steam boilers one by one for individual maintenance.
4. Review results	The design and work method submitted by Japan Nuclear Fuel Ltd. in accordance with Article 45-2 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors were reviewed pursuant to Article 45-3 of said article of said act, and confirmed to be consistent with the licensed business and meet the technical standards.
5. Related permission items	-
6. Remarks on the approval	-

(7) Japan Nuclear Fuel Ltd., Reprocessing Plant

1. Approval application date	March 26, 2012 (partially revised on April 10, 2012)
2. Approval date	April 17, 2012
3. Outline of approval	(1) Subject of approval Radioactive waste receiving facility (2) Details of approval application Changes in the part where the hoisting accessory of the ceiling crane touches the vitrified waste in the vitrified waste inspection room of the vitrified waste receiving facility
4. Review results	Approval was granted as the design and work method submitted in this application were confirmed to comply with the provisions of Paragraph 3, Article 51-7 of the Act on the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors.
5. Related permission items	None
6. Remarks on the approval	None

(8) Japan Atomic Energy Agency, Ningyo-toge Environmental Engineering Center

1. Approval application date	March 13, 2012
2. Approval date	April 17, 2012
3. Outline of approval	(1) Details of approval • Manufacturing of accumulated uranium collection containers and related work (2) Decision criteria • Compliance with Article 3 (criticality prevention of nuclear fuel materials), Article 6 (materials and structure) and Article 8 (shielding) of the Regulations for Technical Standards of Design and the Construction Methods of Fabrication Facilities (Prime Minister's Office Ordinance No. 10, 1987). • Subject to approvals listed in "Related permission items"
4. Review results	Approval was granted because the business is approved and it is confirmed to meet the technical standards.
5. Related permission items	Approval of alteration on February 29, 2012
6. Remarks on the approval	None

(9) Japan Atomic Energy Agency, Ningyo-toge Environmental Engineering Center

1. Approval application date	August 1, 2012
2. Approval date	February 20, 2013
3. Outline of approval	In relation to DOP-1 cascade equipment (note 1), which is currently shut down and operation is suspended, the uranium removal equipment (note 2) is to be added for collecting uranium adhering on the internal wall of DOP-1, and the suspension of DOP-1 cascade equipment and part of DOP-1 UF_6 processing equipment are to be released. (note 1) Cascade equipment: Improves uranium enrichment by combining a set of centrifuges in a hierarchical fashion. (note 2) Uranium removal equipment: The existing equipment used for collecting uranium accumulating on DOP-2 cascade equipment (usage facility) upon approval of the license for using nuclear fuel materials
4. Review results	Approval was granted as applied changes in the design and work method were confirmed to comply with provisions of Paragraph 3, Article 16-2 of the Act on the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors.
5. Related permission items	-
6. Remarks on the approval	-

(10) Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility

1. Approval application date	July 12, 2012
2. Approval date	August 10, 2012
3. Outline of approval	Design and work method in relation to repairs of corrosion pitting and wall thinning on the main exhaust stack duct due to corrosion
4. Review results	The design and work method submitted by Japan Atomic Energy Agency in accordance with Article 45-1 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors were reviewed pursuant to Article 45-3 of said act, and approved to be consistent with the licensed business and meet the technical standards.
5. Related permission items	-
6. Remarks on the approval	-

(11) Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility

1. Approval application date	November 1, 2012
2. Approval date	January 15, 2013
3. Outline of approval	Recurrence prevention measures are to be provided for preventing the recurrence of the following incident on September 13, 2011, reported pursuant to Article 62-3 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors and Article 19-16 of the Rule for Reprocessing of Spent Fuel: The exhausters of the tank ventilation system, including auxiliary devices, for high level liquid waste storage tanks failed to start due to the failure of the timer for controlling power supply installed on the separation and purification plant. The cause is the lack of redundancy in part of facility (power supply control circuit including said timer) for supplying power to exhausters of high level liquid waste storage tanks.
4. Review results	Compliance with Items 1 and 2 of Paragraph 3, Article 45 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors was confirmed.
5. Related permission items	-
6. Remarks on the approval	-

(12) Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility

1. Approval application date	November 1, 2012
2. Approval date	January 15, 2013
3. Outline of approval	Repairs of corrosion pitting on the U-shaped glove box of "the accessory equipment (3) compact test apparatus of other reprocessing equipment," of which the design and work method were approved on March 24, 1972 and September 8, 1993
4. Review results	Compliance with Items 1 and 2 of Paragraph 3, Article 45 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors was confirmed.
5. Related permission items	-
6. Remarks on the approval	-

(13) Japan Atomic Energy Agency, Tokai Research and Development Center, Oarai Research and Development Center, Radioactive Waste Management Facility

1. Approval application date	December 26, 2011 (partially revised on March 5 and 26, 2012)
2. Approval date	May 9, 2012
3. Outline of approval	(1) Applied subject of approval Solid waste volume reduction facility (2) Details of approval Shielding window, manipulator, and manipulate plug
4. Review results	Approval was granted as the design and work method submitted in this application were confirmed to comply with provisions of Paragraph 3, Article 51-7 of the Act on the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors.
5. Related permission items	Alteration approval for waste management business on January 13, 2011
6. Remarks on the approval	None

(14) Japan Atomic Energy Agency, Tokai Research and Development Center, Oarai Research and Development Center, Radioactive Waste Management Facility

1. Approval application date	June 15, 2012
2. Approval date	July 18, 2012c
3. Outline of approval	The design and work method relating to the installation of new fixtures on the shielding door of the beta/gamma enclosure equipment sorting cell and alpha enclosure equipment sealing cell for the processing facility of the waste management equipment, and the beta-gamma storage cell of the radioactive waste receiving facility at the Oarai Research and Development Center run by Japan Atomic Energy Agency
4. Review results	Approval was granted in accordance with Paragraph 1, Article 51-7 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors
5. Related permission items	-
6. Remarks on the approval	-

(15) Japan Atomic Energy Agency, Tokai Research and Development Center, Oarai Research and Development Center, Radioactive Waste Management Facility

1. Approval application date	July 18, 2012 (partially revised on August 3, 2012)
2. Approval date	August 28, 2012
3. Outline of approval	The design and work method relating to the waste pit of the waste compartment of the solid waste volume reduction facility installed at the designated waste management facility of the Oarai Research and Development Center run by Japan Atomic Energy Agency
4. Review results	Approval was granted in accordance with Paragraph 1, Article 51-7 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors
5. Related permission items	-
6. Remarks on the approval	-

(16) Nuclear Fuel Industries, Ltd., Tokai Works

1. Approval application date	December 27, 2011 (partially revised on February 27 and April 5, 2012)
2. Approval date	April 27, 2012
3. Outline of approval	(1) Details of approval • Installation of the container management room for storing transported materials such as fuel assemblies and uranium oxide powder as a nuclear fuel material storage facility, and removal of existing fuel assembly storage racks • Installation of shielding walls on the north and east sides of the waste warehouse II to cope with an increasing volume of stored solid waste • Changes in the nuclear limit of the scrap uranium powder blender at the molding facility (2) Decision criteria • Compliance with Article 3 (criticality prevention of nuclear fuel material), Article 4 (preventing damage by fire), Article 5 (earthquake resistance), Article 8 (shielding), Article 12 (conveyance systems), Article 13 (alarm equipment, etc.) and Article 15 (radiation management facilities) of the Regulations for Technical Standards of Design and the Construction Methods of Fabrication Facilities (Prime Minister's Office Ordinance No. 10, 1987) •Subject to approvals listed in "Related permission items"
4. Review results	Approval was granted because the business is approved and it is confirmed to meet the technical standards.
5. Related permission items	Approval of alteration in the fabrication business on February 10, 2011
6. Remarks on the approval	None

(17) Nuclear Fuel Industries, Ltd., Tokai Works

1. Approval application date	February 27, 2012 (partially revised on April 5, 2012)
2. Approval date	April 27, 2012
3. Outline of approval	(1) Details of approval • Construction schedule change: A new underground fuel assembly storage facility is to be installed after the use of the container storage room of the fabrication plant is started. (2) Decision criteria • Compliance with Article 3 (criticality prevention of nuclear fuel material), Article 5 (earthquake resistance) and Article 8 (shielding) of the Regulations for Technical Standards of Design and the Construction Methods of Fabrication Facilities (Prime Minister's Office Ordinance No. 10, 1987) •Subject to approvals listed in "Related permission items"
4. Review results	Approval was granted because the business is approved and it is confirmed to meet the technical standards.
5. Related permission items	Approval of alteration in the fabrication business on February 10, 2011 and approval of design and work methods on March 11, 2011
6. Remarks on the approval	None

(18) Mitsubishi Nuclear Fuel, Co., Ltd.

1. Approval application date	June 12, 2012 (partially revised on August 27, 2012)
2. Approval date	September 4, 2012
3. Outline of approval	• Use of UF6 casks for transportation as storage containers
4. Review results	The design and work method submitted by Mitsubishi Nuclear Fuel Co., Ltd. in accordance with Paragraph 1, Article 16-2 of the Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors were reviewed pursuant to Paragraph 3 of Article 16-2 of said act, and confirmed to be consistent with the licensed business and meet the technical standards.
5. Related permission items	-
6. Remarks on the approval	-

XIII-3 Qualification in Pre-Service Inspections

· The First Quarter

Applicant	Subject to inspection	Inspection item	Date of certificate issuance
Global Nuclear Fuel-Japan Co., Ltd.	· Upgrade of overheat control system of the sintering furnace at the molding facility · Removal of the compressor at the molding facility and the raw material powder storage rack in the nuclear fuel material storage facility · Modification of conveyors in the nuclear fuel material storage facility	Quantity Appearance Arrangement Performance	April 5, 2012
Japan Nuclear Fuel Ltd	· Modification of ventilators in the spent fuel transport cask management building · Movement of the outdoor monitoring equipment (#5) to the new building	Installation Appearance Performance	April 6, 2012
Japan Nuclear Fuel Ltd	· Manufacturing of the uranium collection container for the accumulated uranium collection equipment.	Appearance Quantity Dimensions Material Leakage	May 11, 2012
Mitsubishi Nuclear Fuel Co., Ltd.	· Modification of the fuel assembly mount · Use of FU6 transport casks as storage containers	Quantity Appearance Arrangement Installation Dimensions Material Leakage	June 7, 2012
Japan Nuclear Fuel Ltd	Vitrified waste receiving equipment in the radioactive waste receiving facility	Installation Appearance Independent operation	June 21, 2012

· The Second Quarter

Applicant	Subject to inspection	Inspection item	Date of certificate issuance
Global Nuclear Fuel Japan Co., Ltd.	Modification of the fire control equipment (removal of sprinklers in the 2nd fabrication building)	(Note)	August 7, 2012
Japan Nuclear Fuel Ltd	Installation of the used centrifuge storage building (used centrifuges resulting from the work for upgrading centrifuges), etc.	(Note)	August 9, 2012
Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Processing facility of the waste management equipment Liquid waste processing facility Cement solidification equipment Instrument control system facility Instrumentation for liquid level, etc. Instrumentation for the cement solidification equipment	Material Appearance Pressure resistance and leakage Structure Dimensions Installation Function General inspection	September 12, 2012

(Note) No description is found in the document published by the former Nuclear and Industrial Safety Agency.

· The Third Quarter

Applicant	Subject to inspection	Inspection item	Date of certificate issuance
Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Processing facility of the waste management equipment Fixtures for the shielding door of the beta/gamma enclosure equipment sorting cell and alpha enclosure equipment sealing cell of the solid waste processing facility Radioactive waste receiving facility Fixtures for the shielding door of the beta-gamma storage cell of the solid waste receiving facility	Material Dimensions Appearance Installation	October 31, 2012
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Building (7) 3rd low-level radioactive effluent evaporator facility, intermediate switchgear, and other accessory equipment of the reprocessing facility (6) Utility equipment (7) Fire control equipment	Material Dimensions Structure Strength Appearance Pressure resistance and leakage Installation and appearance	December 17, 2012

・The Fourth Quarter

Applicant	Subject to inspection	Inspection item	Date of certificate issuance
Nuclear Fuel Industries, Ltd.., Tokai Works	Installation of shielding walls and changes in storage place for radioactive solid waste in waste warehouse II	Interlocking (criticality prevention) Mold (shielding wall) Density (concrete) Building (appearance, quantity, arrangement)	February 18, 2013
Mitsubishi Nuclear Fuel Co., Ltd.	Removal of fuel assembly storage mount in the nuclear fuel fabrication facility, etc.	Quantity Appearance Dimensions Material Leakage	March 7, 2013
Japan Nuclear Fuel Ltd	Upgrade of centrifuges in the uranium enrichment plant	Interlocking Performance Dimensions Material	March 27, 2013

XIV STATUS OF ACCIDENT AND FAILURE

XIV-1-1 Overview of Accident and Failure at Nuclear Power Plants in FY2012 (Excluding Power Reactors in Research and Development Stage)

1. In FY2012, a total of 6 accident and failure were reported to the Minister of Economy, Trade and Industry by electric utilities under the Nuclear Reactor Regulation Act.
   The number of reported accidents per reactor unit was 0.1.

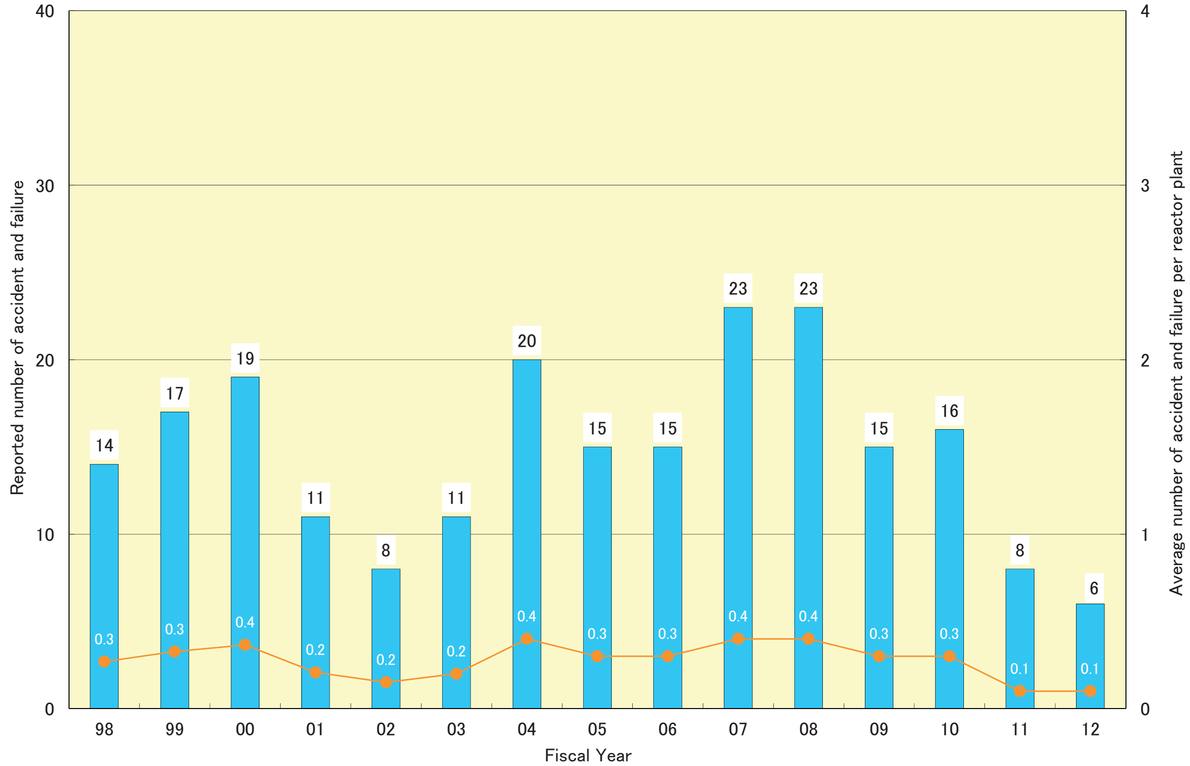
2. The 6 accident and failure consisted of 0 that caused automatic shutdown during operation, including trial and adjustment operation, 0 that caused manual shutdowns, 0 that resulted in an output fluctuation, 0 in which damage to equipment was found during operation, 5 in which damage to equipment was found while a nuclear reactor was not in operation and 1 for other categories.

Table XIV-1-1 Trends in the Number of Reported

Type		66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
During operation	Automatic shutdown	1	1	0	1	3	6	6	2	4	3	9	4	9	7	11	13	7	11	4	4	5	4	4	1
	Manual shutdown	4	2	2	1	0	6	3	2	8	5	5	1	4	6	5	12	10	5	3	8	6	7	9	10
	Output fluctuation	7	3	2	1	0	0	0	0	0	0	2	0	0	0	1	0								
	Component damage																								
Not in operation	SG damage					0	0	0	0	0	0	0	0	0	0	0	2	5	6	5	6	7	5	5	9
	Component damage other than SG	0	0	0	0	0	0	0	0	1	0	6	10	8	10	7	7	3	5	4	1	1	1	5	1
Others		1	*(1)	0	0	0	1	0	1	0	0	2	2	1	3	1	2	1	0	2	0	0	2	0	1
Total		13	6	4	3	3	13	9	5	13	8	24	17	22	26	25	36	26	27	18	19	19	19	23	22

* One fatal accident in automatic shutdown.

Figure XIV-1-1 Trends in the Number of Reported Accident and Failure at Nuclear Power Plants and the Average Number of Accidents per Reactor Plant

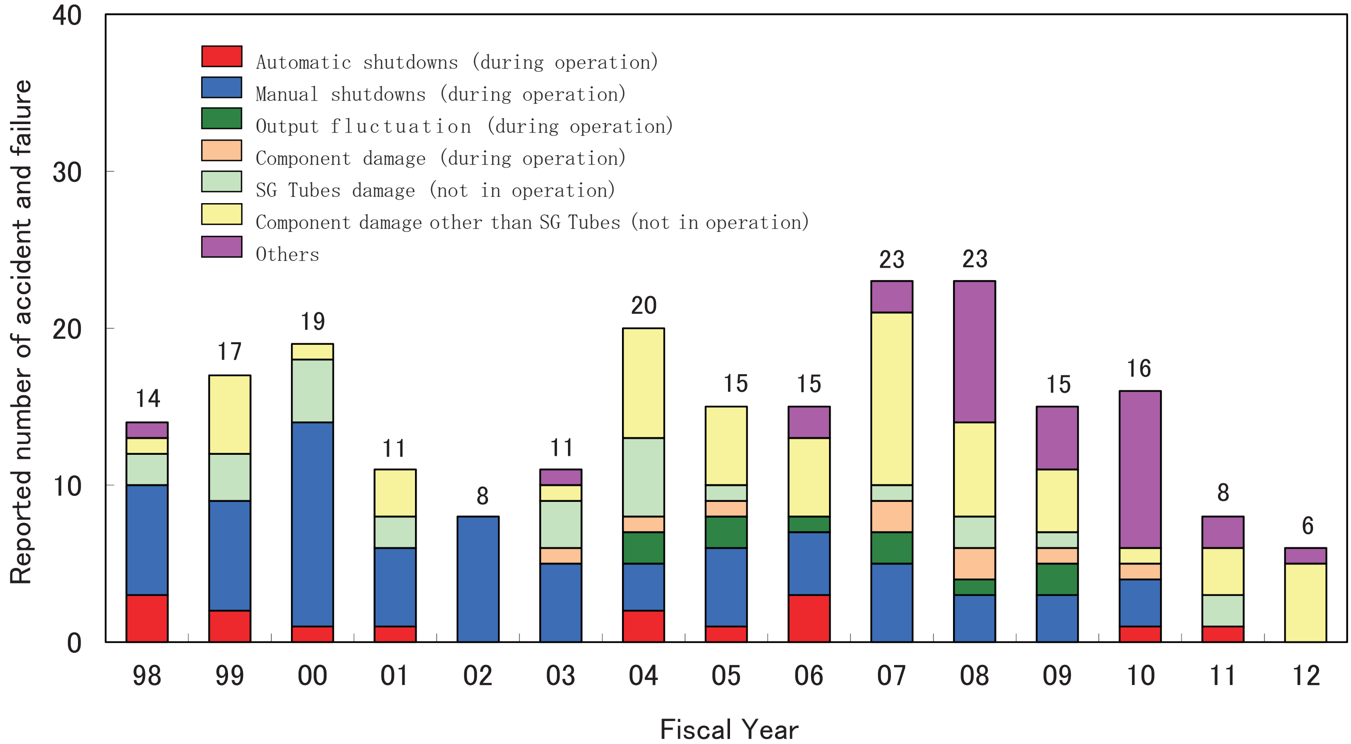


Note: With the amendment to the Nuclear Reactor Regulation Law on October 1, 2003, reporting criteria for accident and failure are clarified and quantified, and reporting based on ministerial notifications was unified into reporting based on the law.

Accident and Failure at Nuclear Power Plants

90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
4	4	4	0	3	1	1	2	3	2	1	1	0	0	2	1	3	0	0	0	1	1	0	154
9	6	10	10	7	9	11	9	7	7	13	5	8	5	3	5	4	5	3	3	3	0	0	266
													0	2	2	1	2	1	2	0	0	0	26
													1	1	1	0	2	2	1	1	0	0	9
9	7	5	6	3	4	2	2	2	3	4	2	0	3	5	1	0	1	2	1	0	2	0	114
2	3	0	1	0	0	0	1	1	5	1	3	0	1	7	5	5	11	6	4	1	3	5	135
0	0	1	0	1	0	0	0	1	0	0	0	0	1	*(1)	0	2	2	9	4	10	2	1	54
24	20	20	17	14	14	14	14	14	17	19	11	8	11	20	15	15	23	23	15	16	8	6	758

Figure XIV-1-2 Trends in the Number of Reported Accident and Failure at Nuclear Power Plants by Accident Type



XIV

XIV-1-2 Accident and Failure at Nuclear Power Plants to be Reported

When accident or failure specified in the related rules of the Acts (the Act for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Nuclear Reactor Regulation Act), and the Electric Utility Industry Act) occurs at nuclear power plants, the licensee reports it to the Nuclear and Industrial Safety Agency. The reporting criteria are as follows (excerpt):

Act	Article 62-3 of the Nuclear Reactor Regulation Act	Article 106 of the Electric Utility Industry Act
Ordinance	Article 19-17 of the Rules for Construction, Operation, etc. of a Commercial Power Reactor	Article 3 of the Electricity-related Reporting Regulations
Reporting Criteria	1) When nuclear fuel materials have been stolen or their location is unknown. 2) When a reactor in operation has been shut down or needed to be shut down due to a failure of the nuclear power reactor facilities, or when a power generation change of over 5% has occurred or been needed. 3) When it has been verified at inspection conducted by a licensee on equipment, etc. important for safety that the equipment, etc. important for safety did not meet Article 9 of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment or the standards specified in Article 9-2 of the ordinance, or when it has been verified that the equipment, etc. important for safety did not have functions necessary to ensure the safety of the nuclear power reactor facilities. 4) When a fire has caused a failure of equipment, etc. important for safety. 5) In addition to the above Item 3, when limiting conditions for operation have been deviated from due to a failure of nuclear power reactor facilities, or when measures specified in safety regulations have not been taken for the deviation of limiting conditions for operation. 6) When a malfunction has been found in the state of exhaust from gaseous radioactive waste exhaust equipment or in the state of discharge from liquid radioactive waste discharge equipment, due to a failure of nuclear power reactor facilities or other unexpected situations.	1) An accident in which an electric shock, damage to a nuclear power generation workpiece, wrong or no operation of a nuclear power generation workpiece has caused injury or death. 2) An electrical fire accident has occurred. 3) An accident in which damage to a nuclear power generation workpiece, wrong or no operation of a nuclear power generation workpiece has caused damage to public properties, made public facilities, such as roads, parks and schools, unusable, or had social impacts. 4) Damage to major electric workpieces has occurred. 5) An accident in which damage to a nuclear power generation workpiece, wrong or no operation of a nuclear power generation workpiece has caused other licensees a power supply trouble of more than 7,000 kW and less than 70,000 kW for longer than one hour, or a power supply trouble of more than 70,000 kW for longer than 10 minutes.

(Excerpt)

Reporting Criteria	7) When exhaust from gaseous radioactive waste exhaust equipment has caused the concentration of radioactive materials in air outside an environmental monitoring area to exceed the concentration limit stipulated in Article 15-4. 8) When discharge from liquid radioactive waste discharge equipment has caused the concentration of radioactive materials in the water outside an environmental monitoring area to exceed the concentration limit stipulated in Article 15-7. 9) When nuclear fuel materials or those contaminated with nuclear fuel materials have leaked outside a controlled area. 10) When a failure or other unexpected situation of nuclear power reactor facilities has caused nuclear fuel materials or others to leak in a controlled area. 11) When a failure or other unexpected situations of nuclear power reactor facilities has caused those in a controlled area to be exposed to radiation; effective dose from this exposure has exceeded or may have exceeded 5 mSv for radiation workers and 0.5 mSv for those other than radiation workers. 12) When a radiation worker has been exposed to radiation that exceeded or may have exceeded the dose limit stipulated in Section 1-1 of Article 9. 13) When a control rod that was not inserted or drawn out has actually moved from the original control point to or past another control point, or when a control rod at the full insertion position that was not inserted or drawn out has actually moved in the direction of insertion beyond the full insertion position. 14) In addition to the above Items, when a failure of nuclear power reactor facilities has inflicted or may have inflicted injury on a person.	

(Excerpt)

Note 1 : In October 2003, these rules were quantified and defined as much as possible so that a licensee can determine properly whether a trouble is an event to be reported, and the contents of the notification criteria issued before October were included in the Acts to make their position clear.

Note 2 : In June 2007, part of Article 19-17 of the Rules for Construction, Operation, etc. of a Commercial Power Reactor was amended. This is because as a result of full inspection of power generating equipment conducted by electric power companies according to the instruction of the Ministry of Economy, Trade and Industry on November 30, 2006, it was revealed that events like an unexpected control rod drop occurred during the shutdown of a reactor. Since events like an unexpected control rod drop may affect the safety of a reactor, it is appropriate to cause licensees to discover these events as preliminary signs of accidents and take measures for them. To cause licensees to report on events in which control rods moved while they were not operated, therefore, Section 13 was added.

XIV-1-3 Analysis of Accident and Failure at Nuclear Power Plants

1. The analysis of accident and failure trends in Japan shows that plants constructed in the early stage have many initial failures with a peak of the number of accident and failure in the third year after the start of operation, and then the number of accident and failure decreases. (See Table XIV-1-2 and Figure XIV-1-3.)

   The main accident and failure encountered in the past are as follows:

   In the case of BWR plants, they include stress corrosion cracking of stainless steel pipes, etc. and thermal fatigue cracking of nozzles of reactor pressure vessels in 1976 to 1978, damage to Primary Loop Recirculation Pumps in 1989, and pipe rupture of residual heat removal systems in 2001.

   In case of PWR plants, they include stress corrosion cracking of support pins and flexible pins of control rod guide pipes and damage to heat transfer tubes of steam generators in 1978 to 1979, pipe rupture of heat transfer tubes of steam generators in 1991, damage to connecting pipes of regenerative heat exchangers of chemical and volume control systems in 1999, damage to secondary system pipes in 2004, and flaws on welded spots of primary coolant inlet stubs of steam generators in 2007 to 2008.

   Common accident and failure include cracking, etc. of nozzles of small pipes due to vibration. They also include accident and failure due to the Niigataken Chuetsu-Oki earthquake, which occurred in July 2007.

   Since recurrence prevention measures, etc. have been taken or considered for each accident, it is considered that there are few possibilities of recurrence of similar accident and failure in plants include that will be operated in future.

   The detailed analysis of the accidents at Fukushima Daiichi Nuclear Power Station, as a result of the Tohoku District - Off the Pacific Ocean Earthquake on March 11, 2011, should wait the future evaluation because of the insufficient investigation of the equipment damage in degree.

Table XIV-1-2 Trends in the Number of Accident and Failure at Nuclear Power Plants by the Number of Years Elapsed after the Start of Operation

Number of years elapsed	1	2	3	4	5	6	7	8	9	10
Number of accidents	32	42	64	51	34	27	30	29	21	26
Number of reactor units	57	57	57	57	56	56	56	56	54	53
Average number of accidents per reactor unit	0.56	0.74	1.12	0.89	0.61	0.48	0.54	0.52	0.39	0.49

Number of years elapsed	11	12	13	14	15	16	17	18	19	20
Number of accidents	19	25	23	21	16	24	22	14	22	29
Number of reactor units	53	53	52	52	52	52	50	49	48	46
Average number of accidents per reactor unit	0.36	0.47	0.44	0.40	0.31	0.46	0.44	0.29	0.46	0.63

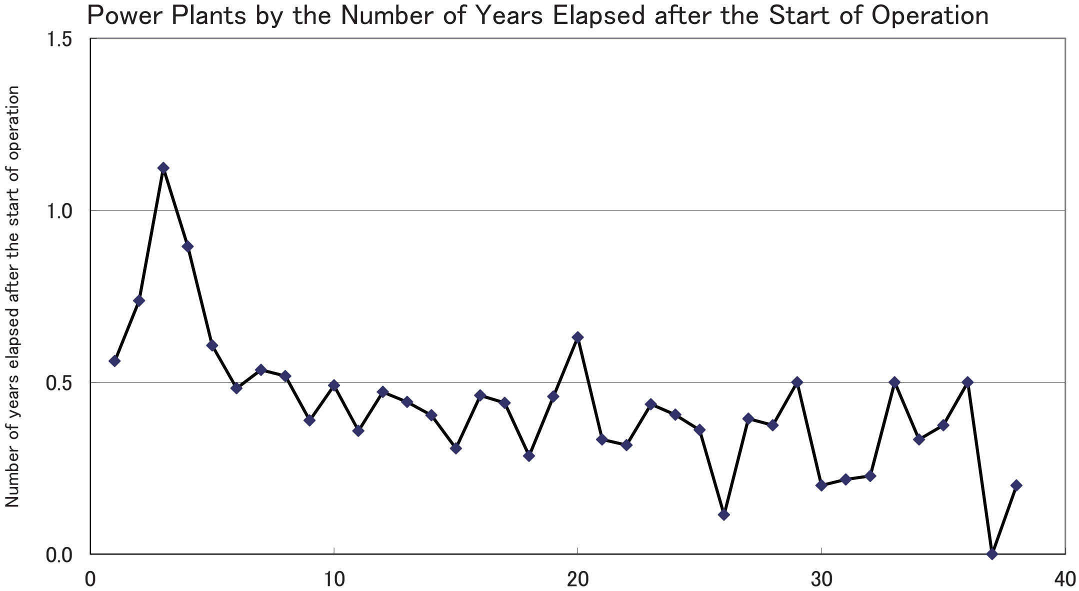
Number of years elapsed	21	22	23	24	25	26	27	28	29	30
Number of accidents	14	13	17	15	13	4	13	12	14	5
Number of reactor units	42	41	39	37	36	35	33	32	28	25
Average number of accidents per reactor unit	0.33	0.32	0.44	0.41	0.36	0.11	0.39	0.38	0.50	0.20

Number of years elapsed	31	32	33	34	35	36	37	38	39	40
Number of accidents	5	5	10	6	6	6	0	2	2	2
Number of reactor units	23	22	20	18	16	12	11	10	7	5
Average number of accidents per reactor unit	0.22	0.23	0.50	0.33	0.38	0.50	0.00	0.20	0.29	0.40

Number of years elapsed	41	42	43	44						
Number of accidents	2	0	1	0						
Number of reactor units	4	3	3	1						
Average number of accidents per reactor unit	0.50	0.00	0.33	0.00						

(Note)
1. Average number of accident and failure per reactor unit = (Number of reported accident and failure / Number of reactor plants at the end of the fiscal year)
2. The number of years elapsed after the start of operation assumes that the period from the day on which the station was brought into commercial operation to the end of the fiscal year constitutes the first year. The number subsequently increases by 1 each fiscal year.
3. The number of reactor plants are the number of operating reactor plants in each fiscal year.

Figure XIV-1-3 Trends in the Number of Accident and Failure at Nuclear Power Plants by the Number of Years Elapsed after the Start of Operation



＊In order to accurately reflect the figures, data when the number of Reactor plants was 10 or above has been graphed.

2. In Japan, a total of 758 accident and failure have been reported to date and they can be classified by their effect on plant operation as shown in Tables XIV-1-3 to XIV-1-7.
   - Accident and failure that resulted in an automatic shutdown during operation: 154
   - Accident and failure that resulted in a manual shutdown during operation: 266
   - Accident and failure that resulted in an output fluctuation during operation: 26
   - Accident and failure in which damage to equipment was found:9
   - Accident and failure during a periodical inspection or when a reactor was not in operation for another reason:249
   - Other accident and failure:54

(1) Accident and failure that resulted in an automatic shutdown during operation (See Table XIV-1-3. BWR: 102, PWR: 46, GCR: 6, Total: 154)

After the peak in FY1981, the number of accident and failure that caused automatic shutdowns while a reactor was in operation has decreased. In the past several years especially, the annual average number of such accident and failure per reactor has been between 0.0 and 0.1. This means cases of automatic shutdown are few.

Major systems to which equipment that caused automatic shutdowns belong include the following:

1) Instrumentation and control system equipment:52
2) Steam turbine equipment:37
3) Electrical equipment:34

Major causes of automatic shutdowns in 1) instrumentation and control system equipment include malfunctions of sensors, malfunctions of control circuits caused by a failed electronic circuit in BWR plants, and trouble with control circuits and valves for instrumentation and control systems in PWR plants.

Major causes of automatic shutdowns in 2) electrical equipment include generator field failures. Major causes of automatic shutdowns in 3) steam turbine equipment include malfunctions of moisture separators and pressure control systems which are often found in BWR plants. Recently, however, there has been a downward trend in the number of these malfunctions.

Recently, there has been a downward trend in the number of accident and failure that cause an automatic shutdown of a reactor due to the adoption of more effective preventative measures appropriate to these systems.

(2) Accident and failure that resulted in a manual shutdown during operation (See Table XIV-1-4. BWR: 170, PWR: 77, GCR: 19, total: 266)

Accident and failure that have caused a manual shutdown while a reactor was in operation are reported in small numbers each year. In most of these incidents, reactors have been manually shut down for inspection or repair work following significant changes in the parameters of the monitoring equipment caused by a leakage in a component of the reactor cooling system equipment or for another reason. To prevent leaks and ruptures of steam generator heat transfer tubes, eddy current tests are conducted in periodical inspections. To prevent fatigue and stress corrosion cracks in pipes, materials and construction processes have been improved and pipes are replaced more often. These preventative measures will reduce the chances of recurrence of similar incidents. To prevent leaks and ruptures of steam generator heat transfer tubes, eddy current tests are conducted in periodical inspections. To prevent fatigue and stress corrosion cracks in pipes, materials and construction processes have been improved and pipes are replaced more often. These preventative measures will reduce the chances of recurrence of similar incidents.

(3) Damage to equipment found in a periodical inspection or when a reactor was not in operation for another reason (See Table XIV-1-5. BWR:59, PWR: 187, GCR: 3, Total: 249)

The annual number of irregularities found in periodical inspections or when a reactor was not in operation for another reason has stayed at around 10 since FY1976. Between FY1976 and FY1978, thermal fatigue cracks in reactor pressure vessel nozzles and stress corrosion cracks in pipes were found in periodical inspections in BWR plants. Between FY1978 and FY1979, damage to control rod guide tube hinge pins or flexible pins were found in periodical inspections in PWR plants. However, appropriate measures against these and other accident and failure in BWR or PWR plants have been adopted. In FY1989, damage to a reactor recirculation pump was found and appropriate measures such as replacement of submerged bearing rings, have been adopted.

In some PWR plants, eddy current tests conducted periodically on steam generator tubes sometimes result in significant signal indications. Recently, however, the replacement of steam generators, complete water quality control and other appropriate measures have been adopted.

(4) Other accident and failure (See Table XIV-1-8)

Other accident and failure included incidents that did not directly affect the operation of plants, incidents that involved death or injury, radiation exposure and leakage of radioactive material. Incidents reported so far include two cases in which workers were exposed to radiation at a level exceeding that specified by law (four workers were exposed), 12 cases in which radioactive materials leaked outside a control zone or access to a certain area was limited due to leakage within a control zone, and 15 incidents resulting in death or injury (fatalities: 11, injuries: 22; those poisoned by gas: 2; oxygen deficiency: 2; fatal accident accompanied by an automatic shutdown: 2).

Classification of accident and failure

The classification of accident and failure here is based on the 758 accident and failure (BWR: 390, PWR: 322, GCR: 46) reported under the Law for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors to March 31, 2013, since the Japan Atomic Power Company Co., Ltd.'s Tokai Power Station began commercial operation on July 25, 1966.

Table XIV-1-3 Accident and Failure at Nuclear Power Plants by Fiscal Year

Facility	Fiscal Year	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
BWR	Reactor cooling system				0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Emergency core cooling system				0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Instrumentation and control system				1	0	2	4	0	0	0	1	0	2	0	3	5 (1)	3	0	1	2	1
	Radiation control facility				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Steam turbine system				0	1	0	0	0	0	1	3	0	1	1	5	5 (3)	2	2	0	1	0
	Condensation and feedwater system				0	1	1	0	0	1	0	1	0	0	2	1	1 (1)	0	0	0	1	1
	Electrical system				0	0	0	1	0	1	2	2	0	3	0	1	1	0	2	1	0	0
	Plant common system				0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Total				1	2	4	5	0	2	3	7	1	7	4	10	12 (5)	5	4	2	4	2
PWR	Reactor cooling system					0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0
	Instrumentation and control system					0	1	0	0	0	0	1	0	0	1	1 (1)	1	2	3 (1)	1 (1)	0	0
	Steam turbine system					0	0	0	0	1	0	1	2	0	0	0	0	0	1	0	0	1
	Condensation and feedwater system					0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
	Electrical system					1	1	1	0	1	0	0	1	1	1	0	0	0	0	1	0	1
	Total					1	2	1	2	2	0	2	3	2	2	1 (1)	1	2	6 (1)	2 (1)	0	2
GCR	Reactor cooling system	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Instrumentation and control system	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
	Electrical system	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Others	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1
Total		1	1	0	1	3	6	6	2	4	3	9	4	9	7	11 (1)	13 (5)	7	11 (1)	4 (1)	4	5
Number of reactor units		1	1	1	2	4	4	5	6	8	12	13	14	19	21	22	23	24	25	28	32	33
Average number of accidents (per reactor)		1	1	0	0.5	0.8	1.5	1.2	0.3	0.5	0.3	0.7	0.3	0.5	0.3	0.5	0.3	0.3	0.4	0.1	0.1	0.2

(Automatic Shutdown)

87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	2	1	0	2 (1)	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	33 (2)
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	28 (3)
1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	13 (1)
2	0	0	0	0	0	0	1	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	20
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3	1	0	3	2	4	0	3 (1)	0	0	1	3	1	0	1	0	0	1	1	2	0	0	0	1	0	0	102 (6)
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16 (3)
0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	9
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	4
0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	13
1	2	1	1	2	0	0	0	1	1	1	0	1	1	0	0	0	1	0	1	0	0	0	0	1	0	46 (3)
0	0	0	0	0	0	0	0	0	0	0																1
0	1	0	0	0	0	0	0	0	0	0																3
0	0	0	0	0	0	0	0	0	0	0																1
0	0	0	0	0	0	0	0	0	0	0																1
0	1	0	0	0	0	0	0	0	0	0																6
4	4	1	4	4	4	0	3 (1)	1	1	2	3	2	1	1	0	0	2	1	3	0	0	0	1	1	0	154 (9)
35	36	37	39	41	42	46	48	49	50	52	51	51	51	52	52	52	53	55	55	55	53	54	54	54	54	1569
0.1	0.1	0.0	0.1	0.1	0.1	0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1

1. Figures in parentheses are the numbers of accident and failure in trial operation and are included in the above figures.
2. The number of reactor plants are the number of operating reactor plants in each fiscal year.
3. The average numbers of accident and failure were calculated from the number of reactor plants in commercial operation and the number of accident and failure reported at these facilities.

Table XIV-1-4 Accident and Failure at Nuclear Power Plants by Fiscal Year

Facility	Fiscal Year	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
BWR	Reactor body				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Reactor cooling system				0	0	1	0	0	2	2	2	1	2	2	1	0	2	0	0	4	1
	Emergency core cooling system				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Reactor auxiliary system				0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0
	Instrumentation and control system				0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	Disposal system				0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	Reactor containment				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Steam turbine system				0	0	1	0	0	0	0	1	0	0	1	0	1 (1)	2	3	0	0	0
	Condensation and feedwater system				0	0	3	0	0	0	1	0	0	0	0	1	3	0	0	0	0	0
	Electrical system				0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1
	Plant Common system				0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
	Ventilation system				0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
	Total				0	0	5	1	0	4	3	4	1	2	4	2	7 (1)	6	4	0	6	3
PWR	Reactor cooling system					0	1	2	1	2	1 (1)	1	0	2	2	1	2	3	1	2	1	0
	Emergency core cooling system					0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
	Reactor auxiliary system					0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Instrumentation and control system					0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
	Steam turbine system					0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0
	Condensation and feedwater system					0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1 (1)
	Electrical system					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plant common system					0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Disposal system					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total					0	1	2	2	4	2 (1)	1	0	2	2	3	5	4	1	2	1	1 (1)
GCR	Reactor body	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Reactor cooling system	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Instrumentation and control system	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fuel handling system	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	Total	4	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Total		4	2	2	1	0	6	3	2	8	5 (1)	5	1	4	6	5	12 (1)	10	5	3	8	6 (1)
Number of reactor units		1	1	1	2	4	4	5	6	8	12	13	14	19	21	22	23	24	25	28	32	33
Average number of accidents (per reactor)		4	2	2	0.5	0	1.5	0.6	0.3	1	0.3	0.4	0.1	0.2	0.3	0.2	0.5	0.4	0.2	0.1	0.3	0.2

(Manual Shutdown)

87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
0	0	0	0	0	0	0	2	0	1 (1)	2	1	0	3	0	1	0	0	0	0	0	0	0	0	0	0	10 (1)
1	3	3	5	0	3	3	0	0	5	0	0	2	1	2	3	2	0	0	0	0	0	0	0	0	0	53
0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2 (1)	1	1	0	0	0	0	0	7 (1)
0	1	1	0	1	1	1	0	1	1	0	0	0	0	3	1	0	0	0	0	1	0	0	2	0	0	18
1	0	1	0	0	0	0	1	1 (1)	1	3	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	14 (1)
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	6
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	3
0	0	1	1	1	0	0	1	2	1	1 (1)	1	0	3	0	0	0	1	0	0	0	0	1	0	0	0	23 (2)
0	0	1	1	1	2	1	0	1	0	2	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	20
2	0	0	1	1	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4	5	8	8	4	8	5	4	5 (1)	9 (1)	9 (1)	4	3	9	5	6	2	3	4 (1)	2	3	2	3	3	0	0	170 (5)
3	2	0	0	0	1	2	1	0	0	0	1	1	0	0	0	2	0	1	0	0	0	0	0	0	0	36 (1)
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
0	1	0	0	0	0	0	0	0	2	0	0	1	1	0	1	1	0	0	1	1	0	0	0	0	0	10
0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6
0	0	1	0	0	0	3 (1)	0	1	0	0	0	0	2	0	1	0	0	0	1	0	1	0	0	0	0	13 (1)
0	0	0	0	0	0	0	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	7 (1)
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3	3	1	0	1	1	5 (1)	3	3	2	0	3	4	4	0	2	3	0	1	2	2	1	0	0	0	0	77 (3)
0	1	1	0	0	0	0	0	0	0	0																7
0	0	0	0	0	0	0	0	0	0	0																5
0	0	0	0	1	1	0	0	1	0	0																3
0	0	0	1	0	0	0	0	0	0	0																4
0	1	1	1	1	1	0	0	1	0	0																19
7	9	10	9	6	10	10 (1)	7	9 (1)	11 (1)	9 (1)	7	7	13	5	8	5	3	5 (1)	4	5	3	3	3	0	0	266 (8)
35	36	37	39	41	42	46	48	49	50	52	51	51	51	52	52	52	53	55	55	55	53	54	54	54	54	1569
0.2	0.3	0.3	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.2

1. Figures in parentheses are the numbers of accident and failure in trial operation and are included in the above figures.
2. The number of reactor plants are the number of operating reactor plants in each fiscal year.
3. The average numbers of accident and failure were calculated from the number of reactor plants in commercial operation and the number of accident and failure reported at these facilities.

Table XIV-1-5 Accident and Failure at Nuclear Power Plants by Fiscal Year

Facility \ Fiscal Year		66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
BWR	Reactor body				0	0	0	0	0	0	0	3	4	1	0	0	0	0	1	0	0	0	0
	Reactor cooling system				0	0	0	0	0	0	0	0	4	0	0	0	0	1	1	1	0	0	0
	Emergency core cooling system				0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Reactor auxiliary system				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Instrumentation and control system				0	0	0	0	0	0	0	1	2	0	1	0	1	0	0	0	0	0	0
	Fuel handling facility				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Reactor containment				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Electrical system				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Condensation and feedwater system				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ventilation system				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exhaust stack facility				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total				0	0	0	0	0	0	0	5	10	1	1	0	1	1	2	2	0	0	0
PWR	Reactor body					0	0	0	0	0	0	1	0	5	5	4	3	0	2	0	1	0	0
	Reactor cooling system					0	0	0	0	0	0	0	0	1 (1)	0	3	2	5	6	5	6	7	5
	Emergency core cooling system					0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0
	Reactor auxiliary system					0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	1	0
	Instrumentation and control system					0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Steam turbine system					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fuel handling facility					0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Reactor containment facility					0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	Condensation and feedwater system					0	0	0	0	1	0	0	0	0	0	0	0	2	1	0	0	0	0
	Electrical facility					0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Exhaust stack facility					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total					0	0	0	0	1	0	1	0	7 (1)	9	7	8	7	9	7	7	8	5
GCR	Reactor body	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Steam turbine facility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total		0	0	0	0	0	0	0	0	1	0	6	10	8 (1)	10	7	9	8	11	9	7	8	6
Number of reactor units		1	1	1	2	4	4	5	6	8	12	13	14	19	21	22	23	24	25	28	32	33	35
Average number of accidents (per reactor)		0	0	0	0	0	0	0	0	0.1	0	0.5	0.7	0.4	0.5	0.3	0.4	0.3	0.4	0.3	0.2	0.2	0.2

(During Shutdowns such as Periodical Inspections)

88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
1	0	1	0	0	0	0	0	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	3
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1	4
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0	1	1	0	0	0	11
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	4
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	3
0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2	1	0	0	0	1	0	6
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
2	0	2	0	0	0	0	0	0	1	0	5	0	2	0	0	1	3	4	5	2	3	0	2	4	59
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	25
6	9	9	7	5	6	3	4	2	2	2	3	4	2	0	4	5	1	1	5	4	1	0	2	0	127 (1)
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	5
1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	1	0	10
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	0	0	8
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3
7	10	9	10	5	6	3	4	2	2	3	3	5	3	0	4	11	3	1	7	6	2	1	3	1	187 (1)
1	0	0	0	0	0	0	0	0	0	0	0	0	0												2
0	0	0	0	0	1	0	0	0	0	0	0	0	0												1
1	0	0	0	0	1	0	0	0	0	0	0	0	0												3
10	10	11	10	5	7	3	4	2	3	3	8	5	5	0	4	12	6	5	12	8	5	1	5	5	249 (1)
36	37	39	41	42	46	48	49	50	52	51	51	51	52	52	52	53	55	55	55	53	54	54	54	54	1569
0.3	0.3	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.2	0.2	0.1	###	0.1	0.1	0.2

1. Figures in parentheses are the numbers of accident and failure in trial operation and are included in the above figures.
2. The number of reactor plants are the number of operating reactor plants in each fiscal year.
3. The average numbers of accident and failure were calculated from the number of reactor plants in commercial operation and the number of accident and failure reported at these facilities.

Table XIV-1-6 Accident and Failure at Nuclear Power Plants by Fiscal Year (Output Fluctuation)

Facility	Fiscal Year	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	03	04	05	06	07	08	09	10	11	12	Total
BWR	Instrumentation and control system				0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	2	0	1	0	1	0	0	0	7
	Steam turbine system				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Electrical system				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	Ventilation system				0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Others				0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	Total				0	0	0	0	0	0	0	2	0	0	0	1	0	0	2	2	1	1	1	1	0	0	0	11
PWR	Instrumentation and control system					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Steam turbine system					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
	Total					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
GCR	Reactor cooling control system	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0											3
	Steam turbine system	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0											6
	Condensation and feedwater system	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											1
	Electrical system	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0											3
	Total	7	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0											13
Total		7	3	2	1	0	0	0	0	0	0	2	0	0	0	1	0	0	2	2	1	2	1	2	0	0	0	26

From 1982, Accident and failure that caused an output reduction were excluded from accident and failure subject to law. However, these accident and failure were made subject to law again in the amendment to the Nuclear Reactor Regulation Law on October 1, 2003.

Table XIV-1-7 Accident and Failure at Nuclear Power Plants by Fiscal Year (Component Damage during Operation)

Facility	Fiscal Year	03	04	05	06	07	08	09	10	11	12	Total
BWR	Fuel handling facility	0	0	0	0	1	0	0	0	0	0	1
	Electrical system	0	0	0	0	1	0	0	0	0	0	1
	Total	0	0	0	0	2	0	0	0	0	0	2
PWR	Emergency core cooling system	0	0	0	0	0	1	0	0	0	0	1
	Reactor auxiliary system	1	1	0	0	0	1	0	1	0	0	4
	Electrical system	0	0	0	0	0	0	1 (1)	0	0	0	1 (1)
	Ventilation system	0	0	1	0	0	0	0	0	0	0	1
	Total	1	1	1	0	0	2	1 (1)	0	0	0	6 (1)
Total		1	1	1	0	2	2	1 (1)	1	0	0	9 (1)

1. Due to the amendment to the Nuclear Reactor Regulation Law on October 1, 2003, damage to equipment is now subject to law.
2. Figures in parentheses are the numbers of accident and failure in trial operation or when a reactor was being constructed and are included in the above figures.

Table XIV-1-8 Accident and Failure at Nuclear Power Plants by Fiscal Year (Others)

Accident type \ Fiscal Year	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
Accident resulting in death or injury	1	*(1)	0	0	0	0	0	0	0	0	1	2	1	0	0	0	1	0	0	0	0	2	0	1
Radiation exposure	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Leak of radioactive materials	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0
Boiler facility	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	1	0	1	0	0	2	2	1	3	1	2	1	0	2	0	0	2	0	1

Accident type \ Fiscal Year	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
Accident resulting in death or injury	0	0	1	0	1	0	0	0	0	0	0	0	0	1	*(1)	0	0	0	0	1	0	0	0	13
Radiation exposure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Leak of radioactive materials	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	1	2	1	1	14
Boiler facility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
Others	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	9	2	7	1	0	21
Total	0	0	1	0	1	0	0	0	1	0	0	0	0	1	0	0	2	2	9	4	10	2	1	54

* Figures in parentheses represent the numbers of fatal accident and failure that resulted in an automatic shutdown, but were counted as an accident and failure that resulted in an automatic shutdown.

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Table XIV-1-9 Systems of Component involved in Accident and Failure in Nuclear Power Plants

Classification	BWR	PWR	GCR	Subtotal
Reactor body	25	25	9	59
Reactor cooling system	66	167	9	242
Emergency core cooling system	14	8	0	22
Reactor auxiliary system	31	24	0	55
Instrumentation and control system	74	25	6	105
Fuel handling system	7	1	4	12
Radiation control facility	1	0	0	1
Disposal system	11	2	1	14
Reactor containment	5	1	0	6
Steam turbine system	52	25	7	84
Condensation and feedwater system	39	19	1	59
Electrical system	40	18	4	62
Plant common system	3	1	0	4
Ventilation system	4	1	0	5
Exhaust stack	2	3	0	5
Auxiliary boiler	6	0	0	6
Incidental facility	0	0	0	0
Others	10	2	5	17
Total	390	322	46	758

Table XIV-1-10 Components involved in Accident and Failure in Nuclear Power Plants

Classification	BWR	PWR	GCR	Subtotal
Pressure vessel	11	4	0	15
Fuel assembly	13	3	7	23
Reactor core internal	2	14	2	18
Steam generator (including boilers)	3	139	6	148
Pump	51	16	1	68
Motor	8	4	0	12
Valve	61	31	6	98
Pipe	63	35	2	100
Heat exchanger	8	8	0	16
Turbine	7	9	1	17
Condenser	1	1	1	3
Power generator	10	7	3	20
Transformer	5	3	0	8
Breaker	4	1	0	5
Control system	32	16	1	49
Power supply equipment	19	4	1	24
Converter	1	1	0	2
Relay	1	1	1	3
Sensor	15	2	0	17
Penetration	0	1	0	1
Recorder	2	1	0	3
crane	1	0	0	1
Others	62	19	9	90
No damage to equipment	10	2	5	17
Total	390	322	46	758

Table XIV-1-11 Causes of Accident and Failure in Nuclear Power Plants

Classification	BWR	PWR	GCR	Subtotal
Improper design	46	29	14	89
Improper manufacturing	66	121	5	192
Improper construction	33	24	6	63
Improper maintenance	113	40	13	166
Improper operation	8	7	1	16
Improper control	55	80	3	138
External factors	22	2	0	24
Natural deterioration	6	3	1	10
Others	37	15	3	55
Causes unknown. Under investigation.	4	1	0	5
Total	390	322	46	758

Table XIV-1-12 Operational Status When Accident and Failure Occurred in Nuclear Power Plants

Classification	BWR	PWR	GCR	Subtotal
During normal operation	228	95	35	358
During operation for adjustment	54	25	4	83
During a periodical inspection	85	186	6	277
During planned shutdown	5	5	1	11
During shutdown because of an accident	5	3	0	8
During construction or Commissioning Test	11	8	0	19
Others	2	0	0	2
Total	390	322	46	758

Table XIV-1-13 How Accident and Failure detected in Nuclear Power Plants

Classification	BWR	PWR	GCR	Subtotal
Activation of an alarm or a protection system	145	56	16	217
Central/field monitoring	78	43	11	132
Inspection patrol	77	38	9	124
Periodical testing	31	7	1	39
Periodical inspection or other inspections conducted during a reactor shutdown	32	163	3	198
During operation	17	10	4	31
Others	10	5	2	17
Total	390	322	46	758

XIV-1-4 Numbers of Reported Accident and Failure in Nuclear Power Plants

As of March 31, 2013

Name of founder	Power plant name (facility number)	Output (10,000 kW)	Date of the start of commercial operation	Fiscal Year																						
				1966	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
The Japan Atomic Power Company	Tokai	16.6	1966.7.25	13	6	4	2	0	1	0	0	0	0	0	1	0	1	0	1	0	1	2	1	3	1	3
	Tokai No. 2	110.0	1978.11.28													2	1	3	4	3	1	2	1	0	0	0
	Tsuruga Unit 1	35.7	1970.3.14				1	2	8	2	0	3	2	2	4	3	2	2	2	1	3	0	2	0	2	0
	Tsuruga Unit 2	116.0	1987.2.17																					1(1)	1	0
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	57.9	1989.6.22																							
	Tomari Unit 2	57.9	1991.4.12																							
	Tomari Unit 3	91.2	2009.12.22																							
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	52.4	1984.6.1																			0	1	0	1	0
	Onagawa Unit 2	82.5	1995.7.28																							
	Onagawa Unit 3	82.5	2002.1.30																							
	Higashidori Unit 1	110.0	2005.12.8																							
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	46.0	1971.3.26					0	1	4	1	1	1	5	2	2	3	1	2	2	2	0	2	0	0	0
	Fukushima Daiichi Unit 2	78.4	1974.7.18									2	2	5	2	1	1	2	2	0	1	1	0	1	0	0
	Fukushima Daiichi Unit 3	78.4	1976.3.27										0	5	2	1	1	1	0	1	0	0	0	0	0	1
	Fukushima Daiichi Unit 4	78.4	1978.10.12													1	1	2	0	0	1	0	1	0	0	0
	Fukushima Daiichi Unit 5	78.4	1978.4.18													0	0	0	2	3	1	0	1	2	1	1
	Fukushima Daiichi Unit 6	110.0	1979.10.24														0	1	1	3	1	0	0	1	0	0
	Fukushima Daini Unit 1	110.0	1982.4.20																6(6)	0	0	2	0	1	1	0
	Fukushima Daini Unit 2	110.0	1984.2.3																		0	0	1	0	0	0
	Fukushima Daini Unit 3	110.0	1985.6.21																				1	0	0	3
	Fukushima Daini Unit 4	110.0	1987.8.25																						0	0
	Kashiwazaki-Kariwa Unit 1	110.0	1985.9.18																				0	0	0	0
	Kashiwazaki-Kariwa Unit 2	110.0	1990.9.28																							
	Kashiwazaki-Kariwa Unit 3	110.0	1993.8.11																							
	Kashiwazaki-Kariwa Unit 4	110.0	1994.8.11																							
	Kashiwazaki-Kariwa Unit 5	110.0	1990.4.10																							
	Kashiwazaki-Kariwa Unit 6	135.6	1996.11.7																							
	Kashiwazaki-Kariwa Unit 7	135.6	1997.7.2																							
Chubu Electric Power Co., Inc.	Hamaoka Unit 1	54.0	1976.3.17										1	1	3	1	2	1	1	0	0	0	0	0	2	1
	Hamaoka Unit 2	84.0	1978.11.29													0	0	1	1	0	0	0	0	0	1	2
	Hamaoka Unit 3	110.0	1987.8.28																						0	0
	Hamaoka Unit 4	113.7	1993.9.3																							
	Hamaoka Unit 5	138.0	2005.1.18																							

Hokuriku Electric Power Co.	Shika Unit 1	54.0	1993.7.30																							
	Shika Unit 2	120.6	2006.3.15																							
The Kansai Electric Power Co., Inc.	Mihama Unit 1	34.0	1970.11.28					1	3	1	2	1	0	0	0	0	0	0	4	1	1	0	0	0	0	0
	Mihama Unit 2	50.0	1972.7.25							2	2	3	0	1	0	0	3	0	0	2	1	1	0	1	1	0
	Mihama Unit 3	82.6	1976.12.1											0	1	2	1	1	0	0	3	1	2	1	1	1
	Takahama Unit 1	82.6	1974.11.14									3	1	3	0	2	2	2	0	1	1	1	2	1	1	1
	Takahama Unit 2	82.6	1975.11.14										0	0	2	3	2	0	2	2	2	2	0	2	1	2
	Takahama Unit 3	87.0	1985.1.17																			1(1)	0	0	1	1
	Takahama Unit 4	87.0	1985.6.5																				0	0	0	0
	Ohi Unit 1	117.5	1979.3.27													1(1)	5	4	5	2	3	0	1	2	2	2
	Ohi Unit 2	117.5	1979.12.5														0	2	2	4	1	4	1	0	1	2
	Ohi Unit 3	118.0	1991.12.18																							
	Ohi Unit 4	118.0	1993.2.2																							
The Chugoku Electric Power Co.,	Shimane Unit 1	46.0	1974.3.29								0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
	Shimane Unit 2	82.0	1989.2.10																							0
Shikoku Electric Power Co., Inc.	Ikata Unit 1	56.6	1977.9.30												0	2	1	1	0	0	1	0	1	1	0	0
	Ikata Unit 2	56.6	1982.3.19																0	0	0	0	0	0	0	0
	Ikata Unit 3	89.0	1994.12.15																							
Kyushu Electric Power Co., Inc.	Genkai Unit 1	55.9	1975.10.15										1(1)	0	0	1	0	0	1	1	2	1	1	2	1	1
	Genkai Unit 2	55.9	1981.3.30															1(1)	0	0	0	0	0	0	0	0
	Genkai Unit 3	118.0	1994.3.18																							
	Genkai Unit 4	118.0	1997.7.25																							
	Sendai Unit 1	89.0	1984.7.4																		1(1)	0	0	0	0	0
	Sendai Unit 2	89.0	1985.11.28																				0	0	0	2
Total				13	6	4	3	3	13	9	5	13	8(1)	24	17	22(1)	26	25(1)	36(6)	26	27(1)	18(1)	19	19(1)	19	23
Number of reactor units				1	1	1	2	4	4	5	6	8	12	13	14	19	21	22	23	24	25	28	32	33	35	36
Average number of accidents (per reactor)				13	6	4	1.5	0.8	3.3	1.8	0.8	1.6	0.6	1.8	1.2	1.1	1.2	1.1	1.3	1.1	1.0	0.6	0.6	0.5	0.5	0.6

Notes: 1. Figures in parentheses are the numbers of accidents in trial operation or when a reactor was being constructed and are included in the above figures.

2. The number of reactor plants are the number of operating reactor plants in each fiscal year.

3. The number of accidents per reactor was calculated from the number of reactor units in commercial operation and the number of accidents reported at these facilities.

4. The licensed output of Unit-5 at the Hamaoka Nuclear Power Station of the Chubu Electric Power Co., was changed from 1,267 MW to 1,380 MW on February 23, 2007.

5. The licensed output of Unit-2 at the Shika Nuclear Power Station of the Hokuriku Electric Power Co. was changed from 1,358 MW to 1,206 MW on June 5, 2008.

As of March 31, 2013

Name of founder	Power plant name (facility number)	Output (10,000 kW)	Date of the start of commercial operation	Fiscal Year																								
				89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
The Japan Atomic Power Company	Tokai	16.6	1966.7.25	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
	Tokai No. 2	110.0	1978.11.28	1	1	0	0	1	0	0	1	1	0	3	1	0	1	0	0	1	0	0	1	2	3	0	1	35
	Tsuruga Unit 1	35.7	1970.3.14	1	1	1	0	3	1	0	3	1	0	1	0	0	1	1	1	0	0	0	1	2	0	0	0	59
	Tsuruga Unit 2	116.0	1987.2.17	1	1	0	0	0	0	0	1	0	0	1	0	0	1	1	1	0	1	1	2	0	0	0	0	13(1)
Hokkaido Electric Power Co., Inc.	Tomari Unit 1	57.9	1989.6.22	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	0	7
	Tomari Unit 2	57.9	1991.4.12			1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	3
	Tomari Unit 3	91.2	2009.12.22																					1(1)	0	0	0	1(1)
Tohoku Electric Power Co., Inc.	Onagawa Unit 1	52.4	1984.6.1	0	1	0	1	1	0	0	1	0	0	1	0	0	0	0	1	0	0	1	1	0	1	1	2	14
	Onagawa Unit 2	82.5	1995.7.28						1(1)	1	0	1	0	0	0	2	1	0	0	0	1	0	0	0	1	0	0	8(1)
	Onagawa Unit 3	82.5	2002.1.30													0	0	0	0	0	0	1	0	1	0	0	0	2
	Higashidori Unit 1	110.0	2005.12.8																	0	0	0	0	0	0	0	0	0
Tokyo Electric Power Co., Inc.	Fukushima Daiichi Unit 1	46.0	1971.3.26	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	2	0	1	0	0	38
	Fukushima Daiichi Unit 2	78.4	1974.7.18	0	1	1	2	0	0	0	0	0	0	0	1	0	0	0	1	2	1	0	0	0	0	0	0	29
	Fukushima Daiichi Unit 3	78.4	1976.3.27	0	2	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0	19
	Fukushima Daiichi Unit 4	78.4	1978.10.12	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	9
	Fukushima Daiichi Unit 5	78.4	1978.4.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	0	15
	Fukushima Daiichi Unit 6	110.0	1979.10.24	0	0	0	2	0	0	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	13
	Fukushima Daini Unit 1	110.0	1982.4.20	2	1	1	2	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	2	0	0	21(6)
	Fukushima Daini Unit 2	110.0	1984.2.3	1	0	0	0	0	0	0	0	1	0	1	0	2	1	0	0	1	0	1	0	0	1	1	0	11
	Fukushima Daini Unit 3	110.0	1985.6.21	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	10
	Fukushima Daini Unit 4	110.0	1987.8.25	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	1	0	0	7
	Kashiwazaki-Kariwa Unit 1	110.0	1985.9.18	0	0	0	1	0	0	0	0	2	0	0	0	1	0	0	2	0	0	1	0	0	0	0	1	8
	Kashiwazaki-Kariwa Unit 2	110.0	1990.9.28		1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
	Kashiwazaki-Kariwa Unit 3	110.0	1993.8.11					0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	3
	Kashiwazaki-Kariwa Unit 4	110.0	1994.8.11						1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4
	Kashiwazaki-Kariwa Unit 5	110.0	1990.4.10		0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	4
	Kashiwazaki-Kariwa Unit 6	135.6	1996.11.7							1(1)	1(1)	0	1	1	1	1	0	0	0	0	0	2	1	0	0	0	0	9(2)
	Kashiwazaki-Kariwa Unit 7	135.6	1997.7.2									1(1)	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3(1)
Chubu Electric Power Co., Inc.	Hamaoka Unit 1	54.0	1976.3.17	0	1	0	0	0	1	1	0	0	0	0	0	2	0	0	1	0	0	2	0	0	0	0	0	21
	Hamaoka Unit 2	84.0	1978.11.29	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7
	Hamaoka Unit 3	110.0	1987.8.28	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	5
	Hamaoka Unit 4	113.7	1993.9.3					0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	3
	Hamaoka Unit 5	138.0	2005.1.18																0	0	1	1	2	0	0	1	0	5

Hokuriku Electric Power Co.	Shika Unit 1	54.0	1993.7.30					0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
	Shika Unit 2	120.6	2006.3.15																	1(1)	0	0	0	1	1	0	0	3(1)
The Kansai Electric Power Co., Inc.	Mihama Unit 1	34.0	1970.11.28	1	0	1	1	3	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	1	0	0	1	26
	Mihama Unit 2	50.0	1972.7.25	0	2	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	0	1	0	1	0	0	0	25
	Mihama Unit 3	82.6	1976.12.1	1	1	0	1	1	1	2	0	0	0	0	2	0	1	0	1	0	0	0	0	0	0	0	0	25
	Takahama Unit 1	82.6	1974.11.14	1	1	1	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
	Takahama Unit 2	82.6	1975.11.14	0	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	28
	Takahama Unit 3	87.0	1985.1.17	1	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	0	0	0	1	0	11(1)
	Takahama Unit 4	87.0	1985.6.5	1	0	0	0	0	0	0	0	0	0	2	1	1	0	1	1	0	0	0	2	1	0	1	0	11
	Ohi Unit 1	117.5	1979.3.27	2	1	1	0	1	0	0	0	0	0	0	1	0	0	1	3	0	0	1	0	0	0	0	0	38(1)
	Ohi Unit 2	117.5	1979.12.5	1	0	2	1	0	2	2	1	0	2	1	0	0	0	0	0	0	0	2	0	0	0	0	0	31
	Ohi Unit 3	118.0	1991.12.18			0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2
	Ohi Unit 4	118.0	1993.2.2				0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
The Chugoku Electric Power Co., Inc.	Shimane Unit 1	46.0	1974.3.29	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	2	0	0	0	0	11
	Shimane Unit 2	82.0	1989.2.10	1	2	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6
Shikoku Electric Power Co., Inc.	Ikata Unit 1	56.6	1977.9.30	1	1	1	0	1	1	1	1	0	0	0	2	0	0	0	1	0	1	0	0	0	2	0	0	20
	Ikata Unit 2	56.6	1982.3.19	0	0	0	1	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	6
	Ikata Unit 3	89.0	1994.12.15						0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	3
Kyushu Electric Power Co., Inc.	Genkai Unit 1	55.9	1975.10.15	1	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17(1)
	Genkai Unit 2	55.9	1981.3.30	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	6(1)
	Genkai Unit 3	118.0	1994.3.18					1(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2(1)
	Genkai Unit 4	118.0	1997.7.25									0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
	Sendai Unit 1	89.0	1984.7.4	0	0	2	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	1	1	0	0	0	0	11(1)
	Sendai Unit 2	89.0	1985.11.28	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4
Total				22	24	20	20	17(1)	14(1)	14(1)	14(1)	14(1)	14	17	19	11	8	11	20	15(1)	15	23	23	15(1)	16	8	6	758(19)
Number of reactor units				37	39	41	42	46	48	49	50	52	51	51	51	52	52	52	53	55	55	55	53	54	54	54	54	1569
Average number of accidents (per reactor)				0.6	0.6	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.2	0.2	0.2	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.1	0.1	0.5

Notes: 1. Figures in parentheses are the numbers of accidents in trial operation or when a reactor was being constructed and are included in the above figures.
2. The number of reactor plants are the number of operating reactor plants in each fiscal year.
3. The number of accidents per reactor was calculated from the number of reactor units in commercial operation and the number of accidents reported at these facilities.
4. Accident (the event of tritium release outside the controlled area in the Fukushima-Daiichi on August 11,2006) in Fukushima-Daiichi Unit-4.
5. Accident (the event of overflow of water to the operating floors of the reactor building in the Kashiwazaki-Kariwa on July 25,2007) in Kashiwazaki-Kariwa Unit 1.
6. Accident (the event of cracks found in the pass-through section of the common exhaust stack of Unit 1 and 2 in the Hamaoka on November 27,2007) in Hamaoka Unit 1.
7. Accident in the Fukushima-Daiichi in March 11,2011is temporary summarized one in Fukushima-Daiichi Unit 1.
8. Accident (the event of Unit 3・4 in the Fukushima-Daini in March 27,2012) in Fukushima-Daini Unit 3.
9. The licensed output of Unit-5 at the Hamaoka Nuclear Power Station of the Chubu Electric Power Co., was changed from 1,267 MW to 1,380 MW on February 23, 2007.
10. The licensed output of Unit-2 at the Shika Nuclear Power Station of the Hokuriku Electric Power Co. was changed from 1,358 MW to 1,206 MW on June 5, 2008.

XIV-1-5 Overview of Accident and Failure at Nuclear Power Plants

	Date of occurrence	Power plant	Overview	Page showing the relevant press release
1	Apr. 4, 2012	Tohoku Electric Power Co., Inc. Onagawa Power Station Unit 1	On April 4, when the unit was shut down for a periodic inspection, the electric motor for emergency cooling seawater pump (A)automatically stopped, and emergency cooling seawater pump (C) automatically started. Subsequent inspection of the failed motor for pump (A) revealed that its insulation resistance was significantly low presumably because of failure in the electric system and this caused pump (A) to stop. An investigation was conducted to determine the cause, and the results are as follows: • The grease cap of the motor, which was replaced for upgrading, was not firmly tightened when the motor was shipped from the factory and installed on site. After the motor was installed, rain water entered through the gap of the grease cap, and caused rust in the motor. • The likely cause of the automatic stop of the motor was that: when rain water flowed in and fretted the stator coil of the motor, part of the coil short-circuited and this spread to other parts of the coil, resulting in a ground fault. • The oil level meter for the grease tank was found to be over the upper limit in September 2012, but a high oil level was considered to pose no problems, and no action was taken. (The investigation revealed that the oil level had exceeded the upper limit as rain water had flowed in the oil tank.)	283 to 290
2	Jun. 7, 2012	Tohoku Electric Power Co., Inc. Onagawa Power Station Unit 1	On June 7, when the unit was shut down for a periodic inspection, part of the wheel bearing of the traveling unit of the overhead crane installed in the reactor building was found to be damaged and it was concluded that the crane failed to provide its necessary function. An investigation of the cause is underway.	291 to 294
3	Nov. 30, 2012	The Japan Atomic Power Company Co., Ltd. Tokai No. 2 Power Station	On November 30, when the liquid waste, produced in the cement solidification equipment test at Tokai No. 2 Power Station, was put in a plastic container and carried to Tokai Power Station, a small amount of water, which contained radioactive materials, was dropped on the ground of the premises (non-controlled area) of Tokai No. 2 Power Station. An investigation was conducted to determine the cause, and the results are as follows: • The licensee did not check the detail procedure of carrying the plastic container containing liquid waste, provided by the contractor, on the assumption that the contactor would take necessary measures, such as the use of a leakproof basket for preventing the liquid from dropping on the ground, based on the contractor's good record of work in other sections of the plant. • As a similar example, sample water containing radioactive materials leaked in a non-controlled area during transportation in March 2012 at Fukushima Daini Nuclear Power Station of Tokyo Electric Power Co., Inc. The container used for transportation did not meet the technical standard in the regulation of transport of nuclear fuel outside the plant, but there is no adequate study on the possibility of the same incident during transportation inside the plan. The idea about necessity for lessons learned of other sites was insufficient for the executives and the members of the trouble prevention committee. • The contractor was aware of waterdrops on the surface of the plastic container during the transportation of the liquid waste of cleaning, but did not check the cause, and only replaced the plastic container without reporting to the licensee.	295 to 302
4	Dec. 12, 2012	Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station Unit 5	On October 16, when the fuel assembly channel box was inspected at Unit 5 of Kashiwazaki-Kariwa Nuclear Power Station, a bent water rod was found in two fuel assemblies. Detailed inspection of these fuel assemblies using a fiberscope on December 12 revealed that some fuel rods were in contact with each other, and the fuel assemblies failed to provide their necessary function. An investigation of the cause is underway.	303 to 305

	Date of occurrence	Power plant	Overview	Page showing the relevant press release
5	Feb. 6, 2013	The Kansai Electric Power Co., Inc., Mihama Power Station Unit 1	On February 5, when smoke was emitted around the turbocharger during the test of emergency diesel generator A at Unit 1 of Mihama Power Station, the operator manually stopped the generator. Subsequent visual observation of the generator on February 6 revealed partial damage on the turbine rotor, and it was concluded that the emergency diesel generator failed to provide its necessary function. An investigation was conducted to determine the cause, and the results are as follows: • A dedicated support for tightening the locknut of the turbocharger had not been used since the overhaul of the equipment at the 22nd periodic inspection in 2006. The force of tightening the locknut was not sufficient during the inspection at the 23rd periodic inspection in 2008 because of an unstable condition, such as the compressor blades held by the hand, in violation of the instruction in the maintenance manual. • The emergency diesel generator was operated under this condition, causing an imbalance between the exhaust side (turbine blades) and admission side (compressor blades) with the slippage produced between the compressor blade and shaft gradually increased, and because of the direction of tightening the locknut coincided with the direction of rotation of the compressor. This caused overspeed of the shaft and turbine blades, and an excessive stress caused by the centrifugal force, resulting in a breakage of the weld of the turbine blade and shaft and damaging the turbine blade.	306 to 312
6	Mar. 19, 2013	Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station Unit 1	As a result of bent water rods were found at Unit 5 of Kashiwazaki-Kariwa Nuclear Power Station (The 4th incident of this table), as mentioned above, the fuel assemblies at Unit 1 were inspected, and inspection on March 19 revealed that some fuel rods were in contact with each other, and the fuel assemblies failed to provide their necessary function. An investigation of the cause is underway.	313 to 315

XIV-1-6　Press Releases on Accident and Failure at Nuclear Power Plants

List of press releases in FY 2012

	Date of release	Title	Page
1	2012/4/4	We received the report on the failure of a seawater pump in the emergency cooling seawater system of Unit-1 of the Onagawa Nuclear Power Station owned by Tohoku Electric Power Company	283
	2012/5/16	Report on the causes of and countermeasures for the failure of a seawater pump in the emergency cooling seawater system of Unit-1 of the Onagawa Nuclear Power Station owned by Tohoku Electric Power Company has been received and checked.	286
2	2012/6/7	We received the report on the failure of a traveling section of the reactor building overhead crane of Unit-1 of the Onagawa Nuclear Power Station owned by Tohoku Electric Power Company	291
		(Press-unannounced issues concerning cause measures)	
3	2012/11/30	We received a report on the leakage of radioactive material in the non-radiation controlled area at the Tokai No.2 Power Station owned by The Japan Atomic Power Company	295
	2013/3/6	Assessment of the report from The Japan Atomic Power Co. on the leak of cleaning waste water outside the controlled area of Tokai No. 2 Power Station	298
4	2012/12/12	We received a report on the contact of fuel rods in the fuel assembly of Unit 5 of the Kashiwazaki-Kariwa Nuclear Power Station owned by the Tokyo Electric Power Company.	303
		(Unevaluated issues concerning cause measures)	
5	2013/2/6	We received a report on the failure of an emergency diesel generator at the Mihama Power Station owned by the Kansai Electric Power Company	306
	2013/5/8	Assessment of the report from the Kansai Electric Power Co., Inc. on the failure of an emergency diesel generator at Unit 1, Mihama Power Station	309
6	2013/3/19	We received a report on the contact of fuel rods in the fuel assembly of Unit 1 of the Kashiwazaki-Kariwa Nuclear Power Station owned by the Tokyo Electric Power Company.	313
		(Unevaluated issues concerning cause measures)	

We received the report on the failure of a seawater pump in the emergency cooling seawater system of Unit-1 of the Onagawa Nuclear Power Station owned by Tohoku Electric Power Company

April 4, 2012
NISA/METI

Today (April 4, 2012), Nuclear and Industrial Safety Agency (NISA) received a report from Tohoku Electric Power Company in accordance with the "law for the regulation of nuclear source material, nuclear fuel material and reactors" regarding the failure of a seawater pump in the emergency cooling seawater system of Unit-1 of the Onagawa Nuclear Power Station (BWR, rated electric power: 520MWe), which was under shutdown for the periodic inspection at the time.

This event did not cause an environmental impact due to radioactive materials.

1. Main points of the report from Tohoku Electric Power Company

Unit 1 of the Onagawa Nuclear Power Station was under shutdown for the periodic inspection. At 9:32, today (April 4), a motor for a seawater pump(*) (A) in the emergency cooling seawater (ECSW) system automatically stopped, which caused a seawater pump (C) in ECSW system automatically to start.

As a result of an investigation into why the pump motor stopped, it was confirmed that the insulation resistance had significantly decreased.

Therefore, it was concluded that some sort of failure occurred in the motor and the pump in ECSW system could not operate.

*1: A pump that lifts up seawater to cool an emergency diesel generator or emergency air conditioning system.

2. Effects of this event on plant safety

In this event, it was confirmed that one seawater pump in ECSW system became unavailable. However, there are 4 seawater pumps in the system and the pump that automatically started was normally operating. Therefore, this event does not affect plant safety immediately.

In addition, this event did not cause an environmental impact due to radioactive materials.

3. Actions taken by NISA

When the event occurred, local nuclear safety inspectors rushed to the site to confirm plant safety.

The report was received by NISA in accordance with article 62-3 of the "law for the regulation of nuclear source material, nuclear fuel material and reactors" and article 19-17 of the "rules for the installation and operation, etc. of commercial power reactors."

In accordance with all applicable laws, NISA will continue to rigorously check the investigation into the causes of and corresponding countermeasures against possible recurrence of the event, as carried out by the company.

(Results of provisional INES (*) event rating)

Criterion 1	Criterion 2	Criterion 3	Level
-	-	0-	0-

Rating basis: In this event, the reactor was under cold shutdown and the reactor and other systems were stably cooled by other systems. As the event did not challenge safety requirements of the facility, the rating was judged as INES level 0- "no safety significant events."

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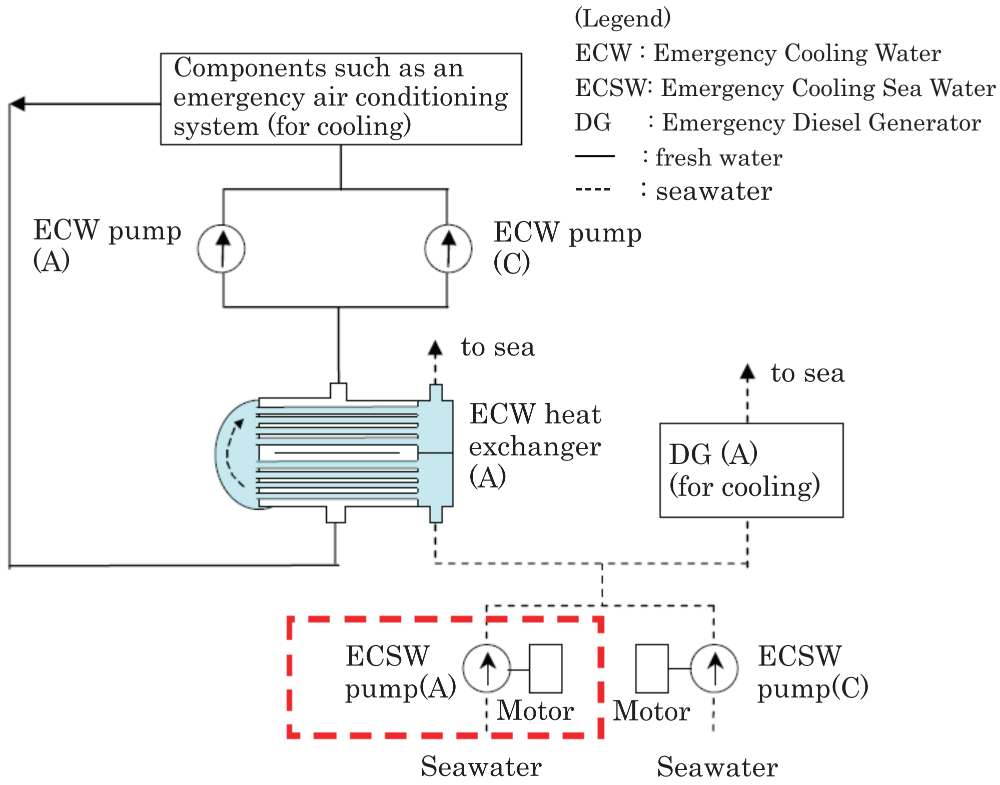
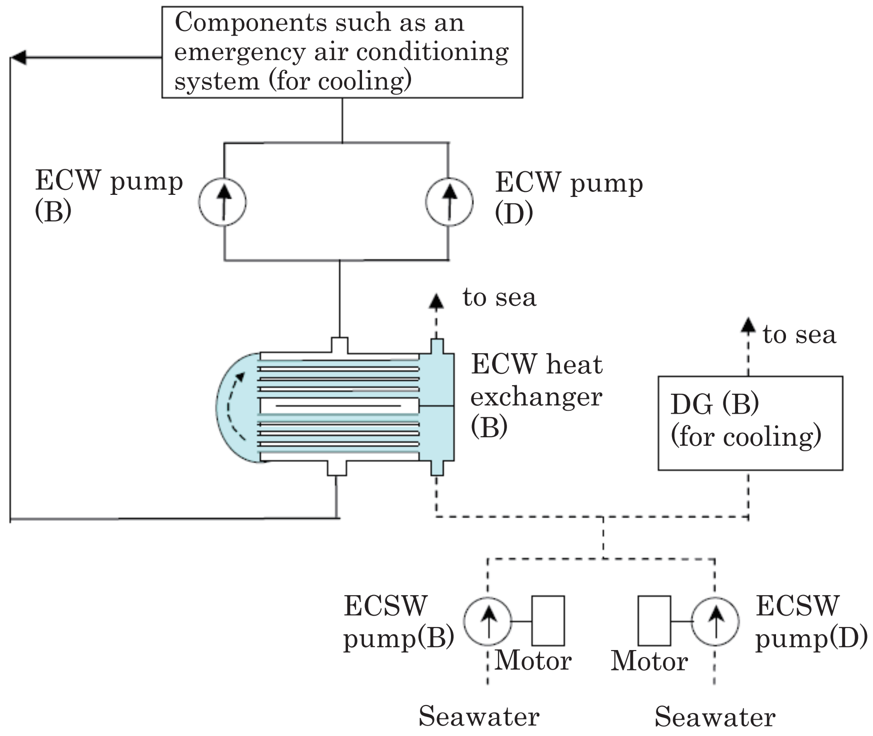
(*) Evaluation under the INES User's Manual 2008 Edition

INES (International Nuclear and Radiological Event Scale) is an indicator used to promptly communicate the safety significance of a reported nuclear and radiological incident or accident. Events are evaluated based on 3 rating criteria (namely, criterion 1: people and the environment, criterion 2: radiological barriers and controls at facilities, and criterion 3: defense in depth) and the highest level among 3 ratings is adopted as the INES rating level of the event. The INES levels range from Level 0 (no safety significance) to Level 7 (major accident) , Below scale/Level 0 are events without safety significance. Level 0 is classified into Level 0+ (event having a possibility to challenge the safety requirement) and Level 0- (event having no possibility to challenge the safety requirement).



Emergency Cooling Seawater (A) System



Emergency Cooling Seawater (B) System

Schematic Diagram of the Emergency Cooling Seawater System

Report on the causes of and countermeasures for the failure of a seawater pump in the emergency cooling seawater system of Unit-1 of the Onagawa Nuclear Power Station owned by Tohoku Electric Power Company has been received and checked.

May 16, 2012

NISA/METI

On April 4, 2012, the Nuclear and Industrial Safety Agency (NISA) received a report from Tohoku Electric Power Company in accordance with the "law for the regulation of nuclear source material, nuclear fuel material and reactors" regarding the failure of a seawater pump in the emergency cooling seawater system of Unit-1 of the Onagawa Nuclear Power Station (BWR, rated electric power: 520 MWe), which was under shutdown for periodic inspection at the time. (reported on April 4, 2012)

This is to inform you that a report on causes and countermeasures was received from the company today (May 16, 2012).

Concerning the contents of the report from the company, the causes were suitably surmised from various studies of causes and the corrective measures are based on the assumed causes. NISA therefore thinks that the contents of the report are generally valid.

The implementation of measures to prevent recurrence by the company will be rigorously confirmed in the future through safety inspections etc.

1. Effects of this event on plant safety

In this event, it was confirmed that one seawater pump (*1), which is important for safety, in the emergency cooling seawater (ECSW) system became unavailable. However, there are 4 seawater pumps in the system, and the pump that automatically started was normally operating. In addition, this event did not cause an environmental impact due to radioactive materials. Therefore, this event does not affect plant safety immediately.

*1: A pump that lifts up seawater to cool an emergency diesel generator or emergency air-conditioning system.

2. Main points of the report from Tohoku Electric Power Company

The report from Tohoku Electric Power Company primarily consisted of the following:

(1) Results of the investigation of the causes, and assumed causes

- During the factory shipment and the field installation work associated with the replacement (carried out from Feb. 2008 to May 2009) of the motor of a seawater pump (A) in the ECSW system, a filler cap of the lubricant oil tank was not sufficiently tightened.
- Therefore, rainwater etc. intruded into the tank through the gap of the concerned filler cap after the motor was installed, and subsequently, rust generated in the motor (see Attachment-1).
- A short circuit was formed in a part of coils because rainwater etc. and rust attached to the stator coil of the concerned motor, and propagated to other parts of coils. Subsequently, grounding occurred and the pump automatically stopped (see Attachment-2).
- Although it was confirmed in September 2010 that the readings of the oil level gauge of the lubricant oil for the concerned motor exceeded the upper limit, it was judged that no problem could occur as long as the oil level was higher, and special action was not taken. (In this investigation, it was confirmed that the higher oil level was due to intrusion of rainwater etc.)

(2) Measures for preventing recurrence

- Concerning a motor installed outside a building, it should be confirmed that the filler cap is adequately tightened before the factory shipment and the field work (installation, overhauling of a pump, etc.), and this should be clarified in a work procedure manual as a confirmation item. (It has already been confirmed that there was no abnormality in the 24 motors installed outside a building, as with the concerned motor, at the Onagawa Nuclear Power Station Units 1, 2, and 3.)

-Confirmation of the readings of a lubricant oil level gauge of the motor bearings should be clarified in the check sheet for regular inspection as confirmation items. And workers should be continuously educated about the risk anticipated in the case of a higher oil level.

3. Action taken by NISA

Concerning the contents of the report from Tohoku Electric Power Co., the causes were suitably surmised from various studies of causes and the corrective measures are based on the assumed causes. NISA therefore thinks that the contents of the report are generally valid.

The implementation of measures to prevent recurrence by Tohoku Electric Power Co. will be rigorously confirmed in the future through safety inspections etc.

In addition, the implementation of measures to prevent recurrence at other nuclear power plants will be rigorously confirmed through safety inspections etc.

(For reference)

1. Summary of this event

Unit 1 of the Onagawa Nuclear Power Station was under shutdown for the periodic inspection. At 9:32, on April 4, 2012, a motor of a seawater pump (A) in the emergency cooling seawater system automatically stopped, which caused a seawater pump (C) in ECSW system automatically started.

As a result of an investigation into why the pump motor stopped, it was confirmed that the insulation resistance had significantly decreased.

Therefore, it was concluded that some sort of failure occurred in the motor and the pump in ECSW system could not operate.

2. Results of provisional INES (*) event rating

Criterion 1	Criterion 2	Criterion 3	Level
-	-	0-	0-

Rating basis: In this event, the reactor was under cold shutdown and the reactor and other systems were stably cooled by other systems. As the event did not challenge safety requirements of the facility, the rating was judged as INES level 0- “no safety significant events.”

(*) Evaluation under the INES User’s Manual 2008 Edition

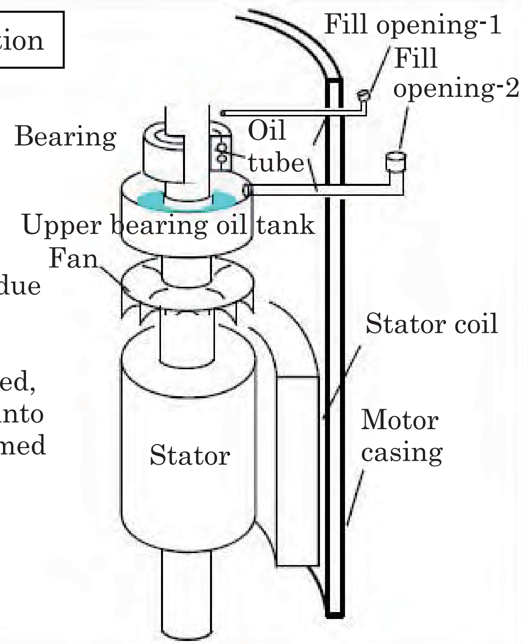
INES (International Nuclear and Radiological Event Scale) is an indicator used to promptly communicate the safety significance of a reported nuclear and radiological incident or accident. Events are evaluated based on 3 rating criteria (namely, criterion 1: people and the environment, criterion 2: radiological barriers and controls at facilities, and criterion 3: defense in depth) and the highest level among 3 ratings is adopted as the INES rating level of the event. The INES levels range from Level 0 (no safety significance) to Level 7 (major accident) and Level 0 is classified into Level 0+ (event having a possibility to challenge the safety requirement) and Level 0- (event having no possibility to challenge the safety requirement).

Mechanism that rain water etc. intruded into the motor

1. Configuration at the installation

- Oil is injected into the tank through the fill opening-1
- Oil is supplied from the upper bearing oil tank to the bearing due to the rotation of the motor.

If a filler cap is normally tightened, rain water etc. does not intrude into the tank. However, it was confirmed that the filler cap-2 was not sufficiently tightened.

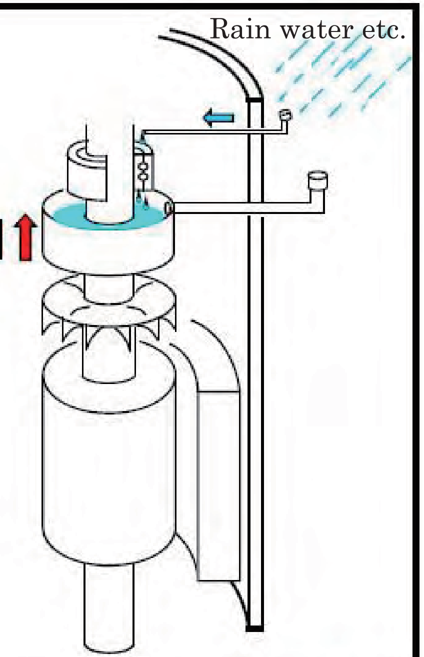


2. Intrusion of rain water etc.

(1) Rain water etc. slowly intruded through the filler cap-2 which was not sufficiently tightened.

Rise of the oil level

(2) Intruded rain water etc. remained in the upper bearing oil tank and subsequently oil level rose.

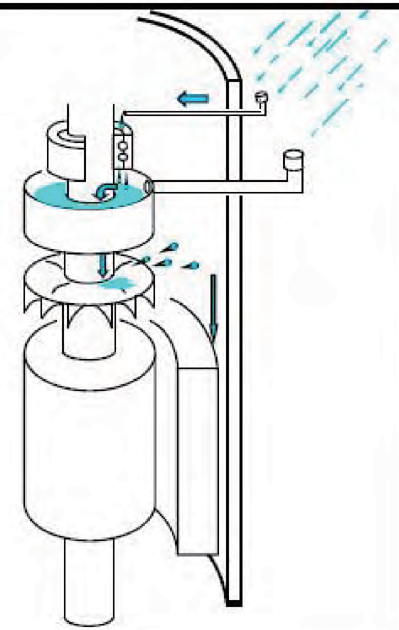


3. Overflow of mixed water from the upper bearing oil tank

(3) Mixed water of rain water etc. and oil overflowed from the upper bearing oil tank because oil level

(4) Mixed water moved down on the motor shaft remained on the upper side of the fan.

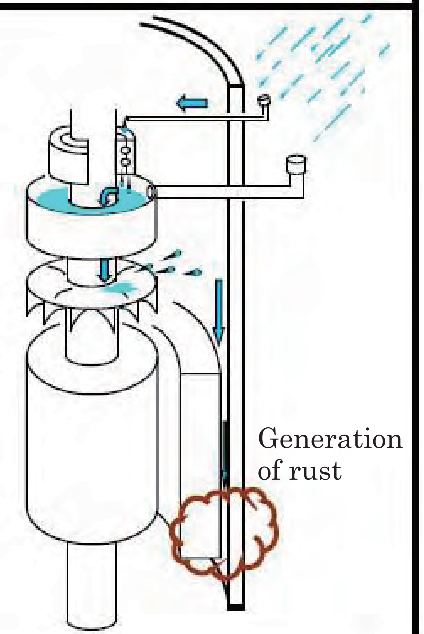
(5) Motor started and the fan rotated, causing mixed water to be scattered.



4. Generation of rust

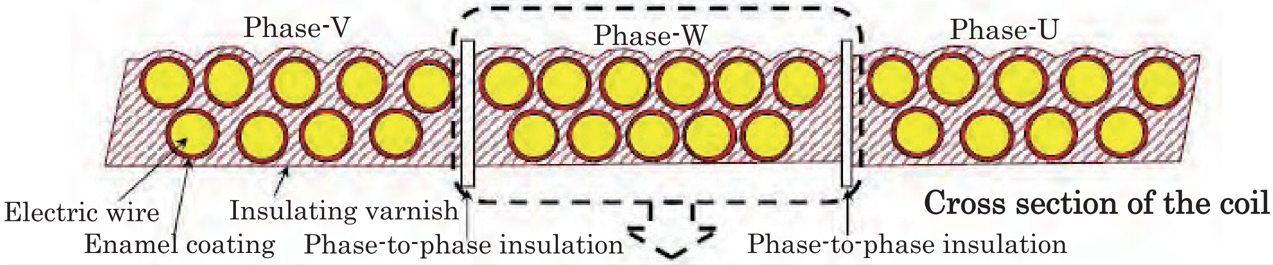
(6) Scattered mixed water moved down on the motor casing.

(7) Mixed water generated rust inside the motor.

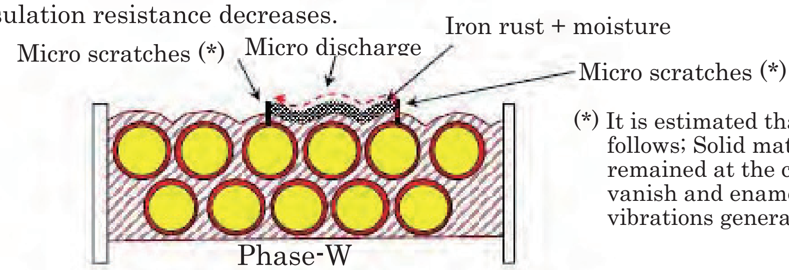


(Attachment-2)

Explanation on the occurrence of short

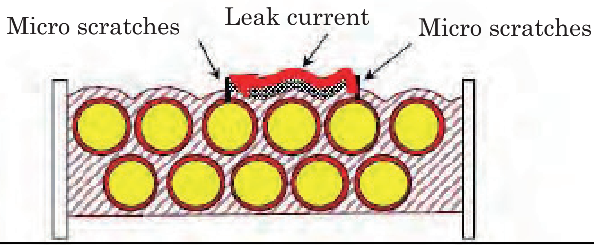


1. Iron rust and moisture attached to the coil-end and insulation resistance decreases on the surface of insulating vanish. As the damaged part was burnt, cause investigation is not possible. However, the cause of decrease in the insulation resistance is assumed as follows;
   (1) Micro discharge between "iron rust + moisture" and micro-scratches (*) started through the surface of insulating vanish.
   (2) Insulating vanish and enamel coating deteriorated (carbonized) due to micro discharges, and insulation resistance decreases.

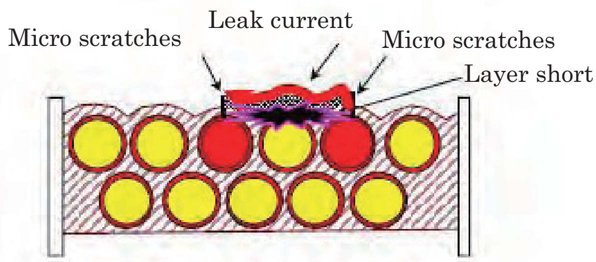


(*) It is estimated that micro scratches generated as follows; Solid material including iron rust remained at the coil-end and damaged insulating vanish and enamel coating due to long term vibrations generated by motor operation.

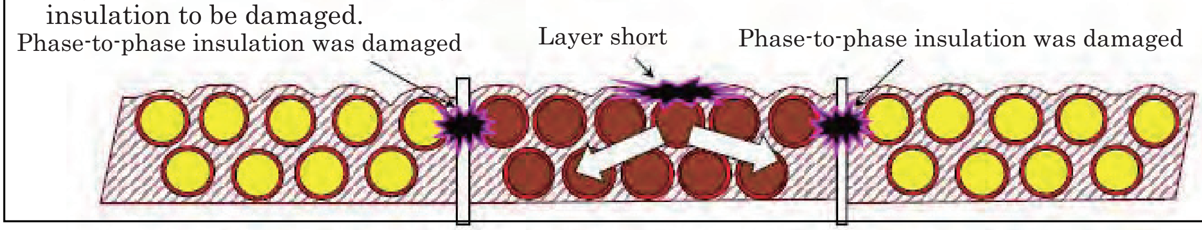
2. Carbonization proceeded due to the continuous micro discharges and insulating vanish and enamel coating were damaged due to leak current.



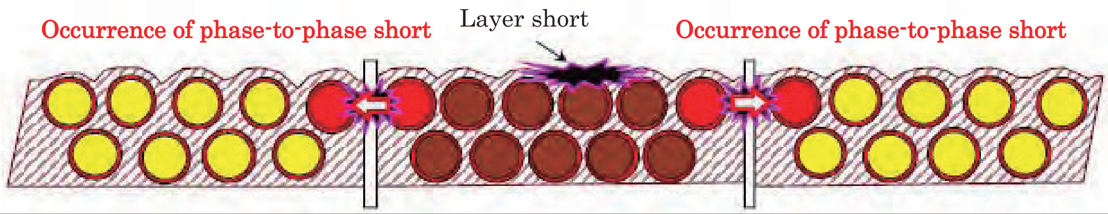
3. Damages of insulating vanish and enamel coating proceeded and it is assumed that layer short occurred.



4. Layer short occurred and damage of electrical insulation spread, which caused phase-to-phase insulation to be damaged.



5. It is assumed that the phase-to-phase insulation was damaged and phase-to-phase short occurred.



We received the report on the failure of a traveling section of the reactor building overhead crane of Unit-1 of the Onagawa Nuclear Power Station owned by Tohoku Electric Power Company

June 7, 2012
NISA/METI

Today (June 7, 2012), Nuclear and Industrial Safety Agency (NISA) received a report from Tohoku Electric Power Company in accordance with the "law for the regulation of nuclear source material, nuclear fuel material and reactors" regarding the failure of a traveling section of the reactor building overhead crane of Unit-1 of the Onagawa Nuclear Power Station (BWR, rated electric power: 524MWe), which was under shutdown for the periodic inspection at the time.

This event did not cause an environmental impact owing to radioactive materials.

1. Main points of the report from Tohoku Electric Power Company

Unit 1 of the Onagawa Nuclear Power Station was under shutdown for the periodic inspection. As a result of an inspection of the reactor building overhead crane (*1), it was confirmed that a bearing of a wheel of one traveling section of the crane failed at one traveling section of the overhead crane. Therefore, it was concluded that the overhead crane did not have necessary functions.

*1: This crane is used for lifting a containment vessel head, reactor vessel head, fuel assemblies etc. during the periodic inspection.

2. Effects of this event on plant safety

In this event, it was confirmed that a traveling section of the reactor building overhead crane, which is a type of equipment for safety, failed, and it was concluded that the overhead crane is not operable. However, fuel assemblies are not to be handled using the overhead crane at the moment. Therefore, this event does not affect plant safety immediately.

3. Actions taken by NISA

When the event occurred, local nuclear safety inspectors rushed to the site to confirm plant safety.

The report was received by NISA in accordance with article 62-3 of the "law for the regulation of nuclear source material, nuclear fuel material and reactors" and article 19-17 of the "rules for the installation and operation, etc. of commercial power reactors."

In accordance with all applicable laws, NISA will continue to scrupulously check the investigation into the causes of and corresponding countermeasures against possible recurrence of the event, as carried out by the company.

(Results of provisional INES (*) event rating)

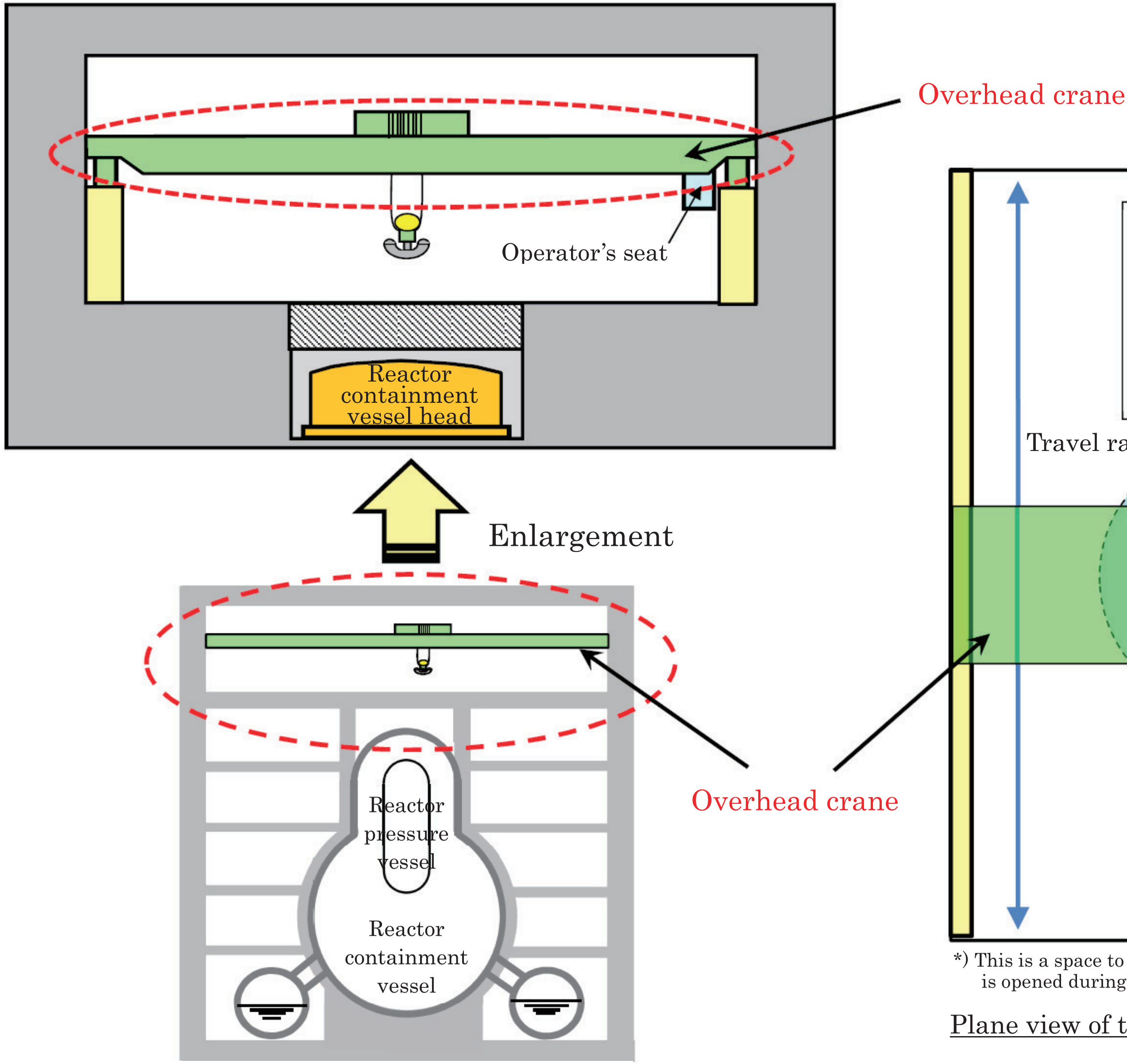
Criterion 1	Criterion 2	Criterion 3	Level
-	-	-	-

Rating basis: In this event, the reactor building overhead crane was confirmed not to be operable under the condition that no lifting work is conducted. As the event did not have relation with the nuclear facility, the rating was judged as "out of scale."

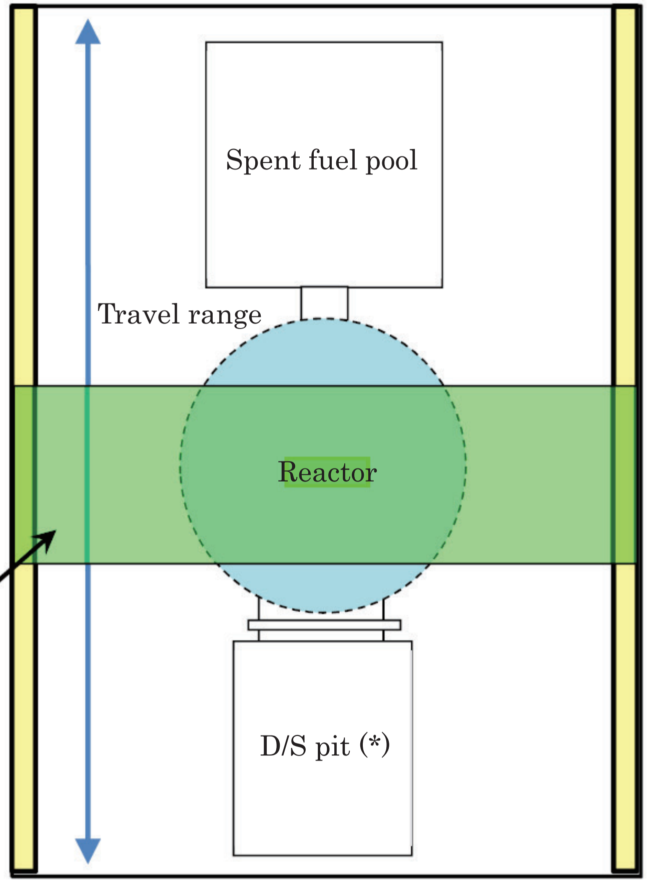
(*) Evaluation under the INES User's Manual 2008 Edition

INES (International Nuclear and Radiological Event Scale) is an indicator used to promptly communicate the safety significance of a reported nuclear and radiological incident or accident. Events are evaluated based on 3 rating criteria (namely, criterion 1: people and the environment, criterion 2: radiological barriers and controls at facilities, and criterion 3: defense in depth) and the highest level among 3 ratings is adopted as the INES rating level of the event. The INES levels range from Level 0 (no safety significance) to Level 7 (major accident). However, if the event does not have relation with safety of the nuclear facility, the rating is judged as “out of scale.”.

Attachment-1



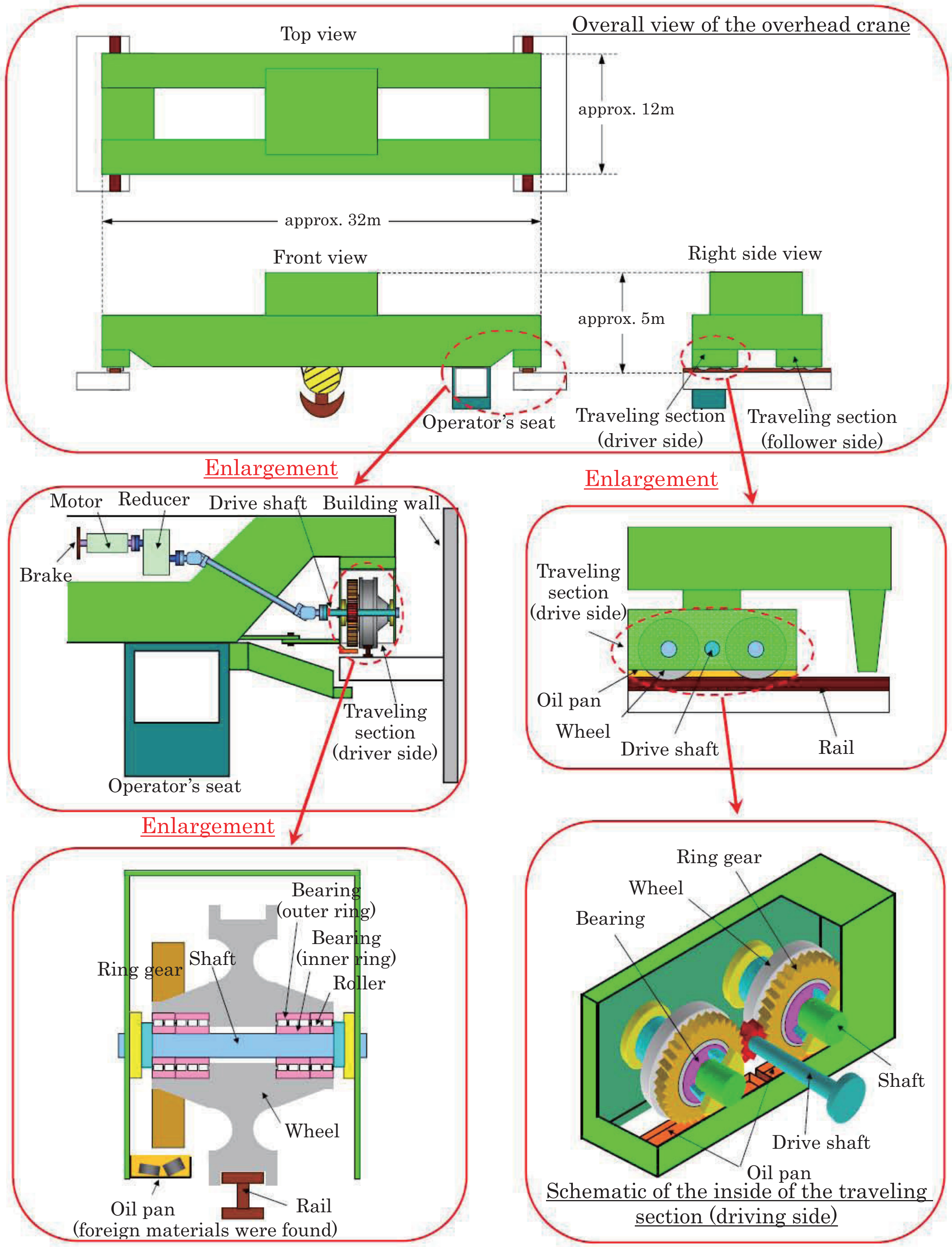
Cross- section of the reactor building



*) This is a space to store the reactor internals when the reactor is opened during the periodic inspection etc.

Plane view of the 5th floor of the reactor building

Layout of the reactor building overhead crane of the Onagawa Unit-1



Photograph of the damaged
bearing(inner and outer rings))

Photograph of the damaged
bearing(roller)

Schematic structure of the overhead crane traveling section

We received a report on the leakage of radioactive material in the non-radiation controlled area at the Tokai No.2 Power Station owned by The Japan Atomic Power Company

November 30, 2012
NRA

> Today (November 30), the Nuclear Regulation Authority (NRA) received reports from The Japan Atomic Power Company (JAPC) regarding the leakage of radioactive material in the non-radiation controlled area at the Tokai No.2 Power Station in accordance with the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Nuclear Reactors."
> There was no impact on the environment from this event.

1. Main points of the report from JAPC

Today (November 30), it was confirmed that liquid waste spilled in the site (non-radiation controlled area) of the Tokai No.2 Power Station when liquid waste generated by testing the cement condensation and solidification facility (*1) in the Tokai No.2 Power Station is put into polyethylene tanks and they are transported to the Tokai Power Station.

A slight amount (27Bq/cm3) of radioactive material was detected in the spilled water by the radioactivity measurement.

Therefore, JAPC judged that water containing radioactive material leaked in the non-radiation controlled area and reported to NRA.

*1: This is a facility for in-drum cement solidification of radioactive waste that is generated in the Tokai and Tokai No.2 Power Stations.

2. Effects of this event on plant safety

In this event, liquid waste containing radioactive material leaked in the non-radiation controlled area. According to the JAPC's investigations, leakage is very slight and leakage point is zoned and access to the point is limited immediately after the discovery of the leakage.

No abnormal changes in readings were observed in the monitoring posts. There was no impact on the environment from radioactive materials, and no workers were exposed to radiation.

3. Actions taken by NRA

After the event was reported to NRA by JAPC, local nuclear safety inspectors rushed to the site and continued to check the JAPC's response including actions taken.

The report was received by NRA in accordance with Article 62-3 of the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Nuclear Reactors." NRA will continue to rigorously check the investigation into the cause of and corresponding countermeasures against possible recurrence of the event,

(Results of provisional INES (*) event rating)

Criterion 1	Criterion 2	Criterion 3	Level
-	-	0-	0-

Rating basis: In this event, radioactive material leaked in the non-radiation controlled area in the Station. Leakage is very slight and there is no impact on plant safety.
Therefore, the rating was judged as INES level 0- "event having no possibility of impact on plant safety."

XIV

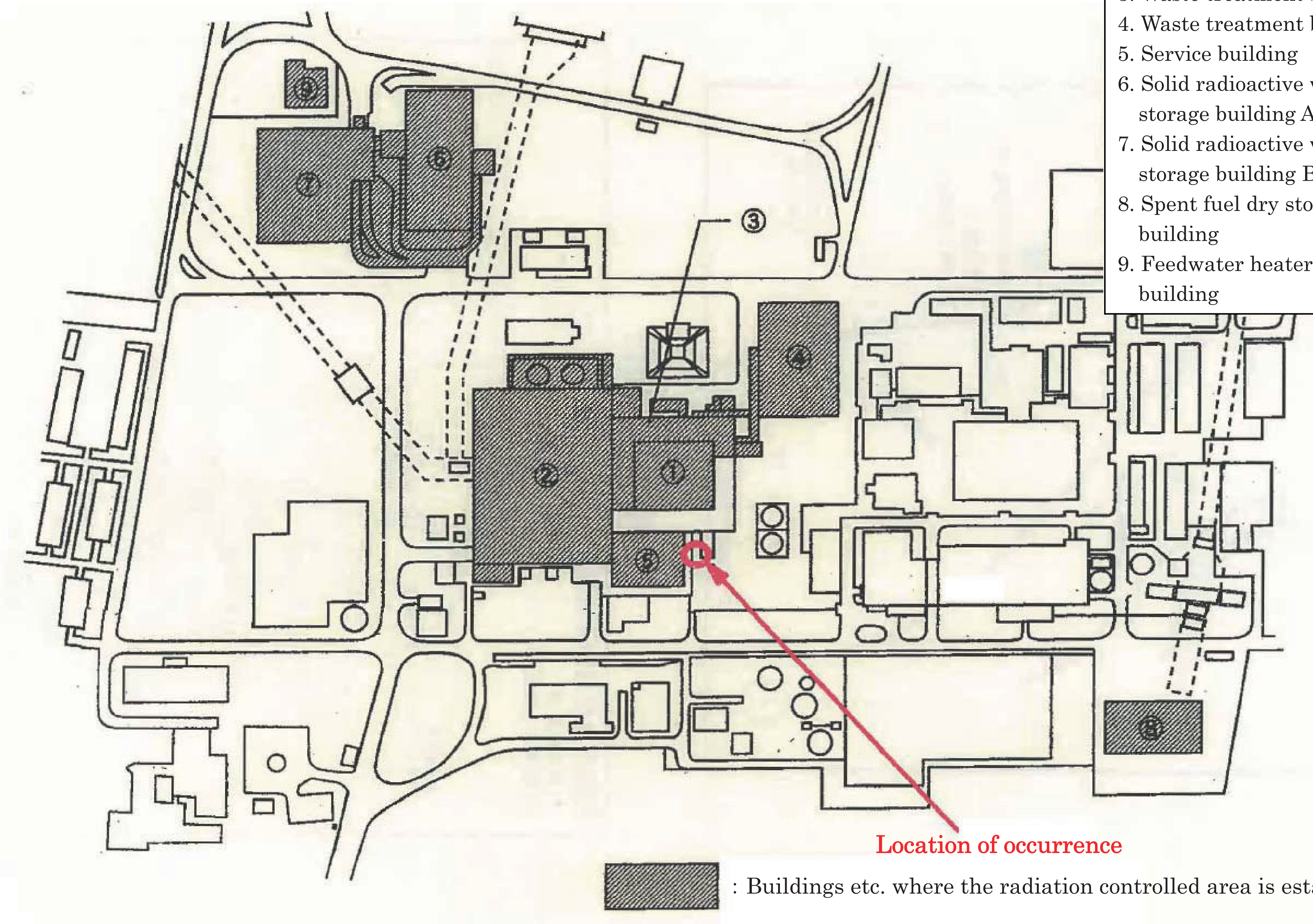
(*) Evaluation under the INES User's Manual 2008 Edition
INES (International Nuclear and Radiological Event Scale) is an indicator used to promptly communicate the safety significance of a reported nuclear and radiological incident or accident. Events are evaluated based on three rating criteria (namely, criterion 1: people and the environment, criterion 2: radiological barriers and controls at facilities, and criterion 3: defense in depth) and the highest level among 3 ratings is adopted as the INES rating level of the event. The INES levels range from Level 0 (no safety significance) to Level 7 (major accident) and Level 0 is classified into Level 0+ (event having a possibility of impact on plant safety) and Level 0- (event having no possibility of impact on plant safety) for nuclear power stations.

＜Reference＞
Attachment: Overall diagram of the controlled area in the Tokai No.2 Power Station

(Attachment)

Overall diagram of the controlled area in the Tokai No.2 Power Station

1. Reactor building
2. Turbine building
3. Waste treatment building
4. Waste treatment building
5. Service building
6. Solid radioactive waste storage building A
7. Solid radioactive waste storage building B
8. Spent fuel dry storage building
9. Feedwater heater storage building



: Buildings etc. where the radiation controlled area is established

XIV

Assessment of the report from The Japan Atomic Power Co. on the leak of cleaning liquid waste outside the controlled area of Tokai No. 2 Power Station

March 6, 2013
Nuclear Regulation Authority

1. Description

On November 30, 2012, the cleaning liquid waste, produced in the cement mixture solidification equipment*1 test at The Tokai No. 2 Power Station of The Japan Atomic Power Co. ("JAPCO"), and put in a plastic container for transport to the Tokai Power Station*2, spilled on the premises (non-controlled area).

As a small amount of radioactive material (2.2 Bq/cm^2) was detected on the ground where the liquid waste leaked, the Nuclear Regulation Authority was notified of the incident from JAPCO on the same day in accordance with the provision of Article 62-3 of the Reactor Regulation Act.

On February 15, the Nuclear Regulation Authority received a report from JAPCO explaining the cause of incident and counteractions taken, and examined the report in detail to provide an assessment.

Report from JAPCO: http://www.nsr.go.jp/activity/bousai/trouble/20130215-1.html

*1 The equipment is used for packing into a drum and solidifying radioactive wastes produced in the Tokai Power Station and Tokai No. 2 Power Station, which share the equipment.

*2 The cleaning liquid waste produced in the solid waste treatment at the Tokai Power Station is reused as additive water for cement solidification process, or if not reused, processed in the relevant facility in the plant. The cleaning liquid waste in question was produced in the trial operation, and carried back to the original location of production (Tokai Power Station) because of a long interval of time to the next cement solidification. Until then, the liquid waste was transported to the Tokai Power Station three times, with the latest transport in FY 2009. Transport is not planned next fiscal year.

2. Outline of the report from JAPCO

The report submitted by JAPCO is outlined below.

(1) Circumstances

The cleaning liquid waste was put in a plastic container for transport to the Tokai Power Station, and leaked from the plastic container, which was not sealed, to the plastic bag on the way due to vibration in transport. When it was temporarily put on the concrete passage way in a non-controlled area, the liquid waste which had leaked in the plastic bag spilled over the passage way through the holes on the bag produced due probably to the friction with the rough surface of concrete.

(2) Main result of cause investigation and probable cause

[The probable cause by JAPCO's estimation]

We did not confirm the actual method of transport by the contractor using a plastic container, on the assumption that the contractor would take necessary measures, such as the use of a leakproof basket, based on the contractor's good reputation in other sections of the plant.

In March 2012, a similar incident* took place in the Fukushima Daini Nuclear Power Station of Tokyo Electric Power Co., Inc. Sample water containing radioactive materials leaked in a non-controlled area during transport. The container used for transport did not meet the technical standard stipulated in the regulation of transport of nuclear fuel outside the plant, but there is no adequate study on the possibility of the same incident during transport inside the plant. The idea about necessity for lessons learned of other sites was insufficient for the executives and the members of the trouble prevention committee.

* The radioactive liquid waste that had leaked from the cap of an unsealed plastic container into the enclosing plastic bag spilled from the holes on the plastic bag during transport outside the plant.

[The probable cause by contractor‘s estimation]

The contractor was aware of waterdrops on the surface of the plastic bag during the transport of cleaning liquid waste in a controlled area, but did not check the cause, and only replaced the plastic bag without reporting to JAPCO.

* The JAPCO personnel claimed that an appropriate action would be taken to prevent leaks in a non-controlled area if the contractor had informed of waterdrops found in the controlled area during the interview by the NRA.

(3) Main actions to be taken

[Actions taken by JAPCO]

To correct the insufficient confirmation with the contractor, the work instruction check sheet was modified to clarify precautions for handling radioactive liquid waste outside the controlled area, which are reaffirmed in each work in a pre-operation briefing session, etc.

In addition, a manual containing specific warnings and cautions, such as the use of a container having a leak protection specification for transporting liquid radioactive materials, will be provided.

In regard to the questioning attitude, corrective measures should be taken in a nonconformity management meeting for "further" questioning the resemblance of work in addition to the cause and actions taken for incidents in other plants.

[Actions taken for the contractor]

To raise the awareness of the contractor as to the importance of handling radioactive materials, measures to be taken include the education of the contractor focusing on the case study on the issues of the incident in question, etc., preparation of an instructional text containing cautions in handling liquids, and repeated instruction for reinforcing the notion as regards to the handling of radioactive materials.

3. Assessment of the report and future approach

The incident in question is the leak of radioactive materials in a non-controlled area of the plant, but it does not affect the safety of the reactor facility because of a small amount of leak not in violation of the legal requirement for transport in Article 13 of Rules for the Installation, Operation, etc. of Commercial Nuclear Power Reactors (“Rule for Commercial Nuclear Power Reactors”).

* Item 2, paragraph 1, Article 13 of Rules for Commercial Nuclear Power Reactors (transport in the factory or plant) requires the use of a container to encapsulate nuclear fuel material for transport inside the plant, provided, however, this shall not apply when the concentration of radioactivity does not exceed the legal limit, and measures against scattering are taken.

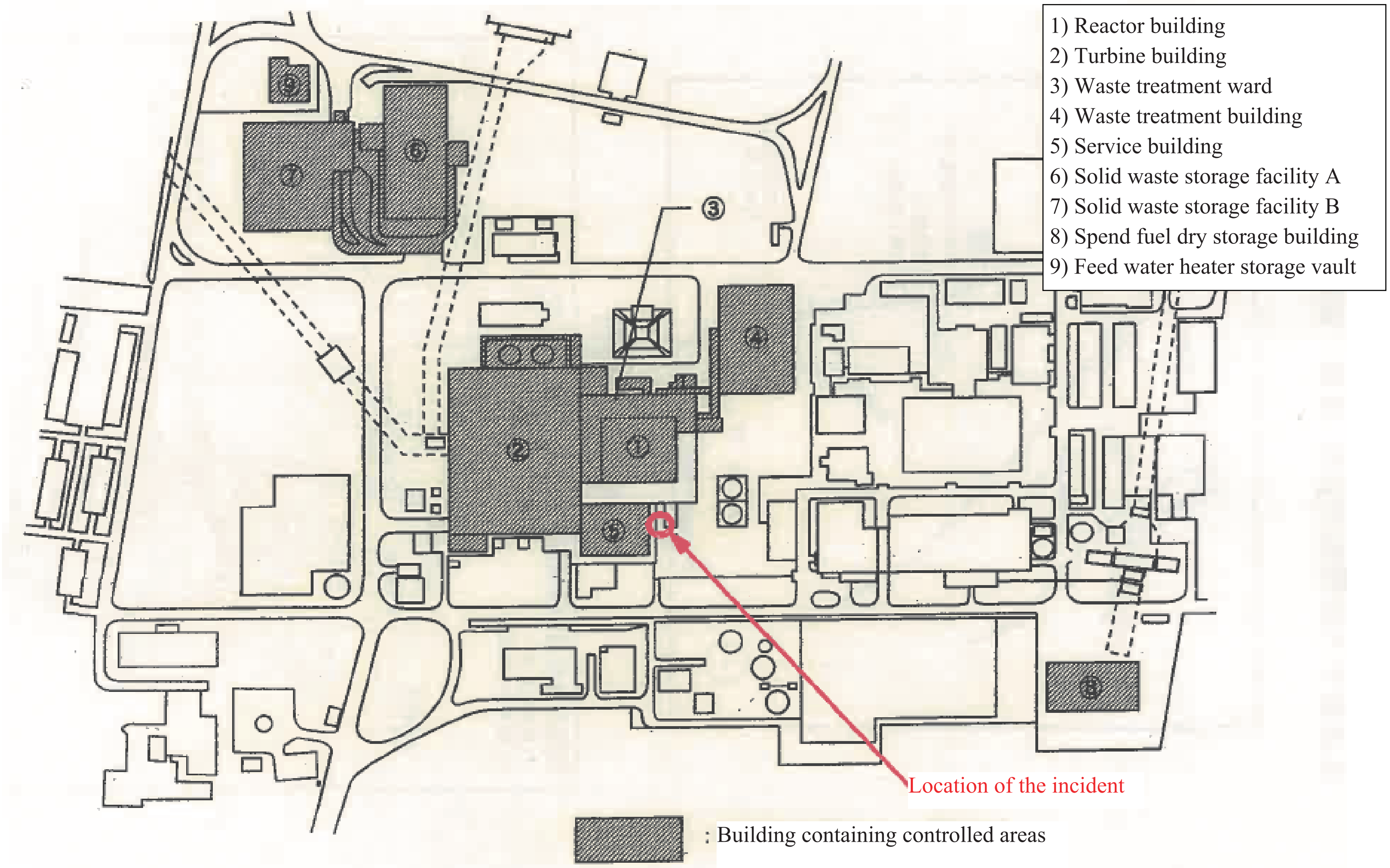
Thus the incident is not in violation of the above regulation, because radioactive material contained in the cleaning liquid waste in the plastic container in question is cesium 137 having a concentration of 2.7×10^{1} (Bq/cm^{3}), which is lower than the legal limit (6×10^{7} (Bq/g)), and scattering prevention measures were taken for the plastic container.

Contamination of a non-controlled area with radioactive materials is the problem of radiation control even if it is extremely small. Careful preparations and due attention are required to prevent leaks when radioactive materials are transported in a non-controlled area.

JAPCO studied details of this incident including preparations and operations with time, and interviewed related persons. In addition, we sought the direct cause, analyzed the root factor, and assured relevant measures to be taken.

When these measures are implemented, the similar incident will be prevented, contributing to increasing the safety in radiation control. The Nuclear Regulation Authority will keep track of the implementation of these measures through Operational Safety Inspection, etc.

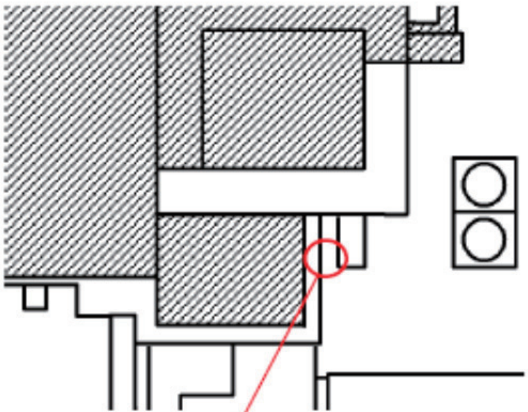
Overview of Controlled Areas in the Tokai No. 2 Power Station



(Reference 2)

Leak of cleaning liquid waste in the controlled area of Tokai No. 2 Power Station on February 15, 2013

Leak of cleaning liquid waste and packaging condition during transport



: Building containing controlled areas

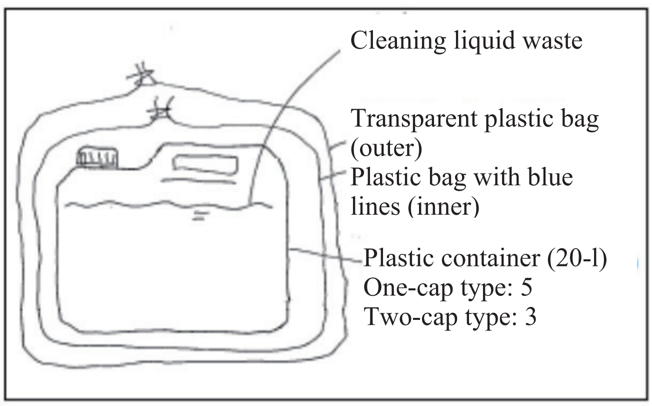
Trace of drops from the plastic container (approx. 5 × 5 cm)

[Transparent plastic bag]

Plastic bag used in the power station

[Plastic bag with blue lines]

Thick plastic bag used in the controlled area



Packaging condition

We received a report on the contact of fuel rods in the fuel assembly of Unit 5 of the Kashiwazaki-Kariwa Nuclear Power Station owned by the Tokyo Electric Power Company.

December 12, 2012
NRA

> Today (December 12), the Nuclear Regulation Authority (NRA) received reports from the Tokyo Electric Power Company (TEPCO) regarding the contact of fuel rods in the fuel assembly at Unit 5 of the Kashiwazaki-Kariwa Nuclear Power Station, in accordance with the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Nuclear Reactors" (hereinafter called "Reactor Regulation Act").
> There was no impact on the environment from this event.

1. Main points of the report from TEPCO

On October 16, when channel boxes of the fuel assemblies were inspected at Unit 5 of the Kashiwazaki-Kariwa Nuclear Power Station, it was found that water rods (*1) of two fuel assemblies were bent. As a result of detailed inspection of these two fuel assemblies using a fiber scope, it was found that some fuel rods were in contact with each other. Therefore, today (December 12), TEPCO reported this event to NRA as a reportable event in accordance with the "Reactor Regulation Act."

*1: This is a hollow tube installed in the center of the fuel assembly in parallel with fuel rods. By passing water through the tube, the output inside the fuel assembly is optimized.

2. Effects of this event on plant safety

In this event, it was estimated that a fuel rod was bent due to bent fuel assembly water rod and was in contact with the adjacent fuel rod. The concerned fuel assemblies were stably cooled in the spent fuel pool and no leakage from the fuel rod was confirmed.

No abnormal changes in readings were observed in the electric conductivity of the spent fuel pool water and area monitors installed around the pool. There was no impact on the environment from radioactive materials, and no workers were exposed to radiation.

3. Actions taken by NRA

On October 19, 2012, NRA instructed TEPCO to conduct an investigation into the cause of and corresponding countermeasures against possible recurrence of the event, and the NRA has been checking the investigation status of TEPCO. And local nuclear safety inspectors confirmed plant safety and TEPCO's response including actions taken at the site.

The NRA will continue to rigorously check the investigation into the cause of and corresponding countermeasures against possible recurrence of the event.

(Results of provisional INES (*) event rating)

Criterion 1	Criterion 2	Criterion 3	Level
-	-	1	1

Rating basis: In this event, some fuel rods were in contact with each other due to deformation of water rods caused by application of excessive load to the fuel assemblies. Although there was no leakage of radioactive materials, the core was loaded in abnormal configuration and the defense in depth principle was confirmed to be degraded. Therefore, the rating was judged as INES level 1 "deviation."

(*) Evaluation under the INES User's Manual 2008 Edition

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＜Reference＞

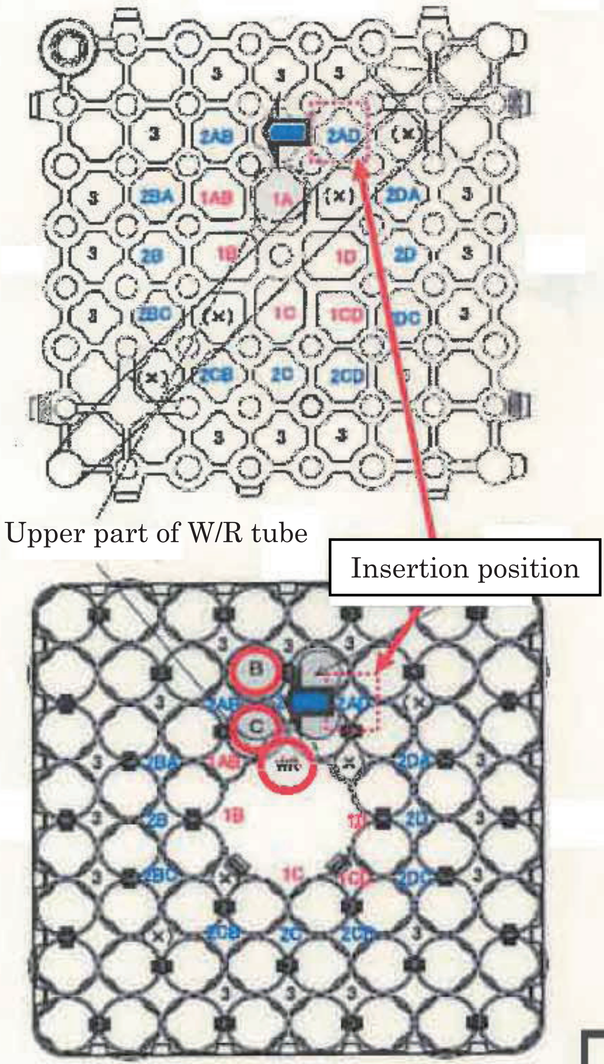
Attachment: Results of a fiberscope investigation (between upper tie plate and top spacer)

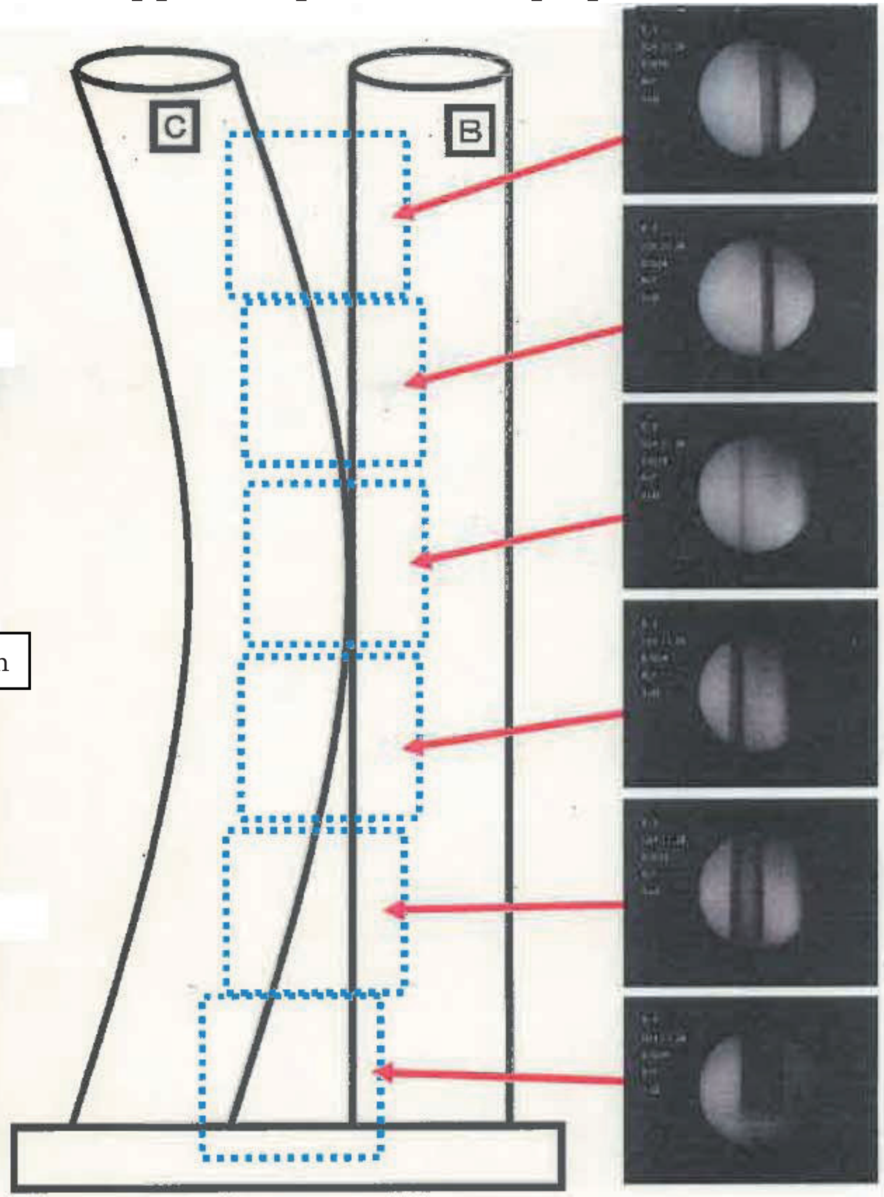
(Attachment)

Results of the fiberscope investigation (between upper tie plate and top spacer)

- **Investigation date**
  Nov.24, 2012
- **Objective rod**
  K5D34
- **Insertion position**
  2AD (8th span)

View direction of a fiberscope





XIV

We received a report on the failure of an emergency diesel generator at the Mihama Power Station owned by the Kansai Electric Power Company

February 6, 2013
NRA

Today (February 6), the Nuclear Regulation Authority (NRA) received reports from the Kansai Electric Power Company (KEPCO) regarding the failure of an emergency diesel generator (EDG) at the Mihama Power Station Unit-1 in accordance with the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Nuclear Reactors."
This event did not have an impact on the environment.

1. Main points of the report from KEPCO

On February 5, 2013, it was confirmed that smoke emitted from around a turbocharger (*1) and CO_2 fire extinguishing equipment (smoke-detection type) operated during the load test of the EDG-A at the Mihama Power Station Unit-1. Therefore, EDG-A was manually shutdown.

On February 5 and 6, as a result of a visual observation, many metallic pieces were found under the turbocharger and it was confirmed that an outlet flange of the turbocharger had come away and an opening had been made. As a result of an observation of the inside of the turbocharger by means of a fiberscope camera, it was confirmed that a part of a turbine rotor (*2) had failed. Therefore, it was judged that the EDG-A could not achieve its intended function.

*1 Turbocharger: This is an air compressor used to force air into a diesel engine.
*2 Turbine rotor: This is a rotating structure that integrates the turbine's blades and shaft.

2. Effects of this event on plant safety

In this event, the failure of the EDG-A became apparent. As another EDG was on standby, this event was not immediately considered to have an impact on plant safety.

No abnormal changes in readings were observed in the monitoring posts. There was no impact on the environment from radioactive materials, and no workers were exposed to radiation.

3. Actions taken by NRA

After the event was reported to NRA by KEPCO, local nuclear safety inspectors rushed to the site and continued to check the KEPCO's response including actions taken.

The report was received by NRA in accordance with Article 62-3 of the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material." The NRA will continue to rigorously check the investigation into the cause of and measures to prevent recurrence of the event.

(Results of provisional INES (*) event rating)

Criterion 1	Criterion 2	Criterion 3	Level
-	-	0-	0-

Rating basis: In this event, the reactor was under shutdown and another EDG was operable. There was no impact on plant safety. Therefore, the rating was judged as INES level 0- "event having no possibility of impacting plant safety."

(*) Evaluation under the INES User's Manual 2008 Edition
INES (International Nuclear and Radiological Event Scale) is an indicator used to promptly communicate the safety significance of a reported nuclear and radiological incident or accident. Events are evaluated based on three rating criteria (namely, criterion 1: people and the

environment, criterion 2: radiological barriers and controls at facilities, and criterion 3: defense in depth) and the highest level among 3 ratings is adopted as the INES rating level of the event. The INES levels range from Level 0 (no safety significance) to Level 7 (major accident) and Level 0 is classified into Level 0+ (event having a possibility of impact on plant safety) and Level 0- (event having no possibility of impact on plant safety) for nuclear power stations.

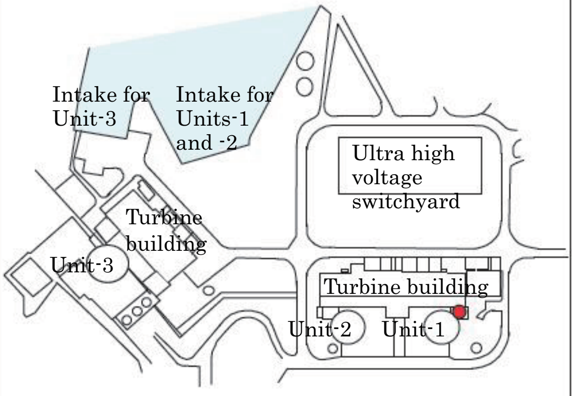
＜Reference＞

Attachment: Failure of the turbocharger of the EDG-A at the Mihama Power Station Unit-1

(Attachment)

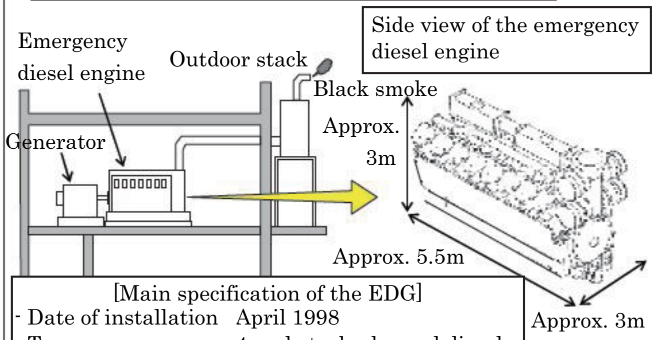
Failure of the supercharger of the emergency diesel generator (EDG)-A at the Mihama Power Station Unit-1

Layout of the power station



Location of occurrence: DG room

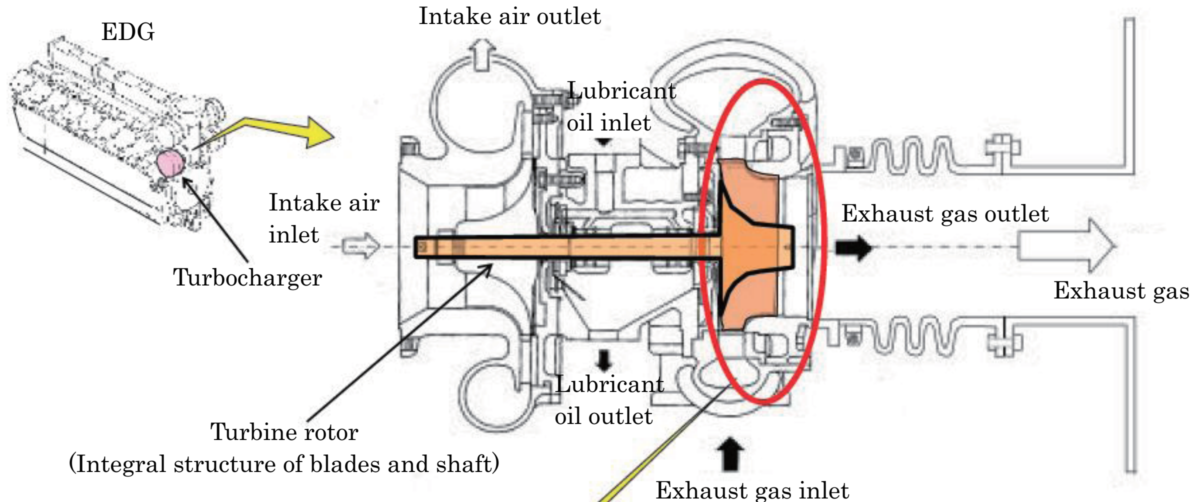
Cross-sectional view of the EDG room



[Main specification of the EDG]

- Date of installation	April 1998
- Type	4-cycle turbocharged diesel engine with an air cooler
- Rated output	4,460PS
- Rated speed	1,200rpm
- Generator's capacity	3,120kW

Detail view of the EDG turbocharger

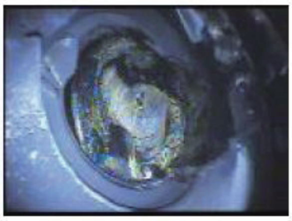


Check of the EDG turbocharger

<Opening of the flange>

Flange and expansion joint came away

<Internal observation by a fiberscope>



Turbine rotor seems to have failed

<Metallic pieces found around the turbocharger>

Assessment of the report from the Kansai Electric Power Co., Inc. on the failure of an emergency diesel generator at Unit 1, Mihama Power Station

May 8, 2013
Nuclear Regulation Authority

1. Description

On February 5, 2013, when a regular load test was conducted on an emergency diesel generator ("emergency DG") installed at Unit 1 of the Mihama Power Station, the Kansai Electric Power Co., Inc. ("KEPCO"), its electric output decreased and black smoke was emitted from the exhaust stack, resulting in the manual shutdown of the DG.

The subsequent visual inspection on February 6 by KEPCO revealed damage on the turbine rotor (a structure composed of blades and a shaft) of one of four superchargers*1. The Nuclear Regulation Authority was notified of the incident from KEPCO on the same day in accordance with the provision of Article 62-3 of the Nuclear Reactor Regulation Act.

On March 18, the Nuclear Regulation Authority received a report from KEPCO explaining the cause of accident and counteraction taken, and examines the report in detail to provide an assessment.

Report from KEPCO: http://www.nsr.go.jp/activity/bousai/trouble/data/20130318-1-02.pdf

*1 A supercharger is designed to transmit compressed combustion air produced from exhaust gas to the diesel engine for increasing output.

2. Outline of the report from KEPCO

The report submitted by KEPCO is outlined below.

(1) Result of cause investigation and probable cause

[Result of cause investigation]

- Detailed inspection of the supercharger confirmed damage on the turbine blade and breakage of the welded joint of the turbine blade and the shaft. Electron microscopy of the damaged portion identified fractured surface (dimpled surface) probably as a result of being torn off by an excessive force.
- Traces of sliding in the forward direction were found on the compressor blade in touch with the shaft, and the locknut for securing the compressor blade and shaft was not firmly tightened.
- The investigation of the loose locknut revealed some facts that the place of overhauling the equipment had been changed from the manufacturer's factory to the installation site from the 22nd periodical inspection in 2006, and a dedicated support used before the change had no longer been used. In the 23rd periodic inspection in 2008, during which the supercharger in question was inspected, the compressor blade was placed vertically and held by the hand when the locknut was tightened, that is, unlike the instruction in the maintenance manual *2, the work was done in a quite unstable condition. In our test for reproducing the tightening work, a reduction in tightening force was confirmed when the locknut was tightened in the same condition.

XIV

- From the very beginning, the thread cutting of the locknut was designed to turn in the same direction of supercharger revolution (the loosening direction of the locknut is identical to the direction of revolution).

*2 The maintenance manual is referred to by the employees of the manufacturer responsible for the on-site overhaul. The work instruction of KEPCO stipulates that the overhaul work is to be carried out in accordance with the maintenance manual and on-site instructor's advice, suggesting that the work procedure could be changed in the discretion of the person in charge on site.

[Probable cause]

- A dedicated support was not used for tightening the locknut of the supercharger in the overhaul from the 22nd periodic inspection in 2006, and the force of tightening the locknut was insufficient because the work was done in an unstable condition such as holding the compressor blade by the hand, unlike the instruction in the maintenance manual.
- The emergency DG was operated in this state, during which a slippage between the compressor blade and the shaft took place, in combination with the thread cutting of the locknut designed to turn in the same direction as that of supercharger revolution, and this gradually grew to the extent that the balance between the exhaust side (turbine blades) and admission side (compressor blades) was no longer able to be maintained. This caused overspeed of the shaft and turbine blades, and the centrifugal force resulted in an excessive stress, causing damage on the turbine blades and breakage of the weld joint of the turbine blade and shaft.

(2) Main actions to be taken

1) Retention of proper locknut tightening force

A dedicated support is used for ensuring the correct procedure of tightening the locknut properly with confirmation of the correct torque value. These changes are reflected in the work instruction of KEPCO which is responsible for managing the changes in relation to quality.

2) Changes in locknut design

The locknut of eight superchargers used for two emergency DGs at Unit 1 of Mihama Power Station is designed so that it is tightened in the direction opposite to the revolution of the equipment to prevent loosening.

3. Assessment of the report and future approach

This incident is not the deviation from the limit of operation defined in the safety regulations because the other emergency DG was ready to operate while one emergency DG failed to provide necessary function.

Measures are required to prevent recurrence of the failure of emergency DGs which are critical for ensuring the safety.

(1) Assessment of the report

It was confirmed that cause investigation includes on-site and factory inspections for studying the phenomenon of incident, and detailed examinations, tests and analysis as well as interviews of persons concerned for identifying the cause of failure leading to the damage of equipment. It was also confirmed that the cause of failure was evaluated and countermeasures were taken based on the results of investigation.

When all of these countermeasures are strictly implemented, the similar failure will be prevented. However, because of the inherent structure of the supercharger, the slippage of the compressor blade may take place irrespective of the forward or reverse direction of tightening, if the locknut is not tightened firmly. When a new supercharger is to be procured for improving the reliability of equipment, investigations into the structure that can prevent slippage, such as a more reliable method of fixing the compressor blade, will be necessary.

(2) Investigations into methods of fixing compressor blades in other nuclear plants

Upon receiving the report, we investigated the methods used at other nuclear plants for fixing the compressor blade onto the shaft in superchargers used for emergency DGs. The inspected facilities include commercial reactor facilities other than Unit 1 of Mihama Power Station, prototype fast-breeder reactor Monju and reprocessing facilities.

Superchargers used in these nuclear facilities have more reliable structures as for the method of fixation, such as shrink fit*3 or spline joint *4. The superchargers having a structure which may cause slippage of compressor blades are used only for two emergency DGs at Unit 1 of Mihama Power Station.

*3 Shrink fit is a method of fixation by inserting the shaft into the wheel hole after expanding the wheel hole by heating, and cooling the heated hole to shrink and firmly grip the shaft.

*4 Spline joint is a method for fixing the shaft and wheel hole by machining a key on the surface of the shaft and inside the wheel hole and engaging these keys for fixation.

(3) Future approach

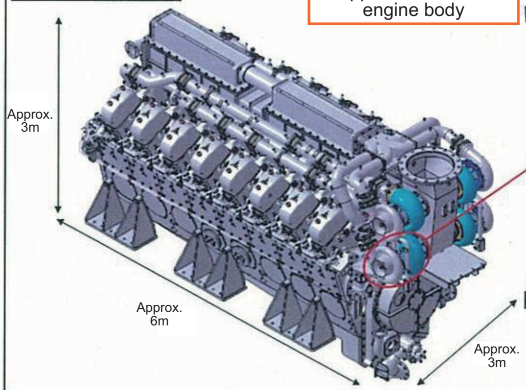
The Nuclear Regulation Authority will keep track of the recurrence prevention measures taken by KEPCO in future through safety inspections, etc.

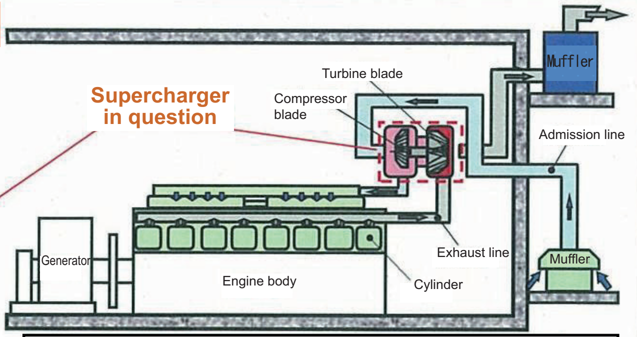
Failure of supercharger in emergency diesel generator at Unit 1 of Mihama Power Station

(Reference)

Nuclear Facility Failure Report as of March 18, 2013 and quote and edition of data published by the Kansai Electric Power Co., Inc.

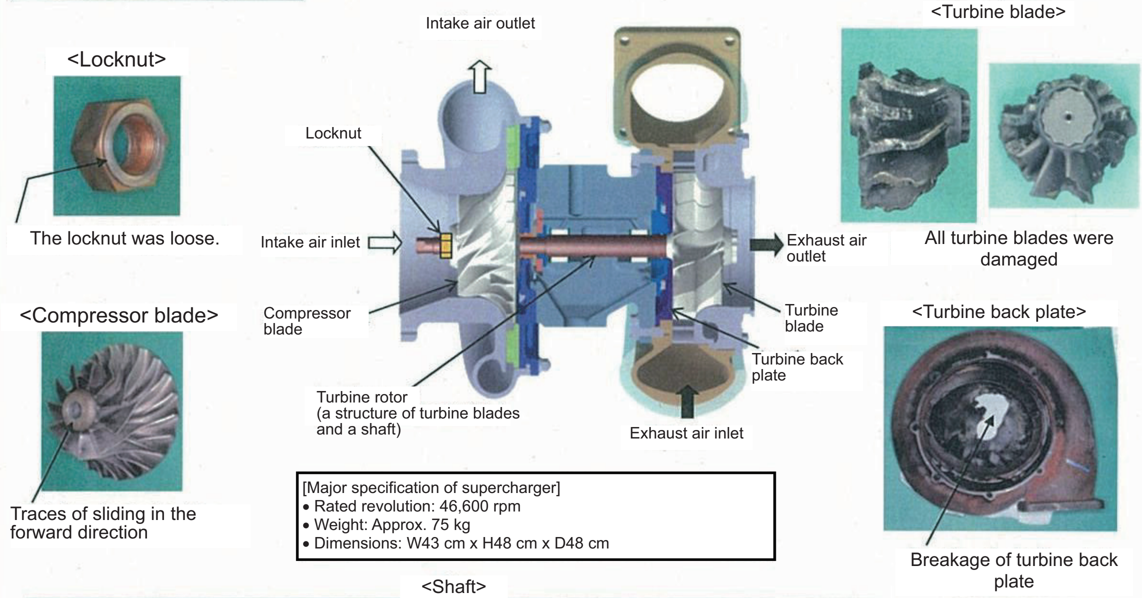
Outline of equipment



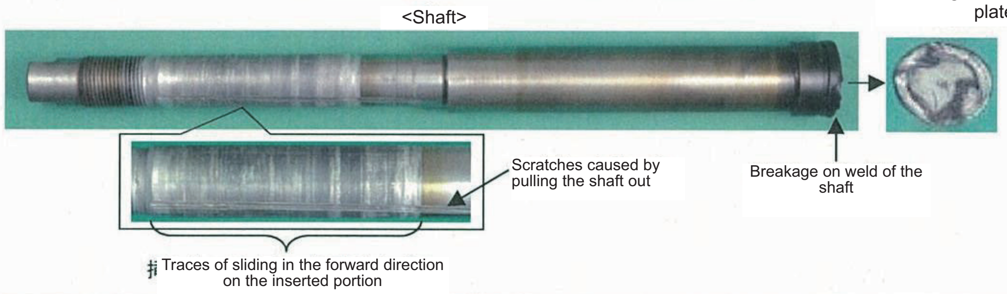


[Major specifications of emergency diesel generator]
- Installation date: July 1989
- Type: Supercharged diesel engine with air cooler
- Output: 4,460 PS
- Revolution: 1,200 rpm
- Generator capacity: 3,120 kW
- Location: Emergency Diesel Generator Room, Intermediate Building,

Results of detail examination on supercharger

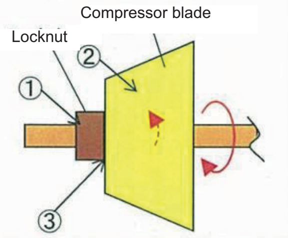


[Major specification of supercharger]
- Rated revolution: 46,600 rpm
- Weight: Approx. 75 kg
- Dimensions: W43 cm x H48 cm x D48 cm



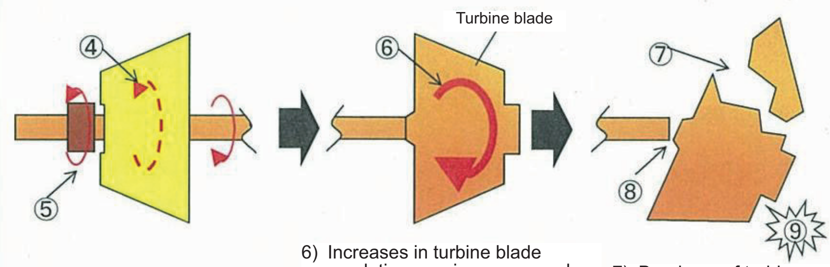
Probable cause

<Conditions in the previous test>



1) Insufficient tightening of the locknut
2) Minor slippage of compressor blades
3) Gradual breakage of blades in touch with the locknut

< Conditions in the latest test >



4) Continuous slippage of compressor blades
5) Loosened locknut
6) Increases in turbine blade revolution causing overspeed due to centrifugal force
7) Breakage of turbine blades
8) Breakage of weld
9) Breakage of surrounding parts

We received a report on the contact of fuel rods in the fuel assembly of Unit 1 of the Kashiwazaki-Kariwa Nuclear Power Station owned by the Tokyo Electric Power Company.

March 19, 2013
NRA

Today (March 19), the Nuclear Regulation Authority (NRA) received reports from the Tokyo Electric Power Company (TEPCO) regarding the contact of fuel rods in the fuel assembly at Unit 1 of the Kashiwazaki-Kariwa Nuclear Power Station, in accordance with the "Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Nuclear Reactors" (hereinafter call "Reactor Regulation Act").

There was no impact on the environment from this event.

1. Main points of the report from TEPCO

As a result of bent water rods (*1) that were found at Unit 5 of the Kashiwazaki-Kariwa Nuclear Power Station, the fuel assemblies at all Units were inspected and some fuel rods were found to be in contact with each other at Unit 1. Therefore, today (March 19), TEPCO reported this event to NRA as a reportable event in accordance with the "Reactor Regulation Act"

*1: This is a hollow tube installed in the center of the fuel assembly in parallel with fuel rods. By passing water through the tube, the output inside the fuel assembly is optimized.

2. Effects of this event on plant safety

In this event, it was estimated that a fuel rod was bent due to bent fuel assembly water rod and was in contact with the adjacent fuel rod. The concerned fuel assemblies were stably cooled in the spent fuel pool and no leakage from the fuel rod was confirmed.

No abnormal changes in readings were observed in the electric conductivity of the spent fuel pool water and area monitors installed around the pool. There was no impact on the environment from radioactive materials, and no workers were exposed to radiation.

3. Actions taken by NRA

This event is the same as the contact of fuel rods in the fuel assembly of Unit 5 of the Kashiwazaki-Kariwa Nuclear Power Station, which was reported to NRA on December 12, 2012.

The NRA will continue to rigorously check the investigation into the cause of and corresponding countermeasures against possible recurrence of the event.

(Results of provisional INES (*) event rating)

Criterion 1	Criterion 2	Criterion 3	Level
-	-	1	1

Rating basis: In this event, some fuel rods were in contact with each other due to deformation of water rods caused by application of excessive load to the fuel assemblies. Although there was no leakage of radioactive materials, the core was loaded in abnormal configuration and the defense in depth principle was confirmed to be degraded. Therefore, the rating was judged as INES level 1 "deviation."

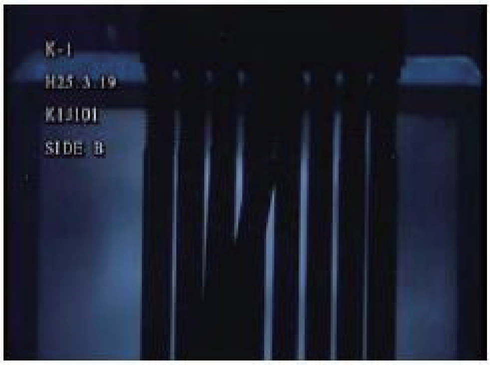
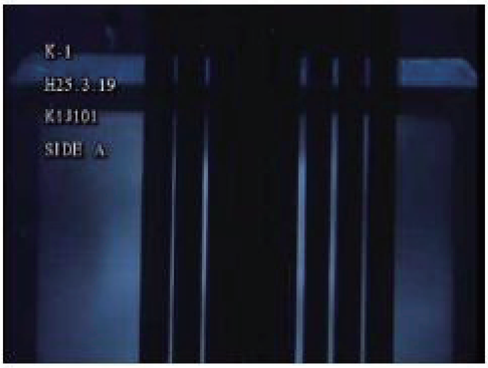
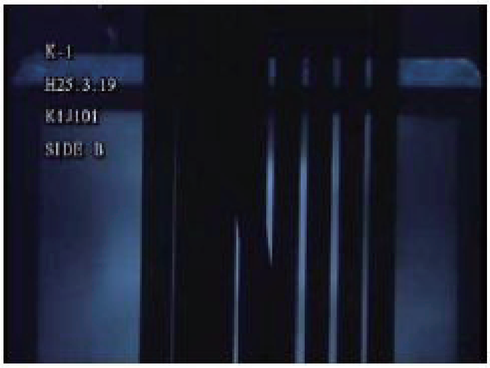
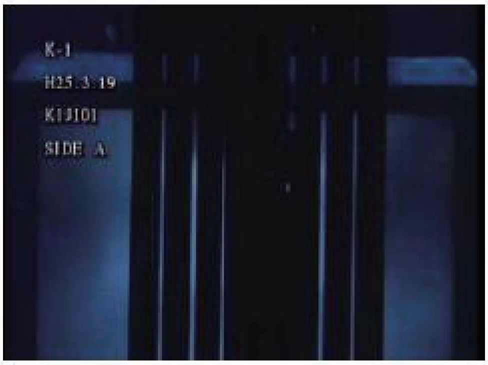
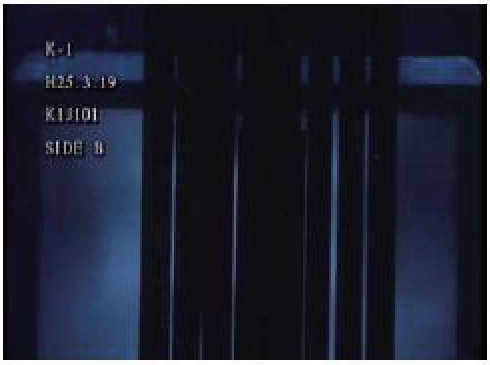
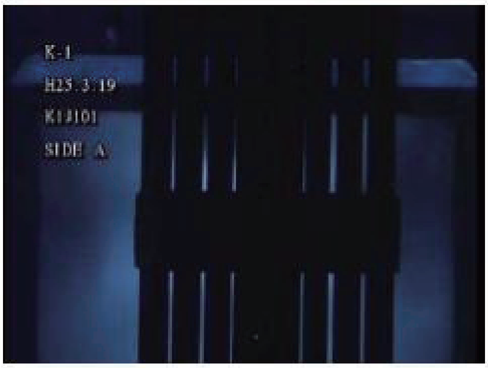
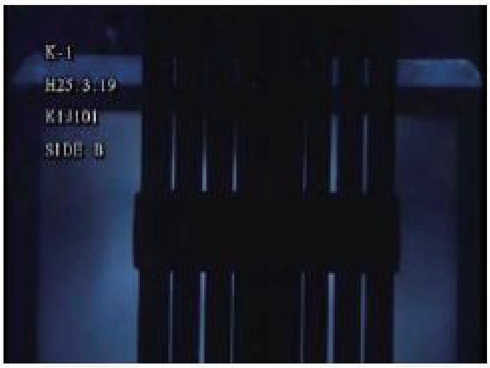
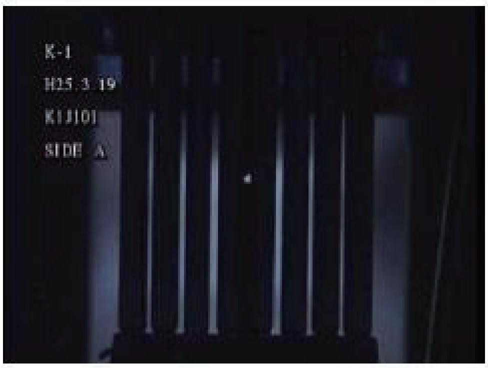
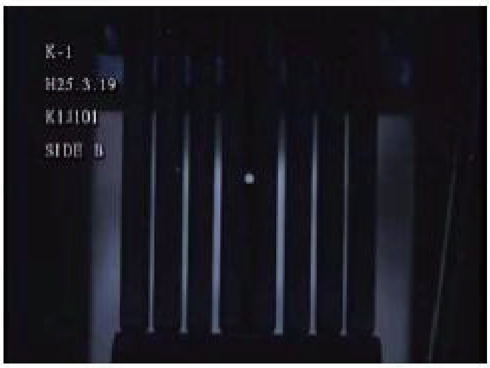
(*) Evaluation under the INES User's Manual 2008 Edition

INES (International Nuclear and Radiological Event Scale) is an indicator used to promptly communicate the safety significance of a reported nuclear and radiological incident or accident. Events are evaluated based on 3 rating criteria (namely, criterion 1: people and the environment, criterion 2: radiological barriers and controls at facilities, and criterion 3: defense in depth) and the highest level among 3 ratings is adopted as the INES rating level of the event. The INES levels range from Level 0 (no safety significance) to Level 7 (major accident).

＜Reference＞

Attachment: Photograph of the fuel assembly whose water rods were bent

Fuel number: K1J101
Date of Investigation: March 19, 2013

The 8th span	       
The 1st span	 

XIV-2-1 Overview of Accident and Failure at Nuclear Power Reactors in Research and Development Stage in FY2012

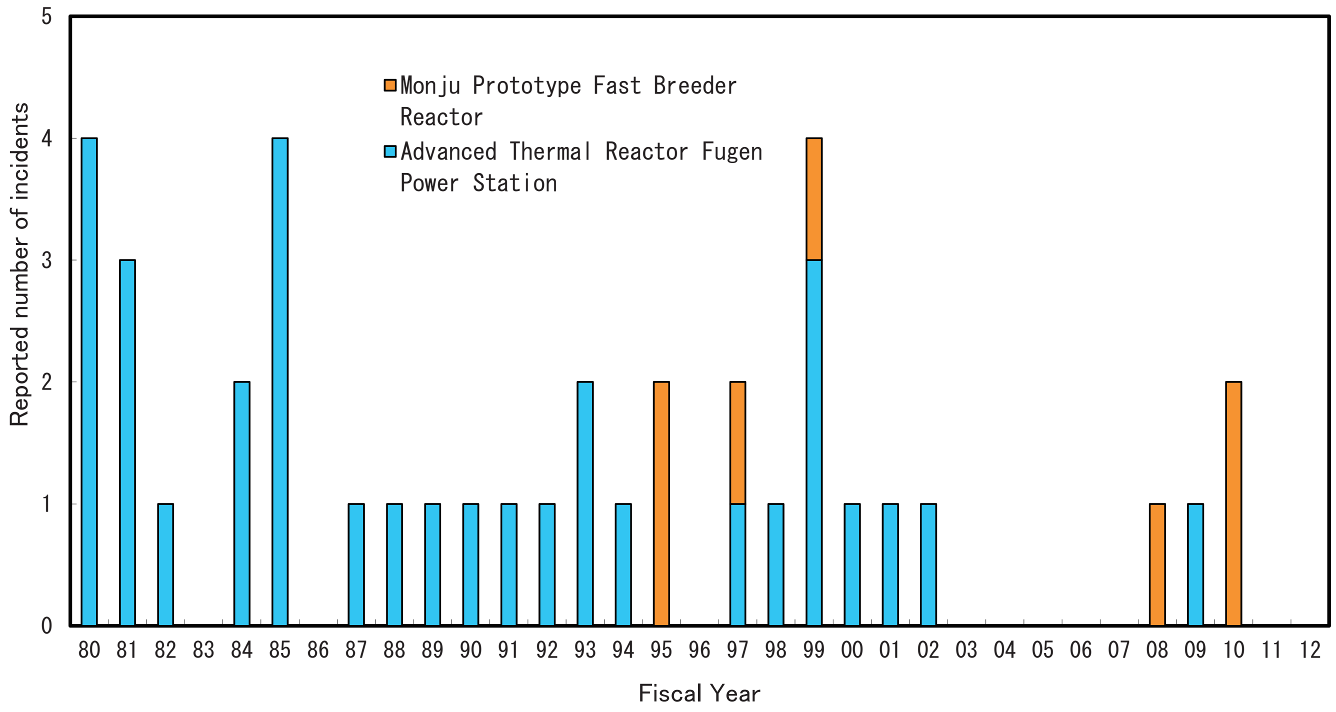
1. In FY2012, no accident and failure was reported by the Japan Atomic Energy Agency related to the Law for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors and other laws.

Table XIV-2-1 Trends in the Number of Reported Accident and Failure at Nuclear

Incident type \ Fiscal Year		80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
During operation	Automatic shutdown	2	1	0	0	2	2	0	0	1	1	1	0	0	1	1	1(1)
	Manual shutdown	0	2	0	0	0	1	0	0	0	0	0	0	1	0	0	1(1)
During shutdown		2	0	1	0	0	1	0	1	0	0	0	1	0	0	0	0
Others		0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Total		4	3	1	0	2	4	0	1	1	1	1	1	1	2	1	2(2)

Figures in parentheses are the numbers of incidents during trial operation at the Monju Prototype Fast Breeder Reactor and are included in the above figures.

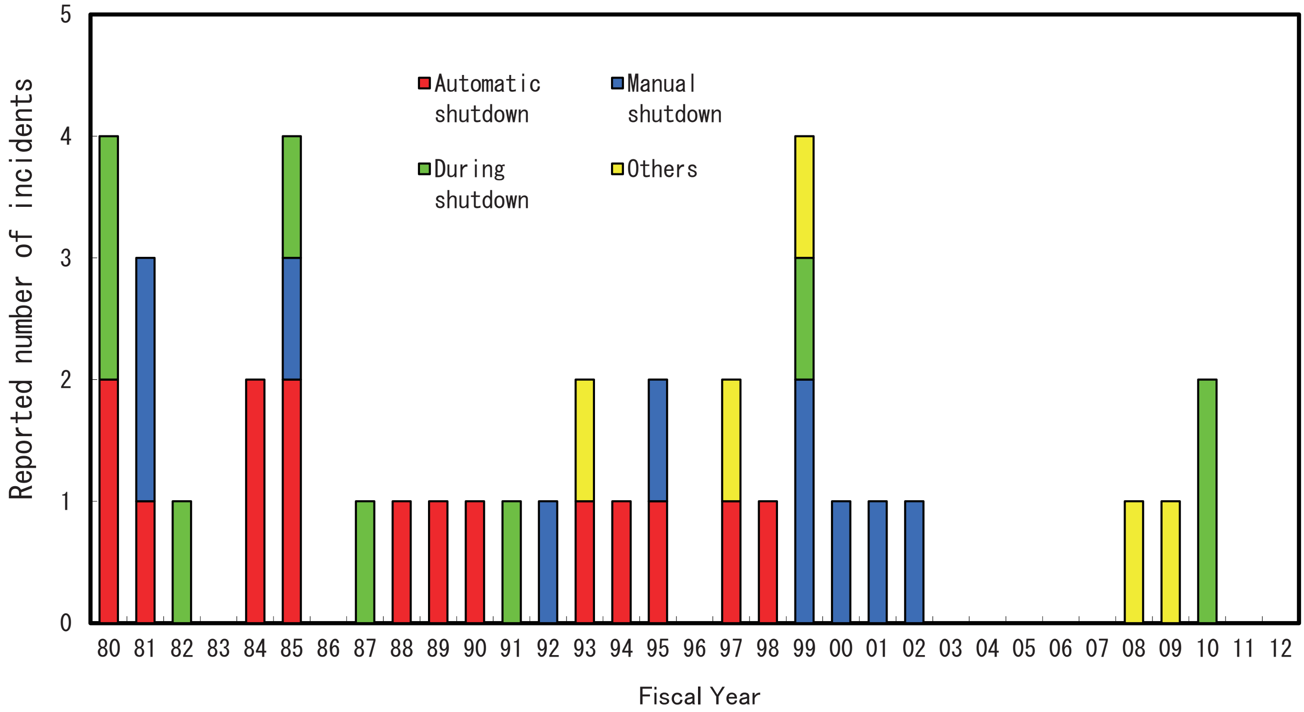
Figure XIV-2-1 Trends in the Number of Reported Accident and Failure at Nuclear Power Reactors in Research and Development Stage



Power Reactors in Research and Development Stage

96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	10
0	0	0	1	0	0	0	0	0	0	0	0	0	0	2(2)	0	0	9
0	1(1)	0	1(1)	0	0	0	0	0	0	0	0	1(1)	1	0	0	0	5
0	2(1)	1	4(1)	1	1	1	0	0	0	0	0	1(1)	1	2(2)	0	0	39

Figure XIV-2-2 Trends in the Number of Reported Accident and Failure at Nuclear Power Reactors in Research and Development Stage



XIV-2-2 Accident and Failure Reported at Nuclear Power Reactors in Research and Development Stage

When accident and failure specified in the related rules of the Acts (the Act for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Nuclear Reactor Regulation Act), and the Electric Utility Industry Act) occurs at nuclear facilities, the licensee or other concerned party reports it to the Nuclear and Industrial Safety Agency. The reporting criteria are as follows (excerpt):

Act	Article 62-3 of the Nuclear Reactor Regulation Act	Article 106 of the Electric Utility Industry Act
Ordinance	Article 43-14 of the Rules for Construction, Operation, etc. of a Nuclear Reactors in Research and Development Stage	Article 3 of the Electricity-related Reporting Regulations
Reporting Criteria	1) When nuclear fuel materials have been stolen or their location is unknown. 2) When a reactor in operation has been shut down or needed to be shut down due to a failure of the nuclear power reactor facilities, or when a power generation change of over 5% has occurred or been needed. 3) When it has been verified at inspection conducted by a licensee on equipment, etc. important for safety that the equipment, etc. important for safety did not meet Article 9 of the Ordinance of Establishing Technical Standards for Nuclear Power Generation Equipment or the standards specified in Article 9-2 of the ordinance, or when it has been verified that the equipment, etc. important for safety did not have functions necessary to ensure the safety of the nuclear power reactor facilities. 4) When a fire has caused a failure of equipment, etc. important for safety. 5) In addition to the above Item 3, when limiting conditions for operation have been deviated from due to a failure of nuclear power reactor facilities, or when measures specified in safety regulations have not been taken for the deviation of limiting conditions for operation. 6) When a malfunction has been found in the state of exhaust from gaseous radioactive waste exhaust equipment or in the state of discharge from liquid radioactive waste discharge equipment, due to a failure of nuclear power reactor facilities or other unexpected situations.	1) An accident in which an electric shock, damage to a nuclear power generation workpiece, wrong or no operation of a nuclear power generation workpiece has caused injury or death. 2) An electrical fire accident has occurred. 3) An accident in which damage to a nuclear power generation workpiece, wrong or no operation of a nuclear power generation workpiece has caused damage to public properties, made public facilities, such as roads, parks and schools, unusable, or had social impacts. 4) Damage to major electric workpieces has occurred. 5) An accident in which damage to a nuclear power generation workpiece, wrong or no operation of a nuclear power generation workpiece has caused other licensees a power supply trouble of more than 7,000 kW and less than 70,000 kW for longer than one hour, or a power supply trouble of more than 70,000 kW for longer than 10 minutes.

(Excerpt)

Reporting Criteria	7) When exhaust from gaseous radioactive waste exhaust equipment has caused the concentration of radioactive materials in air outside an environmental monitoring area to exceed the concentration limit stipulated in Article 34-4. 8) When discharge from liquid radioactive waste discharge equipment has caused the concentration of radioactive materials in the water outside an environmental monitoring area to exceed the concentration limit stipulated in Article 34-7. 9) When nuclear fuel materials or those contaminated with nuclear fuel materials have leaked outside a controlled area. 10) When a failure or other unexpected situation of nuclear power reactor facilities has caused nuclear fuel materials or others to leak in a controlled area. 11) When a failure or other unexpected situations of nuclear power reactor facilities has caused those in a controlled area to be exposed to radiation; effective dose from this exposure has exceeded or may have exceeded 5 mSv for radiation workers and 0.5 mSv for those other than radiation workers. 12) When a radiation worker has been exposed to radiation that exceeded or may have exceeded the dose limit stipulated in Section 1-1 of Article 28. 13) When a control rod that was not inserted or drawn out has actually moved from the original control point to or past another control point, or when a control rod at the full insertion position that was not inserted or drawn out has actually moved in the direction of insertion beyond the full insertion position. 14) In addition to the above Items, when a failure of nuclear power reactor facilities has inflicted or may have inflicted injury on a person.	

(Excerpt)

Note 1 : In October 2003, these rules were quantified and defined as much as possible so that a licensee can determine properly whether a trouble is an event to be reported, and the contents of the notification criteria issued before October were included in the Acts to make their position clear.

Note 2 : In June 2007, part of Article 43-14 of the Rules for Construction, Operation, etc. of a Nuclear Reactors in Research and Development Stage was amended. This is because as a result of full inspection of power generating equipment conducted by electric power companies according to the instruction of the Ministry of Economy, Trade and Industry on November 30, 2006, it was revealed that events like an unexpected control rod drop occurred during the shutdown of a reactor. Since events like an unexpected control rod drop may affect the safety of a reactor, it is appropriate to cause licensees to discover these events as preliminary signs of accidents and take measures for them. To cause licensees to report on events in which control rods moved while they were not operated, therefore, Section 13 was added.

Table XIV-2-2 Accident and Failure in Nuclear Power Reactors in Research and Development Stage by Fiscal Year (Automatic Shutdown)

Facility	Fiscal Year	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
Advanced Thermal Reactor Fugen Power Station*	Reactor cooling system	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Reactor auxiliary system	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Instrumentation and control system	1	1	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	Steam turbine system	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	Total	1	2	0	0	2	2	0	0	1	1	1	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
Monju Prototype Fast Breeder Reactor	Instrumentation and control system																1 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (1)
	Total																1 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (1)

Figures in parentheses are the numbers of accident and failure during trial operation and are included in the above figures.
*: Currently, Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center

Table XIV-2-3 Accident and Failure in Nuclear Power Reactors in Research and Development Stage by Fiscal Year (Manual Shutdown)

Facility	Fiscal Year	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
Advanced Thermal Reactor Fugen Power Station *	Reactor body	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	Reactor cooling system	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	Reactor auxiliary system	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	Instrumentation and control system	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	Steam turbine system	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Plant common system	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Total	0	2	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	9
Monju Prototype Fast Breeder Reactor	Reactor cooling system																1 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (1)
	Total																1 (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (1)

Figures in parentheses are the numbers of accident and failure during trial operation and are included in the above figures
*:Currently, Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center

Table XIV-2-4 Accident and Failure in Nuclear Power Reactors in Research and Development Stage by Fiscal Year (When Not in Operation for an Inspection or Other Reason)

Facility	Fiscal Year	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
Advanced Thermal Reactor Fugen Power Station *	Reactor body	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Reactor cooling system	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	Fuel handling system	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Total	2	0	1	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Monju Prototype Fast Breeder Reactor	Reactor body																															1(1)	0	0	1
	Electrical system																															1(1)	0	0	1
	Total																															2(2)	0	0	2

Figures in parentheses are the numbers of accident and failure during trial operation and are included in the above figures
*: Currently, Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center

Table XIV-2-5 Accident and Failure in Nuclear Power Reactors in Research and Development Stage by Fiscal Year (Others)

Accident type \ Fiscal Year	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
Fatal accident	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Radiation exposure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radioactive materials leakage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boiler facility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Accident type \ Fiscal Year	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
Fatal accident	1(1)	0	1(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	3(2)
Radiation exposure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Radioactive materials leakage	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Boiler facility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	1(1)	0	0	0	0	1(1)
Total	1(1)	0	1(1)	0	0	0	0	0	0	0	0	1(1)	1	0	0	0	5(2)

Figures in parentheses are the numbers of accident and failure during trial operation and are included in the above figures.

Table XIV-2-6 Systems of Component Involved in Accident and Failure in Nuclear Power Reactors in Research and Development Stage

Classification	ATR	FBR	Subtotal
Reactor body	4	0	4
Reactor cooling system	8	1	9
Reactor auxiliary system	3	0	3
Instrumentation and control system	6	1	7
Fuel handling system	2	1	3
Steam turbine system	6	1	7
Plant common system	1	1	2
Others	2	3	5
Total	32	7	39

Table XIV-2-7 Component Involved in Accident and Failure in Nuclear Power Reactors in Research and Development Stage

Classification	ATR	FBR	Subtotal
Pressure vessel	2	0	2
Fuel assembly	2	0	2
Pump	1	0	1
Motor	1	0	1
Valve	3	0	3
Pipe	6	0	6
Control system	2	1	3
Relay	2	0	2
Sensor	4	1	5
Others	2	5	7
No damage to equipment	7	0	7
Total	32	7	39

Table XIV-2-8 Causes of Accident and Failure in Nuclear Power Reactors in Research and Development Stage

Classification	ATR	FBR	Subtotal
Improper design	1	3	4
Improper manufacturing	14	0	14
Improper construction	4	0	4
Improper maintenance	3	1	4
Improper operation	0	0	0
Improper control	1	1	2
External factors	0	0	0
Natural deterioration	0	0	0
Others	9	2	11
Cause unknown. Under investigation	0	0	0
Total	32	7	39

Table XIV-2-9 Operational Status When Accident and Failure Occurred in Nuclear Power Reactors in Research and Development Stage

Classification	ATR	FBR	Subtotal
Normal operation	12	0	12
Adjustment operation	3	0	3
Periodical inspection	6	0	6
Planned shutdown	9	0	9
Unplanned shutdown	2	5	7
Construction or Commissioning Test	0	2	2
Total	32	7	39

Table XIV-2-10 How Accident and Failure Detected in Nuclear Power Reactors in Research and Development Stage

Classification	ATR	FBR	Subtotal
Activation of an alarm or a protection system	15	2	17
Central/field monitoring	2	0	2
Inspection patrol	3	0	3
Periodical testing	0	0	0
Periodical inspection or other inspections conducted during a reactor shutdown	2	1	3
During operation	7	1	8
Others	3	3	6
Total	32	7	39

XIV-2-3 Numbers of Reported Accident and Failure in Nuclear Power Reactors in Research and Development Stage

Power plant name	Capacity (10,000kW)	Start of operation	Fiscal Year																																
			80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
Advanced Thermal Reactor Fugen Power Station*	16.5	1979.3.14	4	3	1	0	2	4	0	1	1	1	1	1	1	2	1	0	0	1	1	3	1	1	1	0	0	0	0	0	0	1	0	0	0	32
Monju Prototype Fast Breeder Reactor	28.0	-																(2)	(0)	(1)	(0)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(2)	(0)	(0)	(7)
Total			4	3	1	0	2	4	0	1	1	1	1	1	1	2	1	2	0	2	1	4	1	1	1	0	0	0	0	0	1	1	2	0	0	39

Figures in parentheses are the numbers of accident and failure during trial operation.
*: Currently, Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center

XIV-2-4 Overview of Accident and Failure in Nuclear Power Reactors in Research and Development Stage

Advanced Thermal Reactor Fugen Power Station*

Date of occurrence	Power plant name	Overview
		No accident and failure reported.

*:Currently, Japan Atomic Energy Agency, Tsuruga Head Office,
Fugen Decommissioning Engineering Center

Monju Prototype Fast Breeder Reactor

Date of occurrence	Power plant name	Overview
		No accident and failure reported.

XIV-2-5 Press Releases on Accident and Failure in Nuclear Power Reactors in Research and Development Stage

List of press releases in FY2012

Date of release	Title
	None

XIV-3-1 Overview of Accident and Failure at Nuclear Fuel Fabrication, Reprocessing, Radioactive Waste Disposal and Waste Management Facilities in FY2012

1. In FY2012, 1 incident were reported by an operator of a facility related to the Law for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors and other laws.

Table XIV-3-1 Trends in the Number of Reported Accident and Failure at Nuclear Fuel Fabrication, Reprocessing, Radioactive Waste Disposal and Waste Management Facilities.

Licensee	Facility	Facility class	Capacity	Start of operation	Fiscal Year																						
					70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
Global Nuclear Fuel-Japan Co., Ltd	Same as on the left	Fuel fabrication	750 tU/year	1970. 8.29	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nuclear Fuel Industries, Ltd.	Tokai Works	Fuel fabrication	250 tU/year	1980.1.4											0	0	0	0	0	0	0	0	0	0	0	0	0
	Kumatori Works	Fuel fabrication	383 tU/year	1972.9.1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mitsubishi Nuclear Fuel Co., Ltd.	-	Fuel fabrication	440 tU/year	1972.1.11			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JCO Co., Ltd.	Tokai Works	Fuel fabrication	718 tU/year	1980.12.18											0	0	0	0	0	0	0	0	0	0	0	0	0
Japan Atomic Energy Agency	Tokai Research and Development Center, Nuclear Science Research Institute, Radioactive Waste Disposal Facility	Radioactive Waste Disposal Facility	2,520 m^3	1995.11.27																							
	Oarai Research and Development Center, Radioactive Waste Management Facility	Radioactive Waste management facility	42,795 200-liter drums	1996.3.29																							
	Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Reprocessing facility	210 tU/year	1981.1.17						(3)	(1)	(1)	(3)	(1)	(2)	1	3	0	0	0	1	1	0	1	2	1	1
	Ningyo-toge Environmental Engineering Center	Uranium Enrichment Demonstration Plant	200 tU/year	1988.4.25																			0	0	0	0	0
Japan Nuclear Fuel Ltd.	Reprocessing Plant	Reprocessing facility**	800 tU/year	1999.12.3																							
	Reprocessing Plant	Waste Storage Facility	1,440 glass blocks	1995.4.26																							
	Enrichment and Disposal Office	Uranium Enrichment Plant	1,890 tU/year	1992.3.27																						0	1
	Enrichment and Disposal Office	Low-Level Radioactive Waste Disposal Center	412,160 200-liter drums	1992.12.8																							0

Licensee	Facility	Facility class	Capacity	Start of operation	Fiscal Year																				
					93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	Total
Global Nuclear Fuel-Japan Co., Ltd	Same as on the left	Fuel fabrication	750 tU/year	1970. 8.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	6
Nuclear Fuel Industries, Ltd.	Tokai Works	Fuel fabrication	250 tU/year	1980.1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Kumatori Works	Fuel fabrication	383 tU/year	1972.9.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mitsubishi Nuclear Fuel Co., Ltd.	-	Fuel fabrication	440 tU/year	1972.1.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
JCO Co., Ltd.	Tokai Works	Fuel fabrication	718 tU/year	1980.12.18	0	0	0	0	0	0	1														1
Japan Atomic Energy Agency	Tokai Research and Development Center, Nuclear Science Research Institute, Radioactive Waste Disposal Facility	Radioactive Waste Disposal Facility	2,520 m^3	1995.11.27			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oarai Research and Development Center, Radioactive Waste Management Facility	Radioactive Waste management facility	42,795 200-liter drums	1996.3.29			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Reprocessing facility	210 tU/year	1981.1.17	1	2	1	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	2	1	33
	Ningyo-toge Environmental Engineering Center	Uranium Enrichment Demonstration Plant	200 tU/year	1988.4.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Japan Nuclear Fuel Limited	Reprocessing Plant	Reprocessing facility**	800 tU/year	1999.12.3							0	0	0	0	0	0	0	0	1	3	1	1	1	0	7
	Reprocessing Plant	Waste Storage Facility	1,440 glass blocks	1995.4.26				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Enrichment and Disposal Office	Uranium Enrichment Plant	1,890 tU/year	1992.3.27	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	Enrichment and Disposal Office	Low-Level Radioactive Waste Disposal Center	412,160 200-liter drums	1992.12.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*: Figures in parentheses are the numbers of accident and failure reported before the start of operation.

**: Only facilities that accept and store spent fuel have commenced operation. The reprocessing facility itself is still under construction

XIV-3-2 Accident and Failure Reported at Nuclear Fuel Fabrication, Reprocessing, Radioactive Waste Disposal and Waste Management Facilities

Regulations on nuclear fuel fabrication, reprocessing, radioactive waste disposal and waste management facilities are based on the Act for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (Nuclear Reactor Regulation Act) and other Acts, and licensees of these facilities are required to promptly report accident and failure to the government. In October 2003, the provisions of these Acts were quantified and made as clear as possible so that licensees of nuclear fuel fabrication facilities, reprocessing facilities, radioactive waste disposal facilities and waste management facilities can properly determine which incidents should be reported. In addition, the former Ministerial Notification before the amendment in October were unified and their position made clear.

The following incidents must be reported:

○ Nuclear fuel fabrication facilities

Act	Article 62-3 of The Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Nuclear Reactors
Regulation	Article 9-16 of the Rules for Processing business for Nuclear Materials
Incident to report	1) Theft or loss of nuclear fuel material 2) Failure of a facility that disturb work as special measures are needed for repair of the failure 3) Failure of a facility that disturb work as a result of loss or potential loss of confinement function of nuclear fuel materials etc. in the limited area, radiation shielding function to prevent radiation hazards by external radiation, or fire or explosion protection function in a facility 4) Abnormal condition of discharge of gaseous radioactive wasters at ventilation facility or discharge of liquid radioactive wasters from a discharge facility due to failures of a facility or other unexpected events 5) Atmospheric radio-nuclides concentrations by radiation monitoring outside peripheral monitoring area exceeding limits 6) Radio-nuclides concentrations in discharge by radiation monitoring at the outer boundary of peripheral monitoring area exceeding limits 7) Leakage of nuclear fuel materials, etc. outside the controlled area 8) leakage of nuclear fuel materials, etc. inside the controlled area due to a failure of a facility or other unexpected events excluding following cases (excluding the case when the measures such as access control or key control for the area related to the leakage or when the leaked material spreads outside the controlled area); (1) When the leaked liquid nuclear fuel materials etc. does not spread outside the curb readily installed around the equipment for prevention of spreading of leakage (2) The function of ventilation related to the area of the leakage of gaseous nuclear fuel materials etc. is maintained approximately (3) The amount of radioactivity of leaked nuclear fuel materials etc. is very small or the degree of leakage is minor 9) Nuclear fuel material being critical or likely to be critical

Incident to report	10) Effective does by radiation exposure of personnel in the controlled area exceeding or likely to exceed dose limits of 5 mSv for radiation workers and 0.5 mSv for non-radiation workers due to a failure of a facility or other unexpected events 11) Radiation exposures of radiation workers exceeding or likely to exceed the dose limits 12) Any other hazards to personnel occurring or likely to occur at a facility (excluding minor non-radiation hazards)

○ Reprocessing facility

Act	Article 62-3 of The Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Nuclear Reactors
Regulation	Article 19-16 of the Rules for Reprocessing business for Spent Fuels
Incident to report	1) Theft or loss of nuclear fuel material 2) Failure of a facility that disturb work as special measures are needed for repair of the failure 3) Failure of a facility that disturb work as a result of loss or potential loss of confinement function of nuclear fuel materials etc. in the limited area, radiation shielding function to prevent radiation hazards by external radiation, or fire or explosion protection function in a facility 4) Abnormal condition of discharge of gaseous radioactive wasters at ventilation facility or discharge of liquid radioactive wasters from a discharge facility due to failures of a facility or other unexpected events 5) Atmospheric radio-nuclides concentrations by radiation monitoring outside peripheral monitoring area exceeding limits 6) Radio-nuclides concentrations in discharge by radiation monitoring at the outer boundary of peripheral monitoring area exceeding limits 7) Leakage of spent fuel outside the controlled area 8) leakage of spent fuel, etc. inside the controlled area due to a failure of a facility or other unexpected events excluding following cases (excluding the case when the measures such as access control or key control for the area related to the leakage or when the leaked material spreads outside the controlled area); (1) When the leaked liquid spent fuel etc. does not spread outside the curb readily installed around the equipment for prevention of spreading of leakage (2) The function of ventilation related to the area of the leakage of gaseous nuclear fuel materials etc. is maintained approximately (3) The amount of radioactivity of leaked nuclear fuel materials etc. is very small or the degree of leakage is minor 9) Nuclear fuel material being critical or likely to be critical 10) Effective does by radiation exposure of personnel in the controlled area exceeding or likely to exceed dose limits of 5 mSv for radiation workers and 0.5 mSv for non-radiation workers due to a failure of a facility or other unexpected events 11) Radiation exposures of radiation workers exceeding or likely to exceed the dose limits 12) Any other hazards to personnel occurring or likely to occur at a facility (excluding minor non-radiation hazards)

○ Radioactive waste disposal facility

Act	Article 62-3 of The Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Nuclear Reactors
Regulation	Article 22-13 of the Rules for Waste Disposal business for Nuclear Materials or Materials contaminated with Nuclear Materials
Incident to report	1) Theft or loss of nuclear fuel material 2) Failure of a facility that disturb work as special measures are needed for repair of the failure 3) Failure of a facility that disturb work as a result of loss or potential loss of confinement function of nuclear fuel materials etc. in the limited area, radiation shielding function to prevent radiation hazards by external radiation, or fire or explosion protection function in a facility 4) Abnormal condition of discharge of gaseous radioactive wasters at ventilation facility or discharge of liquid radioactive wasters from a discharge facility due to failures of a facility or other unexpected events 5) Atmospheric radio-nuclides concentrations by radiation monitoring outside peripheral monitoring area exceeding limits 6) Radio-nuclides concentrations in discharge by radiation monitoring at the outer boundary of peripheral monitoring area exceeding limits 7) Leakage of nuclear fuel materials, etc. outside the controlled area 8) leakage of nuclear fuel materials, etc. inside the controlled area due to a failure of a facility or other unexpected events excluding following cases (excluding the case when the measures such as access control or key control for the area related to the leakage or when the leaked material spreads outside the controlled area); (1) When the leaked liquid nuclear fuel materials etc. does not spread outside the curb readily installed around the equipment for prevention of spreading of leakage (2) The function of ventilation related to the area of the leakage of gaseous nuclear fuel materials etc. is maintained approximately (3) The amount of radioactivity of leaked nuclear fuel materials etc. is very small or the degree of leakage is minor 9) Effective does by radiation exposure of personnel in the controlled area exceeding or likely to exceed dose limits of 5 mSv for radiation workers and 0.5 mSv for non-radiation workers due to a failure of a facility or other unexpected events 10) Radiation exposures of radiation workers exceeding or likely to exceed the dose limits 11) Any other hazards to personnel occurring or likely to occur at a facility (excluding minor non-radiation hazards)

○ Waste management facility

Act	Article 62-3 of The Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Nuclear Reactors
Regulation	Article 35-16 of the Rules for Waste Management business for Nuclear Materials or Materials contaminated with Nuclear Materials
Incident to report	1) Theft or loss of nuclear fuel material 2) Failure of a facility that disturb work as special measures are needed for repair of the failure 3) Failure of a facility that disturb work as a result of loss or potential loss of confinement function of nuclear fuel materials etc. in the limited area, radiation shielding function to prevent radiation hazards by external radiation, or fire or explosion protection function in a facility 4) Abnormal condition of discharge of gaseous radioactive wasters at ventilation facility or discharge of liquid radioactive wasters from a discharge facility due to failures of a facility or other unexpected events 5) Atmospheric radio-nuclides concentrations by radiation monitoring outside peripheral monitoring area exceeding limits 6) Radio-nuclides concentrations in discharge by radiation monitoring at the outer boundary of peripheral monitoring area exceeding limits 7) Leakage of nuclear fuel materials, etc. outside the controlled area 8) leakage of nuclear fuel materials, etc. inside the controlled area due to a failure of a facility or other unexpected events excluding following cases (excluding the case when the measures such as access control or key control for the area related to the leakage or when the leaked material spreads outside the controlled area); (1) When the leaked liquid nuclear fuel materials etc. does not spread outside the curb readily installed around the equipment for prevention of spreading of leakage (2) The function of ventilation related to the area of the leakage of gaseous nuclear fuel materials etc. is maintained approximately (3) The amount of radioactivity of leaked nuclear fuel materials etc. is very small or the degree of leakage is minor 9) Nuclear fuel material being critical or likely to be critical 10) Effective does by radiation exposure of personnel in the controlled area exceeding or likely to exceed dose limits of 5 mSv for radiation workers and 0.5 mSv for non-radiation workers due to a failure of a facility or other unexpected events 11) Radiation exposures of radiation workers exceeding or likely to exceed the dose limits 12) Any other hazards to personnel occurring or likely to occur at a facility (excluding minor non-radiation hazards)

XIV

XIV-3-3 Overview of Accident and Failure at Nuclear Fuel Fabrication, Reprocessing, Radioactive Waste Disposal and Waste Management Facilities

	Date of occurrence	Power plant	Overview	Page showing the relevant press release
1	Sep. 6, 2012	Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	On September 6, the right hand of a worker who inspected the equipment in the controlled area was found to be contaminated by radioactive materials. The subsequent inspection to identify the cause of contamination revealed the contamination of the surface of pipes for radioactive liquid waste in the utility room of the analysis facility (non-controlled area) where the worker worked on September 5. An investigation of the cause is underway.	340 to 343

XIV-3-4 Press Releases on Accident and Failure at Nuclear Fuel Fabrication, Reprocessing,Radioactive Waste Disposal and Waste Management Facilities

List of press releases in FY 2012

	Date of release	Title	Page
1	2012/9/7	We received a report on the confirmation of the radiological contamination in the non-radiation controlled area at the Reprocessing Plant of the Tokai Research and Development Center Nuclear Fuel Cycle Engineering Laboratories, owned by the Japan Atomic Energy Agency	340
		(Press-unannounced issues concerning cause measures)	

XIV

We received a report on the confirmation of the radiological contamination in the non-radiation controlled area at the Reprocessing Plant of the Tokai Research and Development Center Nuclear Fuel Cycle Engineering Laboratories, owned by the Japan Atomic Energy Agency

September 7, 2012
NISA/METI

Yesterday, the Nuclear and Industrial Safety Agency (NISA) received reports from the Japan Atomic Energy Agency (JAEA) regarding the confirmation of the radiological contamination in the non-radiation controlled area at the Reprocessing Plant in accordance with article 62-3 of the "law for the regulation of nuclear source material, nuclear fuel material and reactors." There was no impact on the environment from radioactive materials

1. Main points of the report from JAEA

Around 19:30, yesterday (September 6, 2012), NISA received reports from JAEA, regarding the confirmation of the radioactive contamination in the analysis building *1(installed in the non-radiation controlled area) at the Reprocessing Plant of the Tokai Research and Development Center Nuclear Fuel Cycle Engineering Laboratories, owned by JAEA. The main points of the report are as follows;

○Yesterday, as the radiological contamination was found on the right hand of a worker who had inspected equipment in the radiation-controlled area, investigation into causes of the contamination was conducted. As a result, radiological contamination was found on the work clothes of the concerned worker.

○Therefore, the utility room (designated as the non-radiation controlled area) of the analysis building where the concerned worker inspected yesterday (September 5) was investigated and radiological contamination (α-particle: larger than 7.1×10^2 Bq/cm^2) was found on the surface of the piping in which radioactive liquid waste is flowing

○Regarding three workers including the concerned worker who worked in the room, internal exposure was not detected by using a whole body counter

○The utility room where the contamination was found was zoned so that any person cannot come in, and radiologically-contaminated piping will be decontaminated after establishing work procedures and confirming the contamination status of the whole piping.

*1) Building where radioactive liquid waste, etc., is treated in the reprocessing process

2. Effects of this event on plant safety

In this event, as radioactive contamination was confirmed on the surface of a piping, in which radioactive liquid waste is flowing, outside the radiation-controlled area, the confinement function of this piping was confirmed to be lost. According to the JAEA's investigations, contamination is limited in the utility room of the analysis building. No abnormal changes in readings were observed in the off-gas monitors and radiation monitors installed in the facility. There was no impact on the environment from radioactive materials, and no workers were exposed to radiation.

3. Actions taken by NISA

After the event was reported to NISA by JAEA, local nuclear safety inspectors rushed to the site to confirm plant safety and continued to check the JAEA's response.

The report was received by NISA in accordance with article 62-3 of the "law for the regulation of nuclear source material, nuclear fuel material and reactors" and article 19-16 of the "rules for the spent fuel reprocessing business"

In accordance with all applicable laws, NISA will continue to rigorously check the investigation into the cause of and corresponding countermeasures against possible recurrence of the event, including its action plan and implementation status, as carried out by the company.

(Results of provisional INES (*) event rating)

Criterion 1	Criterion 2	Criterion 3	Level
-	-	1	1

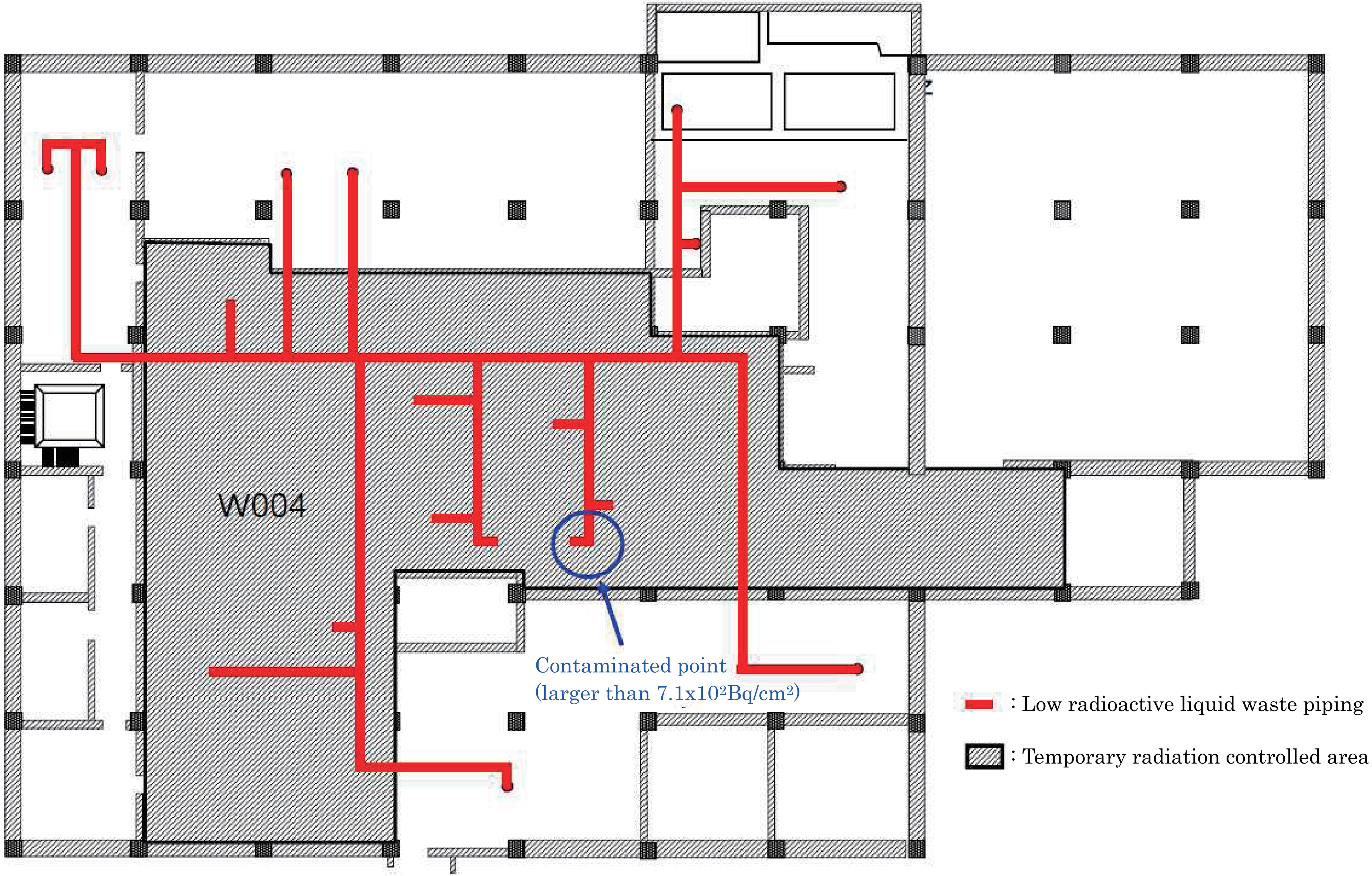
Rating basis: In this event, although there could be a large impact on the environment if the all analysis samples would leak as they are treated in the upper part of the piping where the contamination was found, significant leakage of radioactive liquid waste was not found and development of this event will not be expected.

Therefore, the rating was judged as INES level 1 “anomaly”.

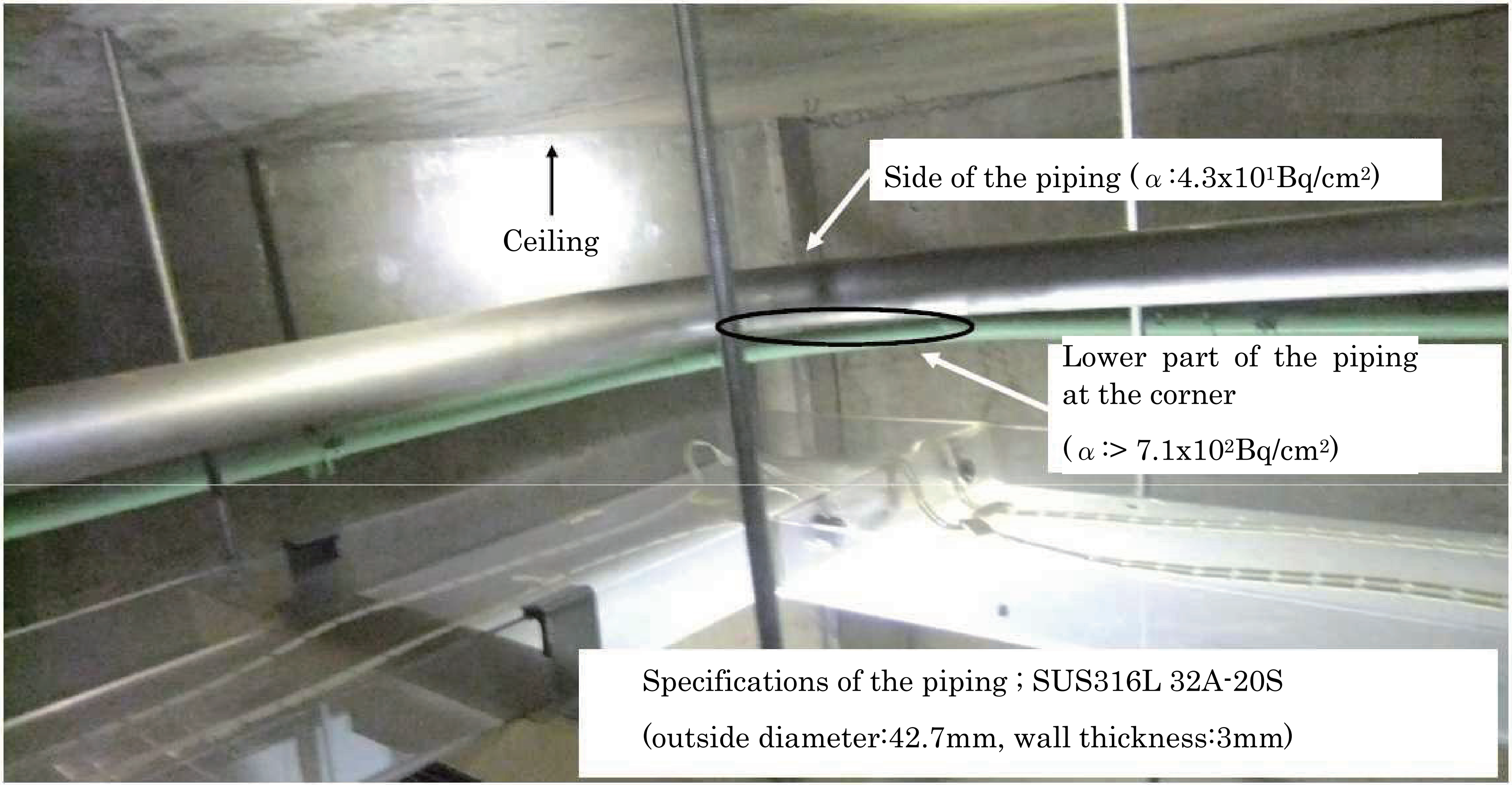
(*) Evaluation under the INES User’s Manual 2008 Edition

INES (International Nuclear and Radiological Event Scale) is an indicator used to promptly communicate the safety significance of a reported nuclear and radiological incident or accident. Events are evaluated based on 3 rating criteria (namely, criterion 1: people and the environment, criterion 2: radiological barriers and controls at facilities, and criterion 3: defense in depth) and the highest level among 3 ratings is adopted as the INES rating level of the event. The INES levels range from Level 0 (no safety significance) to Level 7 (major accident). Level 1 means the deviation of operating limits at a nuclear facility, and corresponds to an event such as a slight malfunction occurring in safety equipment with adequate safety protection layers remaining.

(Attachment 1)



Schematic of the temporal radiation controlled area on the first basement level of the analysis building at the Tokai Reprocessing Plant



Contamination status of the piping on the first basement level of the analysis building at the Tokai Reprocessing Plant

XIV-4 Case Analysis of Fire events and Fire Protection Measures at Nuclear Power Plants

XIV-4-1 Introduction

Nuclear power plants feature the following characteristics with regard to fire protection:

(1) Vast premises;

(2) Retention of various combustibles including hazardous materials;

(3) The presence of various large facilities and equipments with numerous small devices;

(4) Periodical work by many workers who visit the plants. The work often involves the use of flame, including welding and fusion cutting.

Therefore, nuclear power plants require that the utmost care be taken to reduce the potential risk of fire resulting from component failure and malfunction, mistakes in performance of work, and other factors.

Moreover, a fire at any nuclear power plant, regardless of its size or location, carries the risk of creating profound social repercussions that can consequently undermine public confidence in nuclear power plant licensees, even when the fire does not directly affect nuclear safety. For these reasons, in addition to regular measures to ensure safety at each specific nuclear power plant, it is essential to address the issue of fire protection at nuclear power plants as a whole.

Based on this recognition, fire protection measures were considered by analyzing the factors of actual incidences of fire at nuclear power plants, in an effort to reduce fire hazards (fire sources and probability of occurrence) at nuclear power plants as a whole.

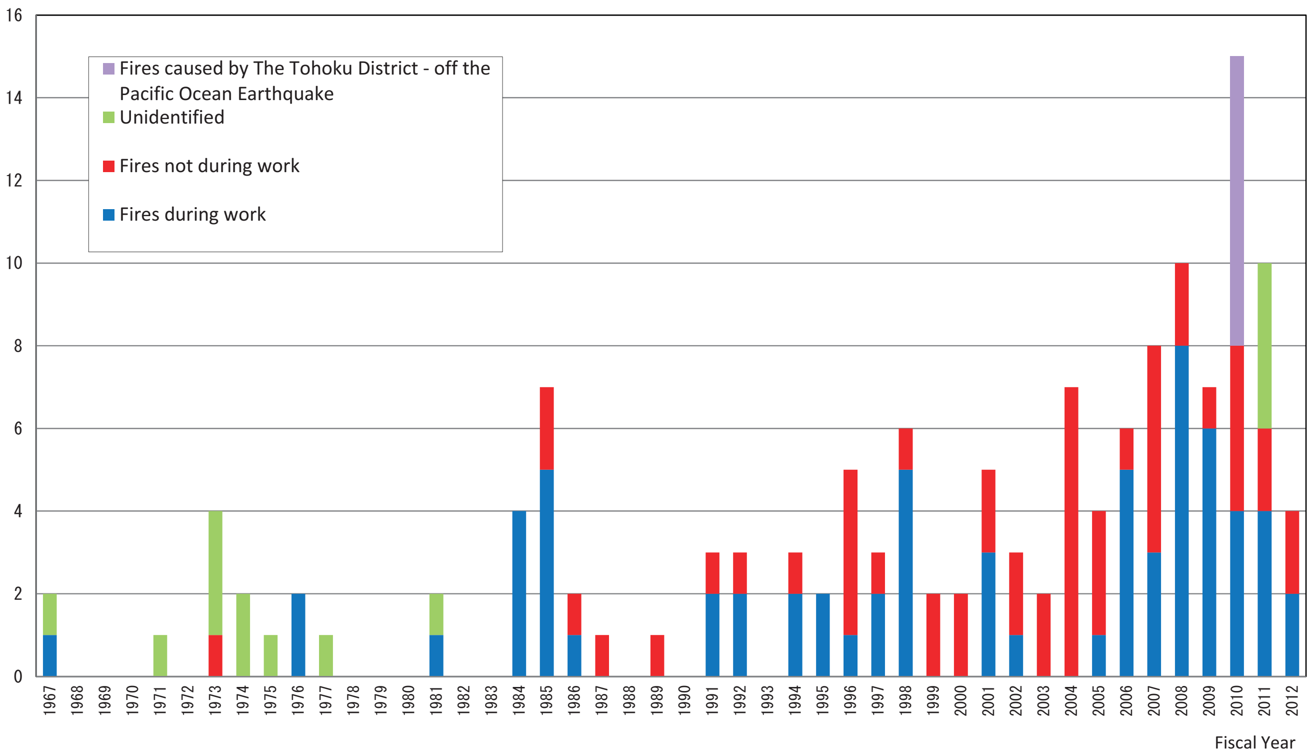
XIV-4-2 Case Analysis of Fires at Nuclear Power Plants

○ Scope of survey: cases of fires at nuclear power plants extracted from the websites of nuclear power plant licensees

○ Scope of period: 1967-2013 (as of the end of March)

○ Samples: 140 cases (detailed analysis was performed with 84 cases from 2000 onwards)

2.1 Trends in number of fires

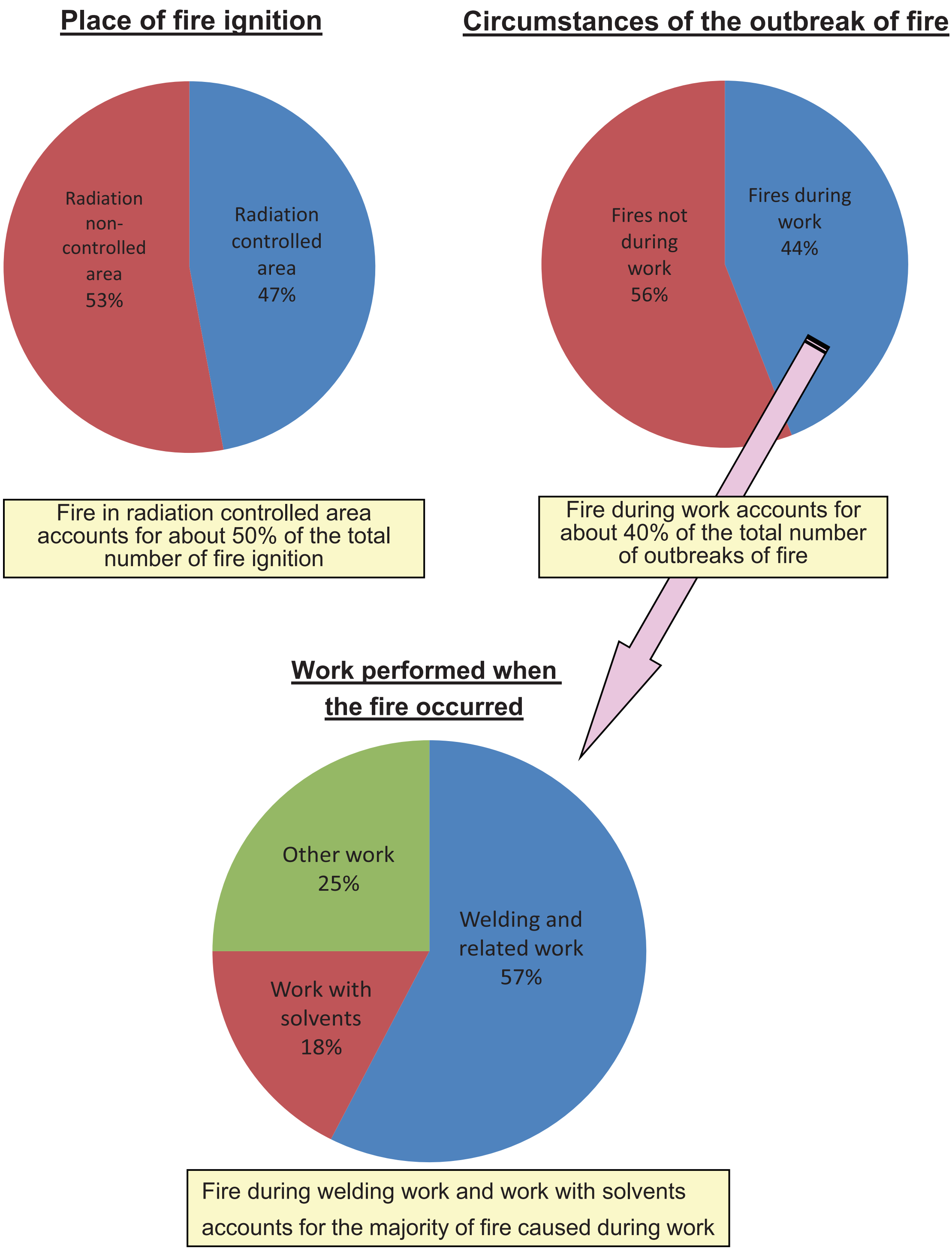


2.2 Occurrence of fires

Case analysis results based on fires since 2000 are presented as follows.

○ The majority of fires during work are “welding work” and “wash with solvents”. Causes include the ignition of solvents, oils, cleaning agents (thinner), curing sheets/tapes, and paints.

○ Except during work period, fires are caused by electric factors, such as “leakage and short circuit by deterioration,” “overheating from overload,” “inadequate maintenance and installation,” and “transformers.”



○ Many fires were caused by welding and related tasks, for example when a spark or melted metal contact with curing sheets, or drawn into the filters of ventilation equipment, etc.

XIV-4-3 Cases of Fires at Nuclear Plants from FY 2010 to FY 2012 and Their Common Factors

3.1 Cases of fires at nuclear plants in FY 2010 and FY 2011

There were many plants that performed seismic reinforcement work during the periodic inspections in FY 2010, and such work (welding, etc.) often involved the use of flames. This work is considered partly responsible for the increase in the number of fires.

In FY 2011, fires were frequently recorded at the facilities of designated licensees. The NISA of the Ministry of Economy, Trade and Industry issued instructions (severe warnings) to these licensees on January 13, 2012 to identify the causes of the fires, to develop measures to prevent recurrence, and to promptly implementation report on the actions taken.

Fires caused by works using flames such as welding decreased in FY 2012 due partly to reductions in works using flames in association with reductions in large-scale remodeling works, and to improvements in monitoring and management of flame related works.

In most of the cases in FY 2010, FY 2011 and FY 2012, the fires did not spread to other objects and the damage was limited to the first ignited area. Even when fires occur, the essence of fire protection measures in nuclear power plants is “early detection and extinguish,” to prevent them from spreading (reduction of fire impact). This philosophy and approach must be emphasized and carried out thoroughly

With regards to the 15 cases of fire in FY 2010, 10 cases in FY 2011 and 4 cases in FY 2012, the direct causes, underlying factors, and common factors were identified. The results of this analysis are presented in Tables XIV-4-1 and XIV-4-2. The tables list “licensees,” “date and hour of occurrence,” “unit,” “title,” and “common factors.”

As common factors of fires, 6 items were identified.

i) Inadequate product management system of manufacturers
ii) Inadequate on-site fire prevention control by the licensees
iii) Inadequate on-site fire prevention control by the subcontractors
iv) Insufficient training on fires and hazardous materials by the licensees
v) Insufficient training on fires and hazardous materials by the subcontractors
vi) Insufficient ability to imagine fire hazards by the licensees

3.2 Common factor analysis of fire occurrence

The underlying factors for fires in from FY 2010 to 2013 were analyzed, by which the following common factors were extracted.

i) Insufficient work-site management by the licensees and subcontractors with regards to fire protection
ii) Insufficient involvement in training about fires and hazardous materials by licensees and subcontractors with regards to fire protection
iii) Insufficient capacity of the licensees to assess fire hazards

The cases in FY 2010 clearly suggest that work involving welding, fusion cutting, and solvents (3Y) requires special caution. As seen with the case where fires broke out during the use of an electric saw and in the diesel generator room, fire risk (frequency and extent of impact) can be potentially aggravated by work that is “carried out for the first time,” “carried out after a long time,” or “carried out with altered procedures” (the so-called “3H” risk factors in Japanese). They demonstrate the need to reinforce work-site management and training.

Numerous cases of fire recurrence among the cases in FY 2011 are evidence that the lessons learned from past cases of fire in domestic plants are not being fully applied in practice. Such cases include smoke from the plastic sheet inside the containment vessel (inadequate curing of fire during modification work) and fire during work using a solvent (fire broke out in the work area and burned part of the curing plastic when a cleaning agent was sprayed by the sprayer).

Many cases of fire in FY 2012 are the recurrence of past incidents in domestic plants, such as ignition from solvent for paints (smoke generated from the reaction of mixed paint hardener and accelerator) and the selection of a wrong voltage (e.g., 200V cable for 100V equipment), indicating an insufficient exploitation of lessons of past cases of fire and measures produced by the ability of licensees to imagine hire hazards.

These all point toward the need for further reinforcement of fire prevention by better management of items i) to iii).

XIV-4-4 Fire Prevention Measures

The analysis of the cases of fire outbreak identified the direct causes (work using flame and the presence of combustibles including hazardous materials) and the underlying factors (work-site management, assessment of fire hazards, education, training, and awareness), which demonstrate the importance of the following actions:

(1) Management of combustibles and hazardous materials
- Minimize the amount of combustibles and hazardous materials that are brought in, regardless of whether it is to a radiation controlled area or a non radiation-controlled area.

(2) Work using flame (including work using solvents (hazardous materials))
- Check before work begins
- Check of items for the performance of work (e.g. posting of fire watchers, curing, antistatic measures, checking of the integrity of equipment to be used)

(3) Work-site management for fire protection
- Fire hazard assessment (e.g. prior approval of the work, fire prevention patrol, information sharing)
- Work-site management for fire protection at power stations (e.g. fire protection patrol, prior consultation on work, posting of watchers)

(4) Education and awareness program for fire protection
- Fire protection training when workers of the licensees and subcontractors enter the work sites
- Specialized fire protection training for fire watchers

  and more.

Table XIV-4-1 Cases of Fire and the Analysis of Factors, FY 2010

Case number	Licensee	Date of occurrence	Unit	Case title	Direct cause	Underlying factor	Common factor
FY 2010 -(1)	The Japan Atomic Power Co., Ltd.	March.18. 2010	Tsuruga Power Station	Fire near the incline in Tsuruga Power Station	Fusion cutting work	Inadequate curing, checking, and management during the fusion cutting work; ii), iii)	i) Inadequate product management system of manufacturers ii) Inadequate on-site fire prevention control by the licensees iii) Inadequate on-site fire prevention control by the subcontractors iv) Insufficient training on fires and hazardous materials by the licensees v) Insufficient training on fires and hazardous materials by the subcontractors vi) Insufficient ability to imagine fire hazards by the licensees
FY 2010 -(2)	Chubu Electric Power Co., Inc.	May.12. 2010	Hamaoka Nuclear Power Station Unit 5	Fire breakout from an electric saw on the 3rd floor of the turbine building	Cleaning work using solvent	Insufficient awareness on the danger of the work; ii), iii), iv), v) vi)	
FY 2010 -(3)	Chubu Electric Power Co., Inc.	June.8. 2010	Hamaoka Nuclear Power Station Unit 1	Smoke identified in the switching panel of the illumination power source on the 2nd floor of the turbine building	Component abnormality	Inadequate maintenance and implementation i), ii), vi)	
FY 2010 -(4)	The Chugoku Electric Power Co., Inc.	June.14. 2010	Shimane Nuclear Power Station Unit 3	Fire in the construction site of Shimane Nuclear Power Station Unit 3 (smoke from metal dust bin)	Spontaneous fire	Insufficient maintenance, checkup, and training; ii), iii), iv), v), vi)	
FY 2010 -(5)	Tokyo Electric Power Co., Inc	August.23. 2010	Kashiwazaki-Kariwa Nuclear Power Station	Fire within the power station premises (outdoor fire from chips)	Spontaneous fire	Insufficient maintenance, checkup, and training; ii), iii), iv), v), vi)	
FY 2010 -(6)	The Kansai Electric Power Co., Inc.	November.19. 2010	Takahama Power Station Unit 3	Fire in the diesel generator room in Takahama Unit 3	Cutting work using a grinder	Insufficient maintenance, checkup, and training; ii), iii), iv), v), vi)	
FY 2010 -(7)	The Japan Atomic Power Co., Ltd.	December.2. 2010	Tsuruga Power Station	Fire on the first floor of Wing A of the solid waste storage space in Tsuruga Power Station	Component abnormality	Insufficient maintenance, checkup, and training; ii), iv), vi)	
FY 2010 -(8)	The Kansai Electric Power Co., Inc.	January.15. 2011	Ohi Power Station Unit 1	Fire alarm set off from the fire alarm in the reactor containment	Welding work	Insufficient maintenance, implementation, and training; ii), iii), iv), v), vi)	
FY 2010 -(9)	Chubu Electric Power Co., Inc.	January.19. 2011	Hamaoka Nuclear Power Station Unit 3	Fire from a combustible sheet as a result of inadequate fire prevention curing during the fusion cutting work	Fusion cutting work	Insufficient maintenance, implementation, and training; ii), iii), iv), v), vi)	
FY 2010 -(10) to (14)	Tokyo Electric Power Co., Inc.	March.11. 2011 and others	Fukushima Daiichi Nuclear Power Station Units 1, 3, and 4	[Associated with the Tohoku District - off the Pacific Ocean Earthquake] ● Hydrogen explosions in the reactor buildings of Units 1, 3, and 4 ● Fire in the reactor building of Unit 4 (details unknown)	Natural phenomenon (earthquake)	<<Investigation into details is not complete>>	
FY 2010 -(15)	Tohoku Electric Power Co., Inc.	March.11. 2011	Onagawa Power Station Unit 1	[Associated with the Tohoku District - off the Pacific Ocean Earthquake] Fire from high-voltage power panel in the 1st basement of the turbine building	Natural phenomenon (short circuit caused by earthquake)	Insufficient maintenance, checkup, and training; iv), vi)	

Table XIV-4-2 Cases of Fires and the Analysis of Factors, FY 2011

Case number	Licensee	Date of occurrence	Unit	Case title	Direct cause	Underlying factor	Common factor
FY 2011 -(1)	Japan Nuclear Fuel, Ltd.	April.16. 2011	Reprocessing plant	Burn mark identified with a fluorescent lamp in the reprocessing plant of JNFL	Unidentified	Under investigation	i) Inadequate product management system of manufacturers ii) Inadequate on-site fire prevention control by the licensees iii) Inadequate on-site fire prevention control by the subcontractors iv) Insufficient training on fires and hazardous materials by the licensees v) Insufficient training on fires and hazardous materials by the subcontractors vi) Insufficient ability to imagine fire hazards by the licensees
FY 2011 -(2)	The Japan Atomic Power Co., Ltd.	May.17. 2011	Tsuruga Power Station Unit 2	Fire from a cleaning cloth during work on the top part of the raw water tank	Welding and fusion cutting work	Insufficient maintenance, implementation, and training; ii), iii), iv), v), vi)	
FY 2011 -(3)	Japan Nuclear Fuel Ltd.	May.18. 2011	Reprocessing plant	Burn mark identified with the remote maintenance device in the pretreatment building in the reprocessing plant of JNFL	Unidentified	Under investigation	
FY 2011 -(4)	Tokyo Electric Power Co., Inc.	May.27. 2011	Fukushima Daini Nuclear Power Station Unit 1	Fire in the attached wing of the reactor building of Fukushima Daini Nuclear Power Station Unit 1	Unidentified	Under investigation	
FY 2011 -(5)	The Japan Atomic Power Co., Ltd.	July.6. 2011	Tokai No. 2 Power Station	Fire on the 3rd floor of the waste treatment building	Poor operation	Inadequate operation, maintenance, and training; ii), iii), iv), v), vi)	
FY 2011 -(6)	Kyushu Electric Power Co., Inc.	September.10. 2011	Sendai Power Station Unit 2	Small fire on the premises of Sendai Nuclear Power Station	Cleaning work using solvent	Insufficient awareness on the danger of the work; ii), iii), iv), v) vi)	
FY 2011 -(7)	The Japan Atomic Power Co., Ltd.	October.12. 2011	Tsuruga Power Station Unit 2	Smoke from a plastic sheet in the reactor containment	Welding work	Insufficient maintenance, implementation, and training; ii), iii), iv), v), vi)	
FY 2011 -(8)	The Japan Atomic Power Co., Ltd.	December.27. 2011	Tokai No. 2 Power Station	Fire in the water intake pump area of Tokai No. 2 Power Station	Unidentified	Under investigation	
FY 2011 -(9)	The Japan Atomic Power Co., Ltd.	January.13 2012	Tokai Power Station (being decommissioned)	Fire on the rooftop cooling tower in the vitrification treatment building of Tokai Power Station	Poor work operation	Inadequate operation, maintenance, and training; ii), iii), iv), v), vi)	
FY 2011 -(10)	The Kansai Electric Power Co., Inc	March.16. 2012	Takahama Power Station	Small fire in the workshop in Wing A of the office of the subcontractor for Takahama Power Station	Poor work operation	Insufficient awareness on the danger of the work; ii), iii), iv), v) vi)	

Table XIV-4-3 Cases of Fires and the Analysis of Factors, FY 2012

Case number	Licensee	Date of occurrence	Unit	Case title	Direct cause	Underlying factor	Common factor
FY 2012 -(1)	Kyushu Electric Power Co., Inc.	June.15. 2012	Genkai Power Station	Damage of lighting cables in the miscellaneous solid waste melting building	Poor work operation	Insufficient maintenance, implementation, and training; ii), iii), iv), v), vi)	i) Inadequate product management system of manufacturers ii) Inadequate on-site fire prevention control by the licensees iii) Inadequate on-site fire prevention control by the subcontractors iv) Insufficient training on fires and hazardous materials by the licensees v) Insufficient training on fires and hazardous materials by the subcontractors vi) Insufficient ability to imagine fire hazards by the licensees
FY 2012 -(2)	Tokyo Electric Power Co., Inc.	October.19. 2012	Fukushima Daiichi Nuclear Power Station Units 1 and 2	Fire around the ultra-high voltage switchyard (outdoor) of Units 1 and 2	Natural phenomenon (ignition of weed)	<<Investigation into details is not complete>>	
FY 2012 -(3)	The Kansai Electric Power Co., Inc.	October.24. 2012	Takahama Power Station Unit 2	Fire due to solvent in the reactor auxiliary building (small fire)	Poor work operation	Insufficient awareness on the danger of the work; ii), iii), iv), v) vi)	
FY 2012 -(4)	Tokyo Electric Power Co., Inc.	January.24. 2013	Fukushima Daiichi Nuclear Power Station	Fire alarm set off in the shared auxiliary facility (shared pool) at Fukushima Daiichi NPS	Poor work operation	Insufficient awareness on the danger of the work; ii), iii), iv), v) vi)	

XV EVALUATION OF EVENTS

XV-1 Outline of International Nuclear and Radiological Event Scale (INES)

1. Outline of International Nuclear and Radiological Event Scale (INES)

   The International Nuclear and Radiological Event Scale (INES) was prepared by the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency of the Organization for Economic Co-operation and Development (OECD/NEA) as an indicator capable of concisely expressing how the safety significance of each event at a nuclear facility. The International Nuclear Event Scale (INES 2001 Edition) was proposed to the member states in March, 1992. Japan had started to apply INES 2001 Edition on August 1, 1992. In addition, Japan have started to use INES 2008 Edition, which extended to be applicable to any event associated with radiation sources and the transport of radioactive material, from April 1, 2010.

   The INES classifies events into 8 levels from 0 to 7 as shown in Table XV-1-1. Level 0 is classified as Below Scale, Levels 1 to 3 are classified as incidents and Levels 4 to 7 are classified as accidents. Events are evaluated based on Criterion 1, Criterion 2 and Criterion 3, and the highest level is taken as the rating result for that event.

   Its operation takes place as follows. For those events occurring at nuclear facilities which were reported to the Government based on the Nuclear Reactor Regulation Law, their tentative INES rating will be promptly made and published by the Nuclear and Industrial Safety Agency (NISA) as a general rule. After cause determination and the determination of preventative measures and so forth against reoccurrence, the INES Evaluation Subcommittee※, consisting of persons of learning and experience and established in the Nuclear Safety and Security Section of the Advisory Committee for Natural Resources and Energy, will deliberate the event rating. After that NISA will make the final rating based on rating results by the subcommittee and will be published the final rating.

   For all events rated at Level 2 or above, and events that attract the attention of the general public internationally, the Nuclear and Industrial Safety Agency will aim to notify the IAEA within 24 hours, and the IAEA will in turn immediately notify the INES participatory countries.

   For reference purposes, the process of establishing the INES is described below.

※The INES Evaluation Subcommittee is to be abolished and the Nuclear Regulation Authority is to deliberate matters in and after 2013.

XV

Table XV-1-1 The Criteria for Rating Events at Nuclear Facilities in INES

	Level	Criteria		
		Criterion-1 People and the environment	Criterion-2 Radiological barriers and controls at facilities	Criterion-3 Defense in depth
Accident	7 (Major accident)	- Major release of radioactive material with widespread health and environmental effects requiring implementation of planned and extended countermeasures.		
Accident	6 (Serious accident)	- Significant release of radioactive material likely to require implementation of planned countermeasures.		
Accident	5 (Accident with wider consequences)	- Limited release of radioactive material likely to require implementation of some planned countermeasures. - Several deaths from radiation.	- Severe damage to reactor core. - Release of large quantities of radioactive material within an installation with a high probability of significant public exposure. This could arise from a major criticality accident or fire.	
Accident	4 (Accident with local consequences)	- Minor release of radioactive material unlikely to results in implementation of planned countermeasures other than local food controls. - At least one death from radiation.	-Fuel melt or damage to fuel resulting in more than 0.1% release of core inventory. - Release of significant quantities of radioactive material within an installation with a high probability of significant public exposure.	
Incident	3 (Serious incident)	- Exposure in excess of ten times the statutory annual limit for workers. - Non-lethal deterministic health effect (e.g. burns) from radiation.	- Exposure rates of more than 1Sv/hr in an operating area. - Severe contamination in an area not expected by design, with a low probability of significant public exposure.	- Near accident at a nuclear power plant with no safety provisions remaining. - Lost or stolen highly radioactive sealed source. - Misdelivered highly radioactive sealed source without adequate radiation procedures in place to handle it.
Incident	2 (Incident)	- Exposure of a member of the public in excess of 10mSv. - Exposure of a worker in excess of the statutory annual limits.	- Radiation levels in an operating area of more than 50mSv/hr. - Significant contamination within the facility into an area not expected by design.	- Significant failures in safety provisions but with no actual consequences. - Found highly radioactive sealed orphan source, device or transport package with safety provisions intact. - Inadequate packaging of a highly radioactive sealed source.
Incident	1 (Anomaly)			- Overexposure of a member of the public in excess of statutory limits. - Minor problems with safety components with significant defense in depth remaining. - Low activity lost or stolen radioactive source, device or transport package.
Below scale	0 (Below scale)	No safety significant events		0+ Events having a possibility to challenge the safety requirement 0- Events having no possibility to challenge the safety requirement
Out of scale		No safety relevant events		

※ The Nuclear Regulation Authority determines ratings at Levels 0+ and 0- are unified as those at level 0 on July 10, 2013.

XV-2 Outline of Event Rating in FY2012

In FY2012, the INES Evaluation Subcommittee of the Nuclear Safety and Security Section of the Advisory Committee for Natural Resources and Energy held one session and deliberated for event rating on the 8 events occurring in FY2012 or before FY2012. (See Tables XV-2-1 to 4).

The rating results of the 8 events were 3 cases at Level 1, 0 case at Level 0+, 5 cases at Level 0–, 0 case at Level 0.

Of these, the number of rated events occurring in FY2012 was 1 case, and their detail is 0 case at Level 0+, 1 case at Level 0–, 0 case at Level 0.

The rating results are as follows:

- 31st session of the INES Evaluation Subcommittee (held on July 13, 2012; 8 cases rated)
  Of the 8 events rated, 1 case is events occurring in FY 2010.
  Of the 8 events rated, 6 cases are events occurring in FY 2011.
  Of the 8 events rated, 1 case is events occurring in FY 2012.

Table XV-2-1　Events at Nuclear Power Plants Evaluated in FY2012（Events in FY2012）

Occurrence date	Nuclear Power Plant	Event	INES Level			
			Criterion 1	Criterion 2	Criterion 3	
April 4, 2012	Onagawa Nuclear Power Station Unit-1, Tohoku Electric Power Co.	Failure of a seawater pump in the emergency cooling seawater system	—	—	0-	0-

Table XV-2-2　Events at Nuclear Power Plants Evaluated in FY2012（Events in FY2011）

Occurrence date	Nuclear Power Plant	Event	INES Level			
			Criterion 1	Criterion 2	Criterion 3	
March 27, 2012	Fukushima-Daini Nuclear Power Station, Tokyo Electric Power Co.	Radioactive contamination in the uncontrolled areas	—	—	1	1
March 30, 2012	Hamaoka Nuclear Power Station Unit-5, Chubu Electric Power Co.	Identification of holes in the liner of the condensate storage tank	—	—	0-	0-
December 16, 2011	Genkai Nuclear Power Station Unit-3, Kyushu Electric Power Co.	Breakage of main shaft of the charging pump	—	—	0-	0-
March 29, 2012	Takahama Nuclear Power Station Unit-3, The Kansai Electric Power Co.	Significant signal indications of a flaw in a steam generator tube detected through the eddy current test (ECT)	—	—	0-	0-

Table XV-2-3　Events at Nuclear Power Plant in Research and Development Stage Evaluated in FY2012（Events in FY2010）

Occurrence date	Nuclear Facility	Event	INES Level			
			Criterion 1	Criterion 2	Criterion 3	
November 9, 2010	Fast Breeder Reactor Research and Development Center, Tsuruga Head Office, Japan Atomic Energy Agency	Deformation of the in-vessel transfer machine	—	—	0-	0-

Table XV-2-4　Events at Reprocessing Facilities Evaluated in FY2012（Events in FY2011）

Occurrence date	Nuclear Facility	Event	INES Level			
			Criterion 1	Criterion 2	Criterion 3	
September 13, 2011	Reprocessing Facility owned by Japan Atomic Energy Agency	Temporary stoppage of a blower in the high level liquid radioactive waste storage tank at the Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility owned by Japan Atomic Energy Agency	—	—	1	1
October 28, 2011	Reprocessing Facility owned by Japan Atomic Energy Agency	Identification of a hole penetrating the wall of the main stack at the Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility owned by Japan Atomic Energy Agency	—	—	1	1

XV-3 Press Release Documents Related to the International Nuclear and Radiological Event Scale (INES) for Events at Nuclear Facilities

NISA evaluated INES (International Nuclear and Radiological Event Scale) Ratings for Events at Nuclear Facilities

July 19, 2012

On July 13, 2012, Nuclear and Industrial Safety Agency (NISA) convened the INES Evaluation Subcommittee (Chairman: Vice Dean Naoto Sekimura, Graduate School of Engineering, The University of Tokyo) to assign INES (*1) ratings for events that have occurred at nuclear facilities. The INES Evaluation Subcommittee is part of the Nuclear and Industrial Safety Subcommittee within the Advisory Committee for Natural Resources and Energy.

Today (July 19, 2012), NISA confirmed the final INES ratings for these events, which are presented below.

1. Background

On July 13, 2012, Nuclear and Industrial Safety Agency (NISA) convened the INES Evaluation Subcommittee (Chairman: Professor Naoto Sekimura, Graduate School of Engineering, The University of Tokyo) at the Ministry of Economy, Trade and Industry (METI) to assign INES ratings for 8 events that have occurred at nuclear facilities. The INES Evaluation Subcommittee is part of the Nuclear and Industrial Safety Subcommittee within the Advisory Committee for Natural Resources and Energy. On July 19, 2012, NISA established the final ratings for the 8 events on the basis of the recommendations of the Subcommittee.

2. Result of the evaluation

Among the eight events that were evaluated, three events including the leakage of water sample containing radioactive materials at the Fukushima-Daini Nuclear Power Station owned by Tokyo Electric Power Co. and the identification of a hole penetrating the wall of the main stack duct at the Reprocessing Plant owned by Japan Atomic Energy Agency are rated level 1, and five events including the breakage of the main shaft of the charging pump at the Genkai Nuclear Power Station Unit-3 owned by Kyushu Electric Power Co. are rated level 0-.

The summaries and final ratings for the 8 events that were evaluated are shown in the appendix.

(*1) INES (International Nuclear and Radiological Event Scale) is an indicator used to promptly communicate the safety significance of a reported nuclear and radiological incident or accident. Events are evaluated based on 3 rating criteria (namely, criterion 1: people and the environment, criterion 2: radiological barriers and controls at facilities, and criterion 3: defense in depth) and the highest level among the 3 criteria is adopted as the INES rating level of the event. The INES levels range from Level 0 (no safety significance) to Level 7 (major accident). Level 0 is classified into Level 0- (event that did not challenge safety requirements) and Level 0+ (event that could possibly challenge the safety requirements). For details, please refer to “INES leaflet” that could be obtained at the IAEA web-site.

(Attachment)

Occurrence Date	Nuclear Facility	Event	INES Level	Basis of Rating
March 27, 2012	Fukushima-Daini Nuclear Power Station	Radioactive contamination in the uncontrolled areas	1	In this event, during the plant shutdown, water samples containing radioactive materials, while being transported for sampling analysis, slightly leaked in the uncontrolled areas. Because of this event, the transportation of the water sample did not comply with the technical standards and was conducted without any control, and thus, safety protection layer did not remain, which could cause further spread of contamination. Therefore, the rating was considered to be level 1.
March 30, 2012	Hamaoka Nuclear Power Station Unit-5, Chubu Electric Power Co.	Identification of holes in the liner of the condensate storage tank	0-	In this event, holes penetrating the liner of the condensate storage tank were found. No water leakage to outside the system was found and the function of this tank as a water source for the emergency core cooling system was maintained. This event had no effect on the plant's safety. Therefore, the rating was considered to be level 0-.
April 4, 2012	Onagawa Nuclear Power Station Unit-1, Tohoku Electric Power Co.	Failure of a seawater pump in the emergency cooling seawater system	0-	In this event, a seawater pump in the ECSW system failed and became unavailable during plant shutdown. Another pump automatically started and operated normally. This event had no effect on the plant's safety. Therefore, the rating was considered to be level 0-.
December 16, 2011	Genkai Nuclear Power Station Unit-3, Kyushu Electric Power Co.	Breakage of main shaft of the charging pump	0-	In this event, Unit-3 was under shutdown, and the main shaft of the charging pump was broken. Two standby charging pumps were available, and the plant operation continued by replacing with one of the standby charging pumps. This event had no effect upon the plant's safety. Therefore, the rating was considered to be level 0-.
March 29, 2012	Takahama Nuclear Power Station Unit-3, The Kansai Electric Power Co.	Significant signal indications of a flaw in a steam generator tube detected through the eddy current test (ECT)	0-	In this event, significant signal indications of a flaw in the steam generator tube were detected through the ECT during the periodic inspection. As there was no record showing a primary coolant leak during the reactor operation, this event had no effect on the plant's safety. Therefore, the rating was considered to be level 0-.

(Attachment)

Occurrence Date	Nuclear Facility	Event	INES Level	Basis of Rating
November 9, 2010	Fast Breeder Reactor Research and Development Center, Tsuruga Head Office, Japan Atomic Energy Agency	Deformation of the in-vessel transfer machine	0-	In this event, the IVTM fell in the reactor vessel during plant shutdown. This event occurred in the non-fuel handling status, and there was no effect on the safety of the facility. Therefore, the rating was considered to be level 0-.
September 13, 2011	Reprocessing Facility owned by Japan Atomic Energy Agency	Temporary stoppage of a blower in the high level liquid radioactive waste storage tank at the Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility owned by Japan Atomic Energy Agency	1	Although this event is considered to be the potential loss of confinement of the radioactive materials due to the temporary stoppage of the ventilation blower for the high level liquid waste storage tank, the boundary (storage tank), the cooling system for the storage tank, and the ventilation system of the building were sound. Therefore, the rating was considered to be level 1.
October 28, 2011	Reprocessing Facility owned by Japan Atomic Energy Agency	Identification of a hole penetrating the wall of the main stack at Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility owned by Japan Atomic Energy Agency	1	In this event, holes penetrating the wall of the stack duct were found during the plant shutdown. The actual effects of this event were not confirmed, but the feedback on the operating experience of similar past events was insufficient. Therefore, the rating was considered to be level 1.

No. 1

1. Nuclear Facility:
   Fukushima-Daini Nuclear Power Station

2. Date of Occurrence:
   March 27, 2012

3. Event:
   Radioactive contamination in the uncontrolled areas

4. Event Description:

Fukushima-Daini Units-3 and -4 were under shutdown. It was found that a workbench on which the containers of the water samples used in the analyses were placed had become soaked during the acceptance of the containers. Measurement of the radioactivity at the location of the spill was approximately 205 Bq/cm2, and it was therefore confirmed that radioactive contamination occurred outside the radiation-controlled area. Therefore, locations that may have been contaminated with radioactive material were zoned in order to prevent the spread of the contamination. Through an investigation into the contamination status in the service building, seven contaminated locations were found in the non-radiation controlled area. These locations were either decontaminated or zoned to prevent the spread of the contamination. Seven containers were used to transport the water sample, and it was confirmed that the lid of one of the containers was loose. Radiation exposure to a worker is 0.07 mSv at maximum (*1).

Through the investigation into this event, causes of the generation of radioactive contamination in the uncontrolled areas are assumed as follows:

- When the seven polyethylene containers that had been brought in were checked, a plug for one of them was found to be loose; the same amount of water as that in the container was observed to exist between the outside surface of the container and its protective vinyl bag, and a tear was discovered at the bottom of the bag, which caused water leakage.
- Concerning the looseness of the plug, a burr was discovered between the container itself and the plug, the protrusion of which prevented the plug from shutting completely. It is assumed that the plug gradually loosened with the vibration produced during subsequent transport.
- Because the container in question was sealed inside a protective vinyl bag and was placed on the floor, on the loading platform of the transportation vehicle, and on the ground between the time when the water was placed in the container and when the container arrived at the Fukushima Daini Nuclear Power Station, it is assumed that the bag was torn by rubbing against a projection on the loading platform of the vehicle or on the ground.
- It has been determined that this transportation of the water sample did not comply with the technical standards for transportation of nuclear fuel materials outside the workplace.

In this event, water samples, while being transported from the Fukushima Daiichi Nuclear Power Station for sampling analysis, leaked in the uncontrolled areas of service buildings for the Fukushima-Daini Nuclear Power Station. Because the spill was not considered to have exposed the workers involved in the transport to a significant radiation or to have leaked outside the Station, it was not immediately considered to be a problem for safety.

(*1) This is the cumulative value of the dosimeter and, therefore, includes the effective dose by exposure due to processes other than transportation work.

5. Rating Results and Their Basis:

(1) Criterion 1: -
   (Basis: Since the radiation dose that the workers received was less than the annual dose limit stipulated by the law, the rating was considered to be “out of scale.”)

(2) Criterion 2: -
   (Basis: Since the amount of leakage was less than the standard value for level 2, the rating was considered to be “out of scale.”)

(3) Criterion 3: Level 1
   (Basis: In this event, during the plant shutdown, water samples containing radioactive materials, while being transported for sampling analysis, slightly leaked in the uncontrolled areas. Because of this event, the transportation of the water sample did not comply with the technical standards and was conducted without any control, and thus, safety protection layer did not remain, which could cause further spread of contamination. Therefore, the rating was considered to be level 1.)

(4) Final Rating Result: Level 1 as a result of [Criterion 1: -, Criterion 2: -, Criterion 3: Level 1]

No. 2

1. Nuclear Facility:
   Hamaoka Nuclear Power Station Unit-5 (BWR, rated electric power: 1380 MWe)

2. Date of Occurrence:
   March 30, 2012

3. Event:
   Identification of holes in the liner of the condensate storage tank

4. Event Description:

Hamaoka Nuclear Power Station Unit-5 was under shutdown for periodic inspection. When the liner of the condensate storage tank was inspected, a total of 40 holes in the wall and the bottom were found. In addition, a detailed inspection of these holes showed that the holes in the wall conformed to the wall thickness requirements but holes in 11 areas had penetrated the liner. Therefore, the condensate storage tank did not conform to technical standards, and it was judged that this event must be reported to NISA in accordance with the law.

Through the investigation into this event, causes of the generation of holes penetrating the liner of the condensate storage tank are assumed as follows:

- On May 14, 2011, seawater entered into the reactor facilities due to the failure of the condenser tubes. Because the water in the condensate storage tank after the penetration of seawater into the tank shows the water quality to be prone to generating the crevice corrosion and because the chemical structure formed by clad accumulated at the bottom of the condensate tank becomes a factor in generating the crevice corrosion, the crevice corrosion generated in the liner of the condensate storage tank and developed, resulting in holes that penetrated through the wall
- As a possible reason for the failure of condenser tubes, it is estimated that an end-cap of the motor-driven reactor feed pump minimum-flow piping came off and that a condenser tube was damaged by a jet flow from there. As for the coming off of the end-cap, it is estimated that the initial crack generated during the welding work of the end-cap region. Afterwards, a cyclic stress had been applied to the end-cap region due to the pressure fluctuations generated during the motor-driven feedwater pump operations, resulting in the development of the initial crack; eventually, the end-cap was broken, which caused the end-cap to come off.

In this event, seawater entered into the reactor facility due to the failure of the condenser tubes, and crevice corrosion generated in the liner of the condensate storage tank and developed, causing holes that penetrated through the wall. As no water leakage to outside the system was found, this event does not affect plant safety. There was no effect of radioactive materials inside or outside the plant.

5. Rating Results and Their Basis:

(1) Criterion 1: -
   (Basis: Since there was no impact upon people or the environment, this event was not rated for this criterion.)

(2) Criterion 2: -
   (Basis: Since there was no impact upon the facilities' radiological barriers or controls, this event was not rated for this criterion.)

(3) Criterion 3: Level 0-
   (Basis: In this event, holes penetrating the liner of the condensate storage tank were found. No water leakage to outside the system was found and the function of this tank as a water source for the emergency core cooling system was maintained. This event had no effect on the plant's safety. Therefore, the rating was considered to be level 0-.)

(4) Final Rating Result: Level 0- as a result of [Criterion 1: -, Criterion 2: -, Criterion 3: Level 0-]

No. 3

1. Nuclear Facility:
   Onagawa Nuclear Power Station Unit-1(BWR, rated electric power: 520 MWe)

2. Date of Occurrence:
   April 4, 2012

3. Event:
   Failure of a seawater pump in the emergency cooling seawater system

4. Event Description:

Unit 1 of the Onagawa Nuclear Power Station was under shutdown for periodic inspection. A motor of the seawater pump (A) in the emergency cooling seawater (ECSW) system automatically stopped, which caused the seawater pump (C) in the ECSW system to automatically start. Through an investigation into why the pump motor stopped, it was confirmed that the insulation resistance had significantly decreased. Therefore, it was concluded that some sort of failure occurred in the motor, and the pump in the ECSW system could not operate.

Through the investigation into this event, causes of the failure of a seawater pump in the ECSW system are assumed as follows:

- During the factory shipment and the field installation work associated with the replacement (carried out from Feb. 2008 to May 2009) of the motor of the seawater pump (A) in the ECSW system, a filler cap of the lubricant oil tank was not sufficiently tightened.
- Therefore, rainwater etc. entered into the tank through the gap of the concerned filler cap after the motor was installed, and subsequently, rust generated in the motor.
- A short circuit was formed in a part of the coils because rainwater etc. had penetrated into and rust has formed on the stator coil of the concerned motor, and this rust had propagated to other parts of coils. Subsequently, grounding occurred and the pump automatically stopped.
- Although it was confirmed in September 2010 that the readings of the oil level gauge of the lubricant oil for the concerned motor exceeded the upper limit, it was judged that no problem could occur as long as the oil level was higher and no special action was taken.

In this event, rainwater etc. entered into the tank through the gap of the filler cap of the motor for the ECSW system seawater pump, and subsequently, rust generated in the motor, which caused grounding and the pump automatically stopped. Another pump that automatically started operated normally. Therefore, this event does not affect plant safety immediately.

There was no effect of radioactive materials inside or outside the plant.

5. Rating Results and Their Basis:

(1) Criterion 1: -
   (Basis: Since there was no impact upon people or the environment, this event was not rated for this criterion.)

(2) Criterion 2: -
   (Basis: Since there was no impact upon the facilities' radiological barriers or controls, this event was not rated for this criterion.)

(3) Criterion 3: Level 0-
   (Basis: In this event, a seawater pump in the ECSW system failed and became unavailable during plant shutdown. Another pump automatically started and operated normally. This event had no effect on the plant's safety. Therefore, the rating was considered to be level 0-.)

(4) Final Rating Result: Level 0- as a result of [Criterion 1: -, Criterion 2: -, Criterion 3: Level 0-]

No. 4

1. Nuclear Facility:
   Genkai Nuclear Power Station Unit-3 (PWR: rated electric output 1,180MW)

2. Date of Occurrence:
   December 16, 2011

3. Event:
   Breakage of main shaft of the charging pump

4. Event Description:

Unit-3 of the Genkai Nuclear Power Station was shutdown for periodic inspection. On December 9, 2011, an alarm indicating the detection of a high temperature in the bearing in charging pump (C) sounded in the main control room, and as a result, pump operations were switched to the standby charging pump (A). From the inspection of the site, it was confirmed that water had leaked from the sealed section of the charging pump (C). Although the leaked water contained radioactive materials, all the leaked water remained in the bank and was transferred into the liquid waste treatment system. Therefore, this event did not cause an environmental effect due to radioactive materials. When the charging pump was later overhauled, it was confirmed that the main shaft of the charging pump was broken. Therefore, on December 16, 2011, it was judged that the charging pump could not maintain the necessary functions.

Through the investigation into this event, causes of the main shaft breakage are assumed as follows:

- The fact that the radius of curvature of the split ring grooves of the main shaft of the charging pump is less than the drawing instructions indicates that stress was concentrated. Contact between the split ring and the main shaft when the impeller was installed produced much more stress on the grooves of the split ring than the stress produced when no contact was made.
- The fact that the volume control tank operated at a low water level for an extended period of time when the periodic inspection was conducted resulted in gas accumulation in the horizontal piping and flowed into the charging pump, thereby causing the main shaft to vibrate.
- This vibration of the main shaft produced early stage cracking from the split ring grooves of the main shaft where stress was concentrated, and the vibration produced by the subsequent intermittent flow of gas resulted in cracks, resulting in damage of the main shaft.
- Similar breakage of the main shafts has also been observed in the charging pumps (Unit-3 at the Ikata Nuclear Power Station of Shikoku Electric Power Co. and Unit-1 at the Sendai Nuclear Power Station of Kyushu Electric Power Co.) because of the following combined effects; i) The radius of curvature of the split ring grooves of the main shaft was small, and the stress was concentrated there; and ii) abnormal vibration of the main shaft was caused by operating the charging pump at a low water level and by the flow of gas into the charging pump, because of the operating without the volume control tank being pressurized
- When the possibility of breakage was assessed for the Genkai-3, it was assessed that abnormal vibration would not be produced in the main shaft because the flow of gas into the pump is very less, and so, the main shaft would not be broken. Replacement of the main shaft was therefore deemed unnecessary.
- In this event, breakage of the main shaft is caused by the combined effects of abnormal vibration due to the flow of gas into the pump caused by other factors, and so, the previous assessment method for the feedback of operating experience to other plants was insufficient.

In this event, because of the stress concentrated on the grooves of the split ring of the charging pump (C) and because of the vibration of the main shaft due to the flow of gas into the charging pump, cracks generated and developed, causing breakage of the main shaft. As the plant operation continued by replacing with a standby charging pump (A), there was no problem involving safety. Because the total amount of radioactive water leaked from the charging pump (C) did not breach the weir and was transferred to the liquid waste treatment system, it was determined that there was no effect of the radioactive material outside the plant.

5. Rating Results and Their Basis:

(1) Criterion-1: -
   (Basis: Since there was no impact on people or the environment, this event was not rated for this criterion.)

(2) Criterion-2: -
   (Basis: Since there was no impact upon the radiological barriers or controls at the facilities, this event was not rated for this criterion.)

(3) Criterion-3: Level 0-

(Basis: In this event, Unit-3 was under shutdown, and the main shaft of the charging pump was broken. Two standby charging pumps were available, and the plant operation continued by replacing with one of the standby charging pumps. This event had no effect upon the plant's safety. Therefore, the rating was considered to be level 0-.)

(4) Final Rating Result: Level 0- as a result of [Criterion 1: -, Criterion 2: -, Criterion 3: Level 0-]

No. 5

1. Nuclear Facility:
   Takahama Power Station Unit-3 (PWR, rated electric power: 870 MWe)

2. Date of Occurrence:
   March 29, 2012

3. Event:
   Significant signal indications of a flaw in a steam generator tube detected through the eddy current test (ECT)

4. Event Description:
   Takahama Unit-3 was under shutdown for periodic inspection. The eddy current test (ECT) was performed on all tubes (9,786 tubes in total, excluding plugged tubes) of the three steam generators (SGs) to confirm their integrity. Significant signal indications of a flaw were detected for one tube in the SG-C (3,264 tubes in total, excluding plugged tubes). Significant signal indications were also detected in the tube sheet portion on the hot leg side (also known as the primary coolant inlet side). No significant signal indications of a flaw were recognized other than those for SG-C.
   Through the investigation into this event, the causes of significant signal indications detected through the ECT at the SG-C tubes are assumed as follows:
   - From a detailed analysis of the significant signal indications detected by this test, the crack was judged to be an axial-directional non-through-wall crack in the inner surface of the tube. This conclusion was made because the crack showed characteristics of an axial-directional crack on the inner surface of the tube at the top end of the tube expansion region, found in the tubesheet portion of the hot leg side, and there were no symptoms showing primary coolant leak during reactor operation.
   - Significant signal indications show the same characteristics as a primary water stress corrosion crack (PWSCC), whose technical details are well known. A flaw developed and was detected on this occasion.
   - Causes were estimated as follows: Residual stress had been generated locally on the inner surface when nickel-based Alloy 600 tubes were expanded during the manufacture in a steam generator. PWSCC was generated as a result of the combined effects of the residual stress and the pressure of the primary coolant in the reactor operation.

   In this event, residual stress had been generated locally on the inner surface when the tubes were expanded during the manufacture in a SG-C The PWSCC was generated as a result of the combined effects of the residual stress and the pressure of the primary coolant in the reactor operation. As there was no record showing a primary coolant leak during the reactor operation, this event did not immediately affect plant safety.
   There was no effect of radioactive materials inside or outside the plant.

5. Rating Results and Their Basis:
(1) Criterion 1: -
   (Basis: Since there was no impact upon people or the environment, this event was not rated for this criterion.)
(2) Criterion 2: -
   (Basis: Since there was no impact upon the facilities' radiological barriers or controls, this event was not rated for this criterion.)
(3) Criterion 3: Level 0-
   (Basis: In this event, significant signal indications of a flaw in the steam generator tube were detected through the ECT during the periodic inspection. As there was no record showing a primary coolant leak during the reactor operation, this event had no effect on the plant's safety. Therefore, the rating was considered to be level 0-.)
(4) Final Rating Result: Level 0- as a result of [Criterion 1: -, Criterion 2: -, Criterion 3: Level 0-]

No. 6

1. Nuclear Facility:
   Fast Breeder Reactor Research and Development Center
   (FBR, rated electric output: 280MW)

2. Date of Occurrence:
   November 9, 2010

3. Event:
   Deformation of the in-vessel transfer machine

4. Event Description:

During the removal operation of the in-vessel transfer machine (IVTM) from the reactor vessel after the refueling operation at the Fast Breeder Reactor Research and Development Center in the cold shutdown condition, the IVTM fell in the reactor vessel. Through the visual inspection of the insides of the IVTM, it was found that the gap at the top of the inner guide tube, which is normally 5–7 mm in size, was actually 14.5 mm. It was therefore concluded that the IVTM was deformed and was no longer able to handle nuclear fuel.

Through the investigation into this event, causes of the falling of the IVTM are assumed as follows:

- The threads of the U-shaped fitting connecting the claw open/close rod of the gripper claws, which grip the IVTM of the auxiliary handling machine (AHM), and the power cylinder of the AHM gradually loosened due to the vibration accompanying the movement of the AHM, and the claw open/close rod began to rotate, which caused the gripper claws to be unable to open correctly. When the IVTM was hoisted up in this status, it was hoisted up with only a single claw. The balance of the gripping part was lost, and the IVTM fell.
- As the AHM had the function of judging a hoist/non-hoist on the basis of only the presence of a load, the AHM could not detect the hoist up under the inadequate status.
- As the rotation of the claw open/close rod was not considered during the design stage of the AEH, the function required for maintaining the shape of the gripping part was not properly established. Therefore, it was not confirmed to the manufacturer as to how to ensure the prevention of falling or how to maintain the shape of the AHM gripper.
- A locking adhesive was applied to the threads during the device fabrication stage by the manufacturer. However, records were not left stating that the application of the locking adhesive had been instructed or performed. Therefore, the locking adhesive was not applied to the threads when the power cylinder was replaced.

In this event, the gripper claws that grip the IVTM of the AHM became unable to open correctly, and when the IVTM was hoisted up in this status, the balance of the gripping part was lost and the IVTM fell. However, this event occurred in the non-fuel handling status, and there was no effect on the component important to safety. Additionally, there was neither sodium leakage nor any effect on the inside or outside of the plant due to the radioactive material.

5. Rating Results and their Basis:

(1) Criterion 1: -
   (Basis: Since there was no impact on people or the environment, this event was not rated for this criterion.)

(2) Criterion 2: -
   (Basis: Since there was no impact upon the radiological barriers or controls at the facilities, this event was not rated for this criterion.)

(3) Criterion 3: Level 0-
   (Basis: In this event, the IVTM fell in the reactor vessel during plant shutdown. This event occurred in the non-fuel handling status, and there was no effect on the safety of the facility. Therefore, the rating was considered to be level 0-.)

(4) Final Rating Result: Level 0- as a result of [Criterion 1: -, Criterion 2: -, Criterion 3: Level 0-]

No. 7

1. Nuclear Facility:
   Reprocessing Facility owned by Japan Atomic Energy Agency

2. Date of Occurrence:
   September 13, 2011

3. Event:
   Temporary stoppage of a blower in the high level liquid radioactive waste storage tank at the Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility owned by Japan Atomic Energy Agency

4. Event Description:
   During shutdown for voluntary regular inspection of equipment, when switching the power receiving terminal for the in-house substation in the Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility owned by Japan Atomic Energy Agency, a ventilation blower for the high level liquid waste storage tank did not start within the predefined time, and negative pressure was temporarily not maintained in the tank due to the failure of an automatic startup timer. The automatic startup timer is used in common by the ventilation blower, dissolution off-gas system blower, and shearing off-gas system blower in the separation and refinement facility.
   The cause of the timer failure is estimated to be as follows: The capacitance of a condenser in the timer had decreased due to ageing, and therefore, the control circuit in the timer was not operating normally.
   In this event, although the negative pressure in the high-level liquid waste storage tank was temporarily not being maintained, the shearing and dissolution processes in the reprocessing plant had shut down and no abnormal changes were observed in the off-gas monitoring and radiation monitoring values. There was no effect on the environment from radioactive materials, and no workers were exposed to radiation. In addition, the cooling system of the tank was available and the negative pressure in the building was being maintained.

5. Rating Results and their Basis:
(1) Criterion 1: -
   (Basis: Since there was no impact upon people or the environment, this event was not rated for this criterion.)
(2) Criterion 2: -
   (Basis: Since there was no impact upon the facilities' radiological barriers or controls, this event was not rated for this criterion.)
(3) Criterion 3: Level 1
   (Basis: Although this event is considered to be the potential loss of confinement of the radioactive materials due to the temporary stoppage of the ventilation blower for the high level liquid waste storage tank, the boundary (storage tank), the cooling system for the storage tank, and the ventilation system of the building were sound. Therefore, the rating was considered to be level 1.)
(4) Final Rating Result: Level 1 as a result of [Criterion 1: -, Criterion 2: -, Criterion 3: Level 1]

XV

No. 8

1. Nuclear Facility:
Reprocessing Facility owned by Japan Atomic Energy Agency

2. Date of Occurrence:
October 28, 2011

3. Event:
Identification of a hole penetrating the wall of the main stack at Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility owned by Japan Atomic Energy Agency

4. Event Description:
During shutdown for voluntary regular inspection of equipment, when seismic strengthening work of the outside duct, which connects the main stack and the separation and refinement facility in the Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility owned by Japan Atomic Energy Agency was conducted, one of the workers found an ellipsoidal hole penetrating the wall of the duct.

Causes of the generation of the hole penetrating the wall are estimated as follows: significant deterioration of the paint, especially at locations where rain water could easily collect, such as the outer surface of the main stack duct, leading to the occurrence and propagation of corrosion. The reasons why corrosion was not prevented from generating and developing before the event happened are estimated as follows: When corrosion was identified in 2009, the trend of decrease in wall thickness of the duct was not evaluated. The main stack duct is located at a high position and is not easily accessible, and an annual inspection of the outer surface of the main stack duct was carried out as a visual inspection using binoculars. As a result, the deterioration status of the paint was not sufficiently confirmed.

Off-gas was discharged outside the facility after it was confirmed that the concentration and amount of radioactive materials to be discharged are less than the standard values specified in the operation safety program. As a result of the dose evaluation, the annual dose for discharge outside the surrounding area is less than the annual dose limit stipulated by law. Therefore, it was confirmed that this event did not affect the environment due to radioactive materials.

In addition, the main process of the reprocessing plant had been shut down during the time of possible leakage, and readings of the radiation monitors in the facility remained within the ordinary parameters. There was no effect of radioactive materials inside the plant and no occupational exposure.

As the feedback on operating experience was insufficient, despite the fact that events had occurred at Monju etc., where holes penetrating the wall of the duct were found , a similar event occurred.

5. Rating Results and their Basis:

(1) Criterion-1: -

(Basis: Off-gas discharge control such as confirmation of concentration prior to the discharge was conducted. The dose evaluation showed that the annual dose or discharge outside the surrounding area is less than the annual dose limit stipulated by law. Therefore, the rating was considered to be "out of scale.")

(2) Criterion-2: -

(Basis: Since there was no effect inside the reprocessing plant, this event was not rated for this criterion.)

(3) Criterion-3: Level 1

(Basis: In this event, holes penetrating the wall of the stack duct were found during the plant shutdown. The actual effects of this event were not confirmed, but the feedback on the operating experience of similar past events was insufficient. Therefore, the rating was considered to be level 1.)

(4) Final Rating Result: Level 1 as a result of [Criterion 1: -, Criterion 2: -, Criterion 3: Level 1]

RADIOACTIVE WASTE MANAGEMENT AND OCCUPATIONAL RADIATION EXPOSURE MANAGEMENT

XVI STATUS OF RADIOACTIVE WASTE MANAGEMENT AND OCCUPATIONAL RADIATION EXPOSURE CONTROL

XVI-1 Status of Radioactive Waste Management

(1) Status of Gaseous and Liquid Radioactive Waste Release Management

1) Commercial Nuclear Power Reactor Facilities

The release of gaseous and liquid radioactive waste is controlled at every nuclear station so that the amount of such waste does not exceed the prescribed dose limit for the local community (i.e., 50 microsieverts/year), in accordance with the "Regulatory Guide for the Annual Dose Target for the Public in the Vicinity of Light Water Nuclear Power Reactor Facilities." The annual release control target values are stipulated in the operational safety program based on the dose levels estimated during safety review and assessments, and the release is controlled so that those levels do not exceed these targets.

The released amount of waste in FY 2012 was less than the release control target at every nuclear power station excluding the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. where the impact of the Tohoku District - off the Pacific Ocean Earthquake is currently being estimated. The environmental impact assessment regarding the gaseous and liquid radioactive waste released from these nuclear facilities in accordance with the "Regulatory Guide for Reviewing Evaluation of Dose Target for Surrounding Area of Light Water Nuclear Power Reactor Facilities" indicated that the general public's effective dose was less than 1 micro-Sv per year.

2) Nuclear Power Reactor Facilities in the Research and Development Stage

The release of gaseous and liquid radioactive waste is controlled so that it does not exceed annual release control levels, as stipulated in the operational safety program based on the dose levels estimated during the review and assessment for the licensing of the reactor installation.

In FY 2012, the amount of released waste was less than the release control targets both at Fast Breeder Reactor Research and Development Center, Tsuruga Head Office, Japan Atomic Energy Agency and Fugen Decommissioning Engineering Center, Tsuruga Head Office, Japan Atomic Energy Agency. The environmental impact assessment regarding the gaseous and liquid radioactive waste released from these nuclear facilities in accordance with the "Regulatory Guide for Reviewing Evaluation of Dose Target for Surrounding Area of Light Water Nuclear Power Reactor Facilities," etc. indicated that the general public's effective dose was less than 1 micro-Sv per year.

3) Fuel Manufacturing Facilities

The release of gaseous and liquid radioactive waste from fuel manufacturing facilities is managed so that the three-month average concentrations do not exceed the concentration control target values as prescribed in the operational safety program, which, in turn, is set within the statutory concentration limits. In each quarter of FY 2012, the amount of released waste conformed to the concentration control targets.

4) Reprocessing Facilities

The release of gaseous and liquid radioactive waste is controlled so that it does not exceed the annual release control levels stipulated in the operational safety program, which are based on the release levels applied in the environmental impact assessment of the area surrounding the facilities in the review and assessment before the business license (installation approval) was granted.

In FY 2012, the amount of released waste was less than the release control targets both at the Reprocessing Facility Nuclear Fuel Cycle Engineering Laboratories, Tokai Research and Development Center, Japan Atomic Energy Agency and the Reprocessing Plant(Reprocessing Facility), Japan Nuclear Fuel Ltd.

The environmental impact assessment regarding the gaseous and liquid radioactive waste released from these nuclear facilities in accordance with the review and assessment method used for the business licensing (installation approval) indicated that the general public's effective dose was less than 1 micro-Sv per year.

5) Waste Burial Facilities and Waste Management Facilities

The release of gaseous and liquid radioactive waste from waste burial facilities and waste management facilities is controlled so that the three-month average concentrations do not exceed the target concentration control limit levels stipulated in the operational safety program.

In each quarter of FY 2012, the amount of released waste conformed to the concentration control targets. In order to comply with the technical standards for waste management facilities, the release of liquid radioactive waste from the Radioactive Waste Management Facility, Oarai Research and Development Center, Japan Atomic Energy Agency is controlled so that it does not exceed the annual release control target level stipulated in the operational safety program, which is based on the release levels applied in the environmental impact assessment of the area surrounding the facilities in the review and assessment before the business license (approval) was granted. The amount of released waste in FY 2012 was less than the target release control level.

The amount of released gaseous and liquid radioactive waste generated annually since the FY 2003 from the commercial power reactor facilities and reactor facilities in the research and development stage is presented in reference materials 1 to 4.

The radioactivity of released gaseous and liquid radioactive waste was measured in accordance with the "Guide for Monitoring of Effluent Released from Light Water Nuclear Power Reactor Facilities." Concentrations of released radioactivity that are below the detection limit are indicated as N.D. in the tables.

[Note] Exponential values, such as $a \times 10^{+b}$, are denoted in the format of aE+b in this report for easier reading.
Legend) $5.1\times10^{+12}$=5.1E+12

XVI

(1) Commercial Nuclear Power Reactor Facilities

Power Station	Item	Gaseous Radioactive Waste		Liquid Radioactive Waste (excluding ^{3}H) (Bq)
		Noble Gases (Bq)	Iodine [^{131}I] (Bq)	
Hokkaido Electric Power Co., Inc., Tomari Power Station	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	1.3E+15	1.2E+10	1.1E+11
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	3.8E+15	1.3E+11	1.1E+10
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	1.2E+15	2.0E+10	3.7E+09
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	Nuclear reactor facilities total	*1 —	*1 —	There was no managed release.
	Annual release Control target value	8.8E+15	4.8E+11	2.2E+11
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	5.5E+15	2.3E+11	1.4E+11
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	Nuclear reactor facilities total	N.D.	*2 N.D.	N.D.
	Annual release Control target value	6.7E+15	2.3E+11	2.5E+11
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	*3 3.6E+15	*3 1.1E+11	*4 3.7E+10
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	2.3E+15	4.8E+10	7.4E+10
The Kansai Electric Power Co., Inc., Mihama Power Station	Nuclear reactor facilities total	5.4E+07	N.D.	N.D.
	Annual release Control target value	2.1E+15	7.3E+10	1.1E+11
The Kansai Electric Power Co., Inc., Takahama Power Station	Nuclear reactor facilities total	4.5E+08	N.D.	N.D.
	Annual release Control target value	3.3E+15	6.2E+10	1.4E+11

Note: The “managed release” at Fukushima Daiichi Nuclear Power Station is that of liquid radioactive waste released from drainage equipment in a properly managed condition. The release affected by the Tohoku District - off the Pacific Ocean Earthquake - is not included.

*1: Undergoing evaluation by the licensee associated with the Tohoku District – off the Pacific Ocean Earthquake
Measured additional release amount of gaseous radioactive waste from units at points unmesurable at exhaust ports or discharge monitoring equipment due to influence of the Tohoku District - off the Pacific Ocean Earthquake. It is evaluated that the total released amount is roughly 87.6 billion Bq a year.

2: The detection limits of all noble gases are based on the measurement concentration lower limits stipulated in the measurement guideline. The detection limits of ^{131}I and the total radioactive particulate mat exceed the measurement concentration lower limit of the measurement guideline * under the influence of defect of the monitor sampling piping connection (outside air inflows through a clearance). The maximum value of the detection limit after amendment is stated.
(* Guide for Monitoring of Effluent Released from Light Water Nuclear Power Reactor Facilities)

Power Station	Item	Gaseous Radioactive Waste		Liquid Radioactive Waste (excluding ^{3}H) (Bq)
		Noble Gases (Bq)	Iodine [^{131}I] (Bq)	
The Kansai Electric Power Co., Inc., Ohi Power	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	4.0E+15	1.0E+11	1.4E+11
The Chugoku Electric Co., Inc., Shimane Nuclear Power Station	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	8.4E+14	4.3E+10	7.4E+10
Shikoku Electric Power Co., Inc. Ikata Power	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	1.5E+15	8.1E+10	1.1E+11
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	Nuclear reactor facilities total	1.3E+10	N.D.	N.D.
	Annual release Control target value	2.2E+15	5.8E+10	1.4E+11
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	Nuclear reactor facilities total	3.5E+09	N.D.	N.D.
	Annual release Control target value	1.7E+15	6.2E+10	7.4E+10
The Japan Atomic Power Company Co., Ltd., Tokai Power Station	Nuclear reactor facilities total			3.9E+05
	Annual release Control target value			*5 3.4E+07
The Japan Atomic Power Company Co., Ltd., Tokai No. 2 Power Station	Nuclear reactor facilities total	N.D.	N.D.	1.5E+06
	Annual release Control target value	1.4E+15	5.9E+10	3.7E+10
The Japan Atomic Power Company Co., Ltd., Tsuruga Power station	Nuclear reactor facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	1.7E+15	3.8E+10	7.4E+10

Note: The radioactivity (Bq) of gaseous (or liquid) waste is obtained by multiplying the concentration of the radioactive material (Bq/cm^3) in the released gas (or liquid) by the amount of released gas (or liquid).
Values lower than the detection limit of radioactivity are indicated as N.D.
The detection limits are as follows. (Bq／cm^3)
Radioactive noble gases : 2E-02 or less
Radioactive iodine : 7E-09 or less
9.2E-9 for the Kashiwazaki-Kariwa Nuclear Power Station of TEPCO,*2
liquid Radioactive waste (excluding ^{3}H): 2E-02 or less (represented by the value of ^{60}Co.) .

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*3: The release control target value is the total value corresponding to Units 3 to 5. Each value of Units 1 and 2 is to be less than the measurement concentration lower limit.
*4: The release control target value is the total value corresponding to Units 3 to 5. Each value of Units 1 and 2 is 9.2E+09.
*5: The release control target values are for ^{60}Co, ^{137}Cs, ^{152}Eu and ^{154}Eu.

(2) Nuclear Power Reactor Facilities in the Research and Development Stage

Facility	Item	Gaseous Radioactive Waste		
		Noble Gases (Bq)	Iodine [^{131}I] (Bq)	Tritium [^{3}H] (Bq)
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center *6	Nuclear reactor facilities total	N.D.	N.D.	5.4E+10
	Annual release control target value	*7 —	*7 —	*8 1.4E+13
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	Nuclear reactor facilities total	N.D.	N.D.	5.5E+08
	Annual release control target value	8.2E+13	1.5E+08	—

Facility	Item	Liquid Radioactive Waste	
		Total Radionuclides (excluding ^{3}H) (Bq)	Tritium [^{3}H] (Bq)
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center *6	Nuclear reactor facilities total	N.D.	3.1E+11
	Annual release control target value	*9 2.8E+08	*10 8.5E+12
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	Nuclear reactor facilities total	N.D.	*11 1.5E+08
	Annual release control target value	5.5E+09	9.2E+12

Note: The radioactivity (Bq) of gaseous (or liquid) waste is obtained by multiplying the concentration of the radioactive material (Bq/cm^3) in the released gas (or liquid) by the amount of released gas (or liquid).
Values lower than the detection limit of radioactivity are indicated as N.D. The detection limits are as follows. (Bq/cm^3)
Radioactive noble gases : 2E-02 or less,
Radioactive iodine : 7E-09 or less,
Radioactive liquid waste : 2E-02 or less (represented by the value of ^{60}Co.).

*6: Due to the approval of the decommissioning plan on February 12, 2008, the facility name was changed from "Japan Atomic Energy Agency, Advanced Thermal Reactor (ATR) Fugen Power Station" to "Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center, Advanced Thermal Reactor Prototype Reactor Facility." (Hereinafter referred to as the "Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center")

*7: Since October 1, 2003, due to revision of the reactor facility operational safety program, the annual release control target values of noble gases and iodine have been removed from the annual release control target values for gaseous radioactive waste.

*8: Since February 12, 2008, due to revision of the operational safety program based on the approval of the decommissioning plan, the annual release control target value for Tritium has been changed to 1.43E+13 (Bq/year).

*9: Since October 1, 2003, due to revision of the reactor facility operational safety program, the annual release control target value of liquid radioactive waste (excluding ^{3}H) has been changed to 2.8E+08 (Bq/year).

*10: Since February 12, 2008, due to revision of the operational safety program based on the approval of the decommissioning plan, the annual release control target value for Tritium has been changed to 8.5E+12 (Bq/year).

*11: The value includes tritium (N.D.) in the water and steam systems.

(3) Fuel Manufacturing Facilities

Facility	Item	Gaseous Radioactive Waste	Liquid Radioactive Waste
		Uranium [U] (Bq/cm^3)	Uranium [U] (Bq/cm^3)
Global Nuclear Fuel-Japan Co., Ltd.	Processing facilities total	N.D.	N.D.
	Concentration control target value	1.5E-09	8E-03
Mitsubishi Nuclear Fuel Co., Ltd.	Processing facilities total	1.0E-10	N.D.
	Concentration control target value	1.5E-09	8E-03
Nuclear Fuel Industries, Ltd., Tokai Works	Processing facilities total	N.D.	N.D.
	Concentration control target value	1.5E-09	8E-03
Nuclear Fuel Industries, Ltd., Kumatori Works	Processing facilities total	N.D.	N.D.
	Concentration control target value	1.5E-09	8E-03
Japan Atomic Energy Agency, *12 Ningyo-toge Environmental Engineering Center, Uranium Enrichment Demonstration Plant	Processing facilities total	N.D.	*13 N.D.
	Concentration control target value	*14 1E-08	*14 5E-03
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Uranium Enrichment Plant)	Processing facilities total	N.D.	N.D.
	Concentration control target value	2E-08	1E-03

Note: Values lower than the detection limit of radioactivity are indicated as N.D.
The detection limits are as follows. ($Bq／cm^3$)

		Gaseous Radioactive Waste	Liquid Radioactive Waste
Global Nuclear Fuel-Japan Co., Ltd.		3.1E-11 or less	3.0E-04 or less
Mitsubishi Nuclear Fuel Co., Ltd.		1.0E-10 or less	4.0E-04 or less
Nuclear Fuel Industries, Ltd., Tokai Works		1.3E-10 or less	3.4E-04 or less
Nuclear Fuel Industries, Ltd., Kumatori Works			1.1E-03 or less
	Exhaust port (1)	1.5E-10 or less	
	Exhaust port (2)	1.5E-10 or less	
Japan Atomic Energy Agency, Ningyo-toge Environmental Engineering Center, Uranium Enrichment Demonstration Plant		1.0E-10 or less	3.0E-04 or less
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Uranium Enrichment Plant)		2E-09 or less	1E-04 or less

*12: Hereinafter referred to as the “Japan Atomic Energy Agency, Uranium Enrichment Demonstration Plant.”
Water discharge was not conducted in the first, second, and fourth quarters.
*13: Water discharge was not conducted in the first, second, and fourth quarters.
*14: Average concentration control target values (Bq/cm^3) over a period of three months

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(4) Reprocessing Facilities (Gaseous Radioactive Waste)

Facility	Item		Krypton [^{85}Kr] (Bq)	Iodine [^{129}I] (Bq)
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Reprocessing facilities total		N.D.	N.D.
	Annual release Control target value		8.9E+16	1.7E+09
Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	Item	Radioactivity Argon (Bq)	Krypton [^{85}Kr] (Bq)	Iodine [^{129}I] (Bq)
	Reprocessing facilities total	N.D.	1.6E+11	N.D.
	Annual release Control target value	–	3.3E+17	1.1E+10

Facility	Item	Total Radioactive Particulate Matter		
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility		[total alpha] (Bq)		total beta gamma (Bq)
	Reprocessing facilities total	N.D.		*15 2.4E+04
	Annual release Control target value	*14 2.2E-08		*14 1.1E-04
Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	Item	Other radionuclides (nuclides that emit alpha rays) (Bq)	Breakdown of the left column (by nuclide): Plutonium [Pu(α)] (Bq)	Other radionuclides (nuclides that do not emit alpha rays) (Bq)
	Reprocessing facilities total	N.D.	N.D.	N.D.
	Annual release Control target value	3.3E+08	—	9.4E+10

Note: The radioactivity (Bq) of gaseous radioactive waste is obtained by multiplying the concentration of the radioactive material (Bq/cm^3) in the released gas by the amount of released gas.
Values lower than the detection limit of radioactivity are indicated as N.D.
The detection limits are as follows. (Bq/cm^3)

Japan Atomic Energy Agency, Reprocessing Facility

- ^{14}C : 4.0E-05 or less
- ^{129}I : 3.7E-08 or less
- Total radioactive particulate material (total α)
- ^{85}Kr : 1.5E-10 or less
- ^{131}I : 2.4E-03 or less
- : 3.7E-08 or less

Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing facility)

- Radioactive Argon : 1E-04 or less
- ^{85}Kr : 2E-02 or less
- ^{129}I : 4E-08 or less
- ^{14}C : 4E-05 or less
- Other radionuclides (nuclides that emit alpha rays) : 4E-10 or less (represented by the value for total alpha)
- Pu(α) : 4E-10 or less
- Other radionuclides (nuclides that do not emit alpha rays) : 4E-09 or less (represented by the value for total beta (gamma))
- ^{106}Ru-^{106}Rh : 4E-09 or less (The values for particulate ^{106}Ru and volatile ^{106}Ru are indicated.)
- ^{137}Cs-^{137m}Ba : 4E-09 or less
- ^{90}Sr-^{90}Y : 4E-10 or less

*15: Attributable to the accidents at the Fukushima Daiichi Nuclear Power Station.

(4)Reprocessing Facilities (Gaseous Radioactive Waste) (cont.)

Iodine [^{131}I] (Bq)	Tritium [^{3}H] (Bq)	Carbon [^{14}C] (Bq)
N.D.	5.0E+11	N.D.
1.6E+10	5.6E+14	5.1E+12
Iodine [^{131}I] (Bq)	Tritium [^{3}H] (Bq)	Carbon [^{14}C] (Bq)
6.6E+05	1.6E+11	4.2E+10
1.7E+10	1.9E+15	5.2E+13

Breakdown of the left column (by nuclide)		
Strontium - Yttrium [^{90}Sr-^{90}Y] (Bq)	Ruthenium - Rhodium [^{106}Ru-^{106}Rh] (Bq)	Cesium - Barium [^{137}Cs-^{137m}Ba] (Bq)
N.D.	N.D.	N.D.
–		

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(4) Reprocessing Facilities (Liquid Radioactive Waste)

	Item	Tritium [^{3}H] (Bq)	Iodine [^{129}I] (Bq)	Iodine [^{131}I] (Bq)
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Annual release	8.7E+11	1.2E+06	N.D.
	Annual release Control target value	1.9E+15	2.7E+10	1.2E+11

	Item	Tritium [^{3}H] (Bq)	Iodine [^{129}I] (Bq)	Iodine [^{131}I] (Bq)
Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	Annual release	1.1E+12	6.7E+06	N.D.
	Annual release Control target value	1.8E+16	4.3E+10	1.7E+11

	Item		Strontium [^{89}Sr] (Bq)	Strontium [^{90}S] (Bq)
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Annual release		N.D.	N.D.
	Annual release Control target value		1.6E+10	3.2E+10

	Item	Other radionuclides (nuclides that do not emit alpha rays) Breakdown (by nuclide)		
		Cobalt [^{60}Co] (Bq)		Strontium - Yttrium [^{90}Sr-^{90}Y] (Bq)
Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	Annual release	N.D.		N.D.
	Annual release Control target value	–		

	Item	Cerium - Praseodymium [^{144}Ce-^{144}Pr] (Bq)		
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Annual release	N.D.		
	Annual release Control target value	1.2E+11		

	Item	Other radionuclides (nuclides that do not emit alpha rays) Breakdown (by nuclide)		
		Cerium - Praseodymium [^{144}Ce-^{144m}Pr, ^{144}Pr] (Bq)	Europium [^{154}Eu] (Bq)	Plutonium [^{241}Pu] (Bq)
Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	Annual release	N.D.	N.D.	N.D.
	Annual release Control target value	–		

(4)Reprocessing Facilities (Liquid RadioactiveWaste) (cont.)

Total Alpha Radioactivity (Bq)	Plutonium [Pu(α)] (Bq)			Total Beta Radioactivity (excluding ^{3}H) (Bq)
N.D.	1.4E+05			N.D.
4.1E+09	2.3E+09			9.6E+11
Other radionuclides (nuclides that emit alpha rays) (Bq)	Breakdown of the left column (by nuclide)			Other radionuclides (nuclides that do not emit alpha rays) (Bq)
	Plutonium [Pu(α)] (Bq)	Americium [Am(α)] (Bq)	Curium [Cm(α)] (Bq)	
N.D.	N.D.	N.D.	N.D.	N.D.
3.8E+09	–			2.1E+11

Zirconium - Niobium [^{95}Zr-^{95}Nb] (Bq)	Ruthenium [^{103}Ru] (Bq)	Ruthenium - Rhodium [^{106}Ru-^{106}Rh] (Bq)	Cesium [^{134}Cs] (Bq)	Cesium [^{134}Ce] (Bq)	Cerium [^{14}C] (Bq)
N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4.1E+10	6.4E+10	5.1E+11	6.0E+10	5.5E+10	5.9E+09
Other radionuclides (nuclides that do not emit alpha rays) Breakdown (by nuclide)					
		Ruthenium - Rhodium [^{106}Ru-^{106}Rh] (Bq)	Cesium [^{134}Cs] (Bq)	Cesium - Barium [^{137}Cs-^{137m}Ba] (Bq)	
		N.D.	N.D.	N.D.	
–					

Note: The radioactivity (Bq) of liquid radioactive waste is obtained by multiplying the concentration of the radioactive material (Bq/cm^{3}) in the released liquid by the amount of released liquid.
Values lower than the detection limit of radioactivity are indicated as N.D.
The detection limits are as follows. (Bq/cm^{3})

Japan Atomic Energy Agency,
Tokai Research and Development Center,
Nuclear Fuel Cycle Engineering Laboratories,
Reprocessing Facility

^{129}I	: 1.4E-03 or less
^{131}I	: 1.8E-03 or less
Total Alpha Radioacti	: 1.1E-03 or less
Pu(α)	: 3.7E-05 or less
Total Beta Radioactivity (excluding ^{3}H)	: 2.2E-02 or less
^{89}Sr	: 2.2E-03 or less
^{90}Sr	: 1.1E-03 or less
^{95}Zr-^{95}Nb	: 4.3E-03 or less
^{103}Ru	: 1.1E-03 or less
^{106}Ru-^{106}Rh	: 3.2E-02 or less
^{134}Cs	: 1.1E-03 or less
^{137}Cs	: 1.8E-03 or less
^{141}Ce	: 2.2E-03 or less
^{144}Ce-^{144}Pr	: 2.2E-02 or less

Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing facility)

^{131}I	: 2E-02 or less
Other radionuclides (nuclides that emit alpha rays) (represented by the value for total alpha)	: 4E-03 or less
Pu(α)	: 1E-03 or less
Am(α)	: 6E-05 or less
Cm(α)	: 6E-05 or less
Other radionuclides (nuclides that do not emit alpha rays) (represented by the value for total beta (gamma))	: 4E-02 or less
^{60}Co	: 2E-02 or less
^{90}Sr-^{90}Y	: 7E-04 or less
^{106}Ru-^{106}Rh	: 2E-02 or less
^{134}Cs	: 2E-02 or less
^{137}Cs-^{137m}Ba	: 2E-02 or less
^{144}Ce-^{144m}Pr,^{144}Pr	: 2E-02 or less
^{154}Eu	: 2E-02 or less
^{241}Pu	: 3E-02 or less

(5) Waste Burial Facilities and Waste Management Facilities

Waste burial facility

Facility	Item	Gaseous Radioactive Waste		
		Tritium 「^{3}H」 (Bq/cm^{3})	Cobalt 「^{60}Co」 (Bq/cm^{3})	Cesium 「^{137}Cs」 (Bq/cm^{3})
*16 Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center)	Waste disposal facilities total	—	—	—
	Concentration control targets	*14 5E-04	*14 3E-07	*14 1E-06
*17 Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Science Research Institute, Radioactive Waste Disposal Facility	Waste disposal facilities total	—	—	—
	Concentration control targets	—	—	—

Facility	Item	Liquid Radioactive Waste		
		Tritium 「^{3}H」 (Bq/cm^{3})	Cobalt 「^{60}Co」 (Bq/cm^{3})	Cesium 「^{137}Cs」 (Bq/cm^{3})
*16 Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center)	Concentration	—	—	—
	Concentration control targets	*14 6E+00	*14 1E-02	*14 7E-03
*17 Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Science Research Institute, Radioactive Waste Disposal Facility	Concentration	—	—	—
	Concentration control targets	—	—	—

*16: There was no release of gaseous and liquid radioactive waste at the waste disposal facility (low-level waste management building) in the Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center) of Japan Nuclear Fuel Ltd.

*17: Hereinafter referred to as the “Japan Atomic Energy Agency, Radioactive Waste Disposal Facility”
There is no release of gaseous or liquid radioactive waste.

Waste Management Facilities

Facility	Item	Gaseous Radioactive Waste		
		Cobalt [^{60}Co] (Bq/cm^3)	Radioactive Cesium [Cs] (Bq/cm^3)	Radioactive Ruthenium [Ru] (Bq/cm^3)
Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)	Waste management facilities total		N.D.	N.D.
	Concentration control targets		9.0E-07	1.0E-07
*18 Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Waste management facilities total	N.D.	N.D.	—
	Concentration *19 control targets	—	—	—

(cont.)

Facility	Item	Gaseous Radioactive Waste	
		Radioactive Argon [Ar] (Bq/cm^3)	Plutonium [^{239}Pu] (Bq/cm^3)
Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)	Waste management facilities total	N.D.	
	Concentration control targets	—	
*18 Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Waste management facilities total	—	N.D.
	Concentration *19 control targets	—	—

Facility	Item	Liquid Radioactive Waste			
		Tritium [^{3}H] (Bq)	Cobalt [^{60}Co] (Bq)	Radioactive Cesium [Cs] (Bq)	Others (Bq)
*20 Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)	Annual release	—	—	—	—
	Release control target value	—	—	—	—
*18 Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Annual release	9.8E+09	N.D.	N.D.	—
	Release control target value	3.7E+12	2.2E+08	1.8E+09	2.2E+08

Note: Values lower than the detection limit of radioactivity are indicated as N.D.
The detection limits are as follows. (Bq/cm^3)

Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)
Gaseous Radioactive Waste
Radioactive Cs : 4E-09 or less
Radioactive Ru : 1E-08 or less
Radioactive Ar : 1E-04 or less

Radioactive Waste Management Facility, Japan Atomic Energy Agency
Gaseous Radioactive Waste
^{60}Co : 7.8E-09 or less
^{239}Pu : 9.0E-10 or less
Radioactive Cs : 7.4E-09 or less
Radioactive Liquid Waste
^{60}Co : 3.6E-05 or less
Radioactive Cs : 4.5E-05 or less

*18: Hereinafter referred to as the “Radioactive Waste Management Facility,Japan Atomic Energy Agency”
*19: For the Radioactive Waste Management Facility, Japan Atomic Energy Agency, the concentration control target values of gaseous waste are established for each exhaust stack; the concentration control target values for the whole facilities are not established.
*20: Because all of the liquid radioactive waste is stored for disposal within the facilities, there is no external release.

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(2) Status of Solid Radioactive Waste, etc. Management

1) Commercial Nuclear Power Reactor Facilities

In FY 2012, the amount of low-level solid radioactive waste generated at the commercial nuclear power reactor facilities was equivalent to roughly 46,400 200-liter drums. Meanwhile, the amount of cumulative storage decreased by only roughly 2,050 drums, mainly owing to the shipment to the Low-Level Radioactive Waste Burial Center and the volume-reducing effects of measures such as incineration. Accordingly, the amount of waste in solid waste storage at commercial power reactor facilities at the end of FY 2012 was roughly equivalent to approximately 673,000 200-liter drums, which is 72.8% of the total storage capacity of approximately 924,092 drums.

The steam generator storage facility is a storage facility used exclusively for solid radioactive waste generated by processes including the replacement of steam generators or vessel heads in pressurized water reactor (PWR) nuclear power stations. In FY 2012, the storage volume remained 6,693 m^3, the same as the previous fiscal year, since no solid radioactive waste had been generated.

The feedwater heater storage facility is a storage facility used exclusively for radioactive waste generated as a result of replacing the No. 6 feedwater heater at Tokai No. 2 Power Station, The Japan Atomic Power Co., Ltd., In FY 2012, the storage volume remained 311 m^3, the same as the previous fiscal year, since no solid radioactive waste had been generated.

The Shika Nuclear Power Station, Hokuriku Electric Power Co., Inc., stores a turbine rotor 630 m^3.

Spent control rods, channel boxes, spent resin, and a part of the radioactive waste generated by the replacement of the shroud are stored in the spent fuel pool, storage bunker, tank, etc.

In solid waste storage facilities, solid radioactive waste is enclosed in drums for storage and management.

The amount of solid radioactive waste is expressed in the equivalent number of 200-liter drums. Other types of solid radioactive waste include oversized equipment and other items which do not fit into drums. The amount of generated waste and the amount of cumulative storage are represented by the equivalent number of 200-liter drums.

“Reduction in the station” refers to the total amount of reduction achieved by incinerating combustible waste and by compressing the waste enclosed into drums. “Reduction outside the station” refers to the amount of reduction achieved by shipment to the Low-Level Radioactive Waste Burial Center or clearance treatment at the Tokai Power Station, Japan Atomic Power Company.

The amount of solid radioactive waste stored in the steam generator storage, etc., is represented by the number of removed and stored steam generators and the capacity of the storage containers.

The amount of radioactive waste in spent fuel pools, storage bankers, tanks, etc. is shown by the number of control rods and channel boxes and amount of resins and other storage volume.

2) Nuclear Power Reactor Facilities in the Research and Development Stage

The amount of low-level solid radioactive waste generated at Fugen Decommissioning Engineering Center, Tsuruga Head Office, Japan Atomic Energy Agency in FY 2012 was roughly equal to 600 200-liter drums. The amount of cumulative storage was reduced by approximately 90 drums owing to volume-reducing efforts such as incineration. Accordingly, the stored amount of waste at the end of FY 2012 was equal to roughly 19,290 200-liter drums, compared to the approximate capacity of the storage facility, 21,500 drums. Ion-exchange resins and filter sludge are stored in tanks, while spent control rods and neutron detectors are stored in spent fuel pools.

The amount of low-level solid radioactive waste generated at Fast Breeder Reactor Research and Development Center, Tsuruga Head Office, Japan Atomic Energy Agency in FY 2012 was equal to roughly 180 200-liter drums. Accordingly, the stored amount of waste at the end of FY 2012 was equal to roughly 5,400 200-liter drums, compared to the capacity of the storage facility, approximately 23,000 drums.

3) Fuel Manufacturing Facilities

In FY 2012, the amount of low-level solid radioactive waste generated at a total of six fuel manufacturing plants operated by five companies was equivalent to roughly 2,400 200-liter drums. The amount of cumulative storage was increased by approximately 800 drums owing to volume-reducing efforts such as incineration. Accordingly, the amount of low-level solid radioactive waste stored at the end of FY 2012 was equivalent to roughly 50,500 units of 200-liter drums compared with the total capacity of the storage facilities, approximately 74,120 drums.

4) Reprocessing Facilities

The amount of low-level solid radioactive waste generated at the reprocessing facilities of Japan Atomic Energy Agency in FY 2012 was equivalent to roughly 220 200-liter drums. Accordingly, the amount of low-level solid radioactive waste stored at the end of FY 2012 was equivalent to roughly 75,900 units of 200-liter drums compared with the capacity of the storage facilities, approximately 92,140 drums. The amount of high-level solid radioactive waste generated was equivalent to two 200-liter drums. No vitrified waste (in 120-liter canisters) was generated. Accordingly, the amount of high-level solid radioactive waste stored at the end of FY 2012 was equivalent to roughly 6,600 200-liter drums compared to the capacity of the storage facilities of approximately 10,320 drums. The amount of vitrified waste (in 120-liter canisters) stored is 247 canisters.

The amount of low-level solid radioactive waste generated at Reprocessing Plant (Reprocessing Facility), Japan Nuclear Fuel Ltd., in FY 2012 was equivalent to roughly 2,400 200-liter drums. Accordingly, the amount of low-level solid radioactive waste stored at the end of FY 2012 was equivalent to roughly 35,200 units of 200-liter drums compared with the capacity of the storage facilities, approximately 75,180 drums. No sheared pieces of cladding materials, etc. were generated. Accordingly, the amount of the sheared pieces of cladding materials, etc. stored at the end of FY 2012 was equivalent to roughly 219 1,000-liter drums compared to the capacity of the storage facilities of approximately 2,000 drums. The amount of vitrified waste generated (in canisters of approx. 1,340 mm in height and approx. 430 mm in outer diameter) was 170 canisters, and the cumulative number of the vitrified waste canisters stored at the end of FY 2012 was 295.

5) Waste Burial Facilities, Waste Management Facilities

In the Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center), Japan Nuclear Fuel Ltd., by the end of FY 2012, homogeneous and uniform solidified wastes equivalent to roughly 146,900 200-liter drums was disposed of at the No. 1 waste burial facility with a capacity of approximately 200,000 drums, while container-filled and solidified wastes equivalent to roughly 105,100 200-liter drums was disposed at the No.2 waste burial facility, which has a capacity of approximately 210,000 drums. No low-level solid radioactive waste was generated in association with the burial.

About 1,670 tons of solid radioactive waste associated with the dismantling of the JPDR has already been disposed of at the Radioactive Waste Disposal Facility, Nuclear Science Research Institute, Tokai Research and Development Center, Japan Atomic Energy Agency.

In the Reprocessing Plant (Waste Storage Facility), Japan Nuclear Fuel Ltd., the amount of low-level solid radioactive waste generated through the business operation in FY 2012 was equivalent to 264 units of 200-liter drums. Accordingly, the amount of low-level solid radioactive waste stored at the end of FY 2012 was equivalent to 1,116 200-liter drums compared to the capacity of the storage facility of 1,200 drums. By the end of FY 2012, 1,442 canisters of high-level solid radioactive waste (returned vitrified waste) were received and managed in the management storage facility, which has a capacity of 2,880 canisters.

As of the end of FY 2012, the low-level radioactive waste managed by the Radioactive Waste Management Facility, Oarai Research and Development Center, Japan Atomic Energy Agency was equivalent to roughly 29,400 200-liter drums (including approximately 700 drums of low-level solid radioactive waste generated by the agency) of a capacity equivalent to approximately 42,800 drums.

The status of solid radioactive waste management in each fiscal year since FY 2003 is shown in reference material 5. The amount of waste shipped to the low-level radioactive waste burial center is shown by fiscal year in reference material 6. Trends in the amount of disposed radioactive waste at the waste burial facilities of the Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center), Japan Nuclear Fuel Ltd., are shown in reference material 7. The status of high-level radioactive waste (returned vitrified waste) managed at the Reprocessing Plant(Waste Storage Facility), Japan Nuclear Fuel Ltd., is shown by fiscal year in reference material 8.

(1) Commercial Nuclear Power Reactor

i) Solid Waste Storage

Power Station	Item	Drum (number of drums)			Others*1 (equivalent number of drums)	Total (equivalent number of drums) *1	Storage Equipment Capacity (equivalent number of drums)
		Homogeneous and Uniform Solidified Wastes	Container-filled and Solidified Wastes	Miscellaneous Solid Waste			
Hokkaido Electric Power Co., Inc., Tomari Power Station	Storage at the end of previous fiscal year	700	—	6,907	569	8,176	
	Generation in this fiscal year	100	—	507	60	667	
	Reduction in this fiscal year	0	—	9	173	182	
	Reduction in the station	0	—	9	173	182	
	Reduction outside the station	0	—	0	0	0	18,000
	Storage at the end of this fiscal year	800	—	7,405	456	8,661	
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	Storage at the end of previous fiscal year	1,996	0	21,116	3,480	26,592	
	Generation in this fiscal year	328	228	3,980	1,760	6,296	
	Reduction in this fiscal year	48	0	5,996	0	6,044	
	Reduction in the station	48	0	5,996	0	6,044	
	Reduction outside the station	0	0	0	0	0	30,132
	Storage at the end of this fiscal year	2,276	228	19,100	5,240	26,844	*2
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station	Storage at the end of previous fiscal year	—	—	9,028	0	9,028	
	Generation in this fiscal year	—	—	392	0	392	
	Reduction in this fiscal year	—	—	0	0	0	
	Reduction in the station	—	—	0	0	0	
	Reduction outside the station	—	—	0	0	0	18,360
	Storage at the end of this fiscal year	—	—	9,420	0	9,420	
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	Storage at the end of previous fiscal year *3	15,784	2,789	156,922	10,155	185,650	
	Generation in this fiscal year	0	0	0	0	0	
	Reduction in this fiscal year	0	0	0	0	0	
	Reduction in the station	0	0	0	0	0	
	Reduction outside the station	0	0	0	0	0	284,500
	Storage at the end of this fiscal year	15,784	2,789	156,922	10,155	185,650	
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	Storage at the end of previous fiscal year	644	1,666	15,071	0	17,381	
	Generation in this fiscal year	0	51	1,140	0	1,191	
	Reduction in this fiscal year	0	0	0	0	0	
	Reduction in the station	0	0	0	0	0	
	Reduction outside the station	0	0	0	0	0	32,000
	Storage at the end of this fiscal year	644	1,717	16,211	0	18,572	
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	Storage at the end of previous fiscal year	0	500	32,498	0	32,998	
	Generation in this fiscal year	0	1,949	2,576	0	4,525	
	Reduction in this fiscal year	0	1,400	3,607	0	5,007	
	Reduction in the station	0	0	3,607	0	3,607	
	Reduction outside the station	0	1,400	0	0	1,400	45,000
	Storage at the end of this fiscal year	0	1,049	31,467	0	32,516	
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	Storage at the end of previous fiscal year *3	3,295	1,296	3,219	26,592	34,402	
	Generation in this fiscal year	0	1,240	984	2,684	4,908	
	Reduction in this fiscal year	0	1,200	820	2,936	4,956	
	Reduction in the station	0	0	820	2,936	3,756	
	Reduction outside the station	0	1,200	0	0	1,200	42,000
	Storage at the end of this fiscal year	3,295	1,336	3,383	26,340	34,354	

*1 : The "equivalent number of drums" indicates the number of drums obtained by rounding off the volume converted to the equivalent number of drums.

*2 : The storage equipment capacity was changed to the equivalent of 30,132 drums for optimization of the description associated with the filing of the solid waste storage expansion work plan (June 25, 2012).

*3 : It was undergoing evaluation. On April 26, 2013, they were reported.

Power Station	Item	Drum (number of drums): Homogeneous and Uniform Solidified Wastes	Drum (number of drums): Container-filled and Solidified Wastes	Miscellaneous Solid Waste	Others*1 (equivalent number of drums)	Total (equivalent number of drums) *1	Storage Equipment Capacity (equivalent number of drums)
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	Storage at the end of previous fiscal year	8	1,050	5,124	68	6,250	10,000
	Generation in this fiscal year	0	220	860	0	1,080	
	Reduction in this fiscal year	0	480	388	0	868	
	Reduction in the station	0	0	388	0	388	
	Reduction outside the station	0	480	0	0	480	
	Storage at the end of this fiscal year	8	790	5,596	68	6,462	
The Kansai Electric Power Co., Inc., Mihama Power Station	Storage at the end of previous fiscal year	2,416	1,782	21,210	3,232	28,640	35,000
	Generation in this fiscal year	40	684	3,437	48	4,209	
	Reduction in this fiscal year	200	1,744	2,759	47	4,750	
	Reduction in the station	0	0	2,759	47	2,806	
	Reduction outside the station	200	1,744	0	0	1,944	
	Storage at the end of this fiscal year	2,256	722	21,888	3,234	28,100	
The Kansai Electric Power Co., Inc., Takahama Power Station	Storage at the end of previous fiscal year	4,725	0	37,997	3,540	46,262	50,600
	Generation in this fiscal year	54	*4 0	1,557	47	1,658	
	Reduction in this fiscal year	0	0	2,714	22	2,736	
	Reduction in the station	0	0	2,714	22	2,736	
	Reduction outside the station *5	0	0	0	0	0	
	Storage at the end of this fiscal year	4,779	0	36,840	3,565	45,184	
The Kansai Electric Power Co., Inc., Ohi Power Station	Storage at the end of previous fiscal year	3,606	3,343	20,759	5,613	33,321	38,900
	Generation in this fiscal year	114	666	1,766	24	2,570	
	Reduction in this fiscal year	0	2,032	832	325	3,189	
	Reduction in the station	0	0	832	325	1,157	
	Reduction outside the station	0	2,032	0	0	2,032	
	Storage at the end of this fiscal year	3,720	1,977	21,693	5,312	32,702	
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	Storage at the end of previous fiscal year	265	1,217	22,881	3,218	27,581	35,500
	Generation in this fiscal year	13	628	2,499	136	3,276	
	Reduction in this fiscal year	0	616	2,562	699	3,877	
	Reduction in the station	0	0	2,562	699	3,261	
	Reduction outside the station	0	616	0	0	616	
	Storage at the end of this fiscal year	278	1,229	22,818	2,655	26,980	
Shikoku Electric Power Co., Inc., Ikata Power Station	Storage at the end of previous fiscal year	1,425	816	16,147	11,436	29,824	38,500
	Generation in this fiscal year	41	752	1,434	992	3,219	
	Reduction in this fiscal year	320	640	1,336	1,955	4,251	
	Reduction in the station	0	0	1,336	1,955	3,291	
	Reduction outside the station	320	640	0	0	960	
	Storage at the end of this fiscal year	1,146	928	16,245	10,473	28,792	
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	Storage at the end of previous fiscal year	4,086	1,539	*6 27,753	6,335	39,713	49,000
	Generation in this fiscal year	111	1,295	2,108	1,656	5,170	
	Reduction in this fiscal year	320	720	2,949	2,124	6,113	
	Reduction in the station	0	0	2,949	2,124	5,073	
	Reduction outside the station	320	720	0	0	1,040	
	Storage at the end of this fiscal year	3,877	2,114	*6 26,912	5,867	38,770	

*4 : In this fiscal year, 2,404 drums of container-filled and solidified wastes were produced in the solid waste solidification building.
*5 : In this fiscal year, 2,000 drums were shipped out from the solid waste solidification building for waste reduction outside the station (2,000 drums of container-filled and solidified wastes).
*6 : Includes ion-exchange resin of an amount equivalent to 50 200-liter drums (99 100-liter drums)

Power Station	Item	Drum (number of drums)			Others*1 (equivalent number of drums)	Total (equivalent number of drums) *1	Storage Equipment Capacity (equivalent number of drums)
		Homogeneous and Uniform Solidified Wastes	Container-filled and Solidified Wastes	Miscellaneous Solid Waste			
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	Storage at the end of previous fiscal year	2,073	—	13,502	4,743	20,318	37,000
	Generation in this fiscal year	43	—	480	200	723	
	Reduction in this fiscal year	0	—	610	0	610	
	Reduction in the station	0	—	610	0	610	
	Reduction outside the station	0	—	0	0	0	
	Storage at the end of this fiscal year	2,116	—	13,372	4,943	20,431	
The Japan Atomic Power Company Co., Ltd., Tokai Power Station	Storage at the end of previous fiscal year	—	0	13	1,388	1,401	1,600
	Generation in this fiscal year	9	0	206	744	959	
	Reduction in this fiscal year	9	0	172	724	905	
	Reduction in the station *9	9	0	172	644	825	
	Reduction outside the station	0	0	0	*8 80	*8 80	
	Storage at the end of this fiscal year	0	0	*9 47	*9 1,408	*9 1,455	
The Japan Atomic Power Company Co., Ltd., Tokai No. 2 Power Station	Storage at the end of previous fiscal year	489	725	17,025	39,096	57,335	73,000
	Generation in this fiscal year	0	364	873	1,328	2,565	
	Reduction in this fiscal year	0	0	1,341	1,364	2,705	
	Reduction in the station	0	0	*10 1,341	1,288	*10 2,629	
	Reduction outside the station	0	0	0	*11 76	*11 76	
	Storage at the end of this fiscal year *12	498	1,089	16,729	39,704	58,020	
The Japan Atomic Power Company Co., Ltd., Tsuruga Power station	Storage at the end of previous fiscal year	2,423	408	31,633	35,645	70,109	85,000
	Generation in this fiscal year	85	57	110	2,764	3,016	
	Reduction in this fiscal year	0	0	2,159	948	3,107	
	Reduction in the station	0	0	2,159	948	3,107	
	Reduction outside the station	0	0	0	0	0	
	Storage at the end of this fiscal year	2,508	465	29,584	37,461	70,018	
Total	Storage at the end of previous fiscal year	43,935	17,131	458,805	155,110	674,981	924,092
	Generation in this fiscal year	938	8,134	24,909	12,443	46,424	
	Reduction in this fiscal year	888	8,832	28,082	10,673	48,475	
	Reduction in the station *13	48	0	28,082	10,517	38,647	
	Reduction outside the station	840	8,832	0	156	9,828	
	Storage at the end of this fiscal year	43,985	16,433	455,632	156,881	672,931	

* 7: Amount of waste transferred to the Tokai No.2 Power Station
* 8: Reduction achieved by clearance treatment
* 9: Includes an amount equivalent to 19 miscellaneous drums of solid waste from the demolition waste and the equivalent of 1,324 drums of other miscellaneous solid waste
*10: Includes 5 drums of cement solidification treatment from the Tokai Power Station
*11: Reduction achieved by clearance treatment at the Tokai Power Station
*12: Includes the amount transferred from the Tokai Power Station during this period (equivalent to 9 drums of uniform solidified wastes, 172 drums of miscellaneous solid waste and 644 drums of other miscellaneous solid waste)
In addition, the amount in storage includes 1,380 drums of miscellaneous solid waste from demolition and 5,464 drums of other waste.
*13: Does not include the reduction achieved by transfer from the Tokai Power Station to Tokai No. 2 Power Station.

ii) Steam Generator Storage. etc.

Power Station	Item	Steam Generator (number of units)	Production or storage (m^3)
Hokkaido Electric Power Co., Inc., Tomari Power Station *14	Generation in this fiscal year		0
	Storage at the end of this fiscal year		179
The Kansai Electric Power Co., Inc., Mihama Power Station	Generation in this fiscal year	0	0
	Storage at the end of this fiscal year	7	966
The Kansai Electric Power Co., Inc., Takahama Power Station	Generation in this fiscal year	0	0
	Storage at the end of this fiscal year	6	894
The Kansai Electric Power Co., Inc., Ohi Power Station	Generation in this fiscal year	0	0
	Storage at the end of this fiscal year	8	2,674
Shikoku Electric Power Co., Inc., Ikata Power Station	Generation in this fiscal year	0	0
	Storage at the end of this fiscal year	4	638
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station *15	Generation in this fiscal year	0	0
	Storage at the end of this fiscal year	4	663
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station *16	Generation in this fiscal year	0	0
	Storage at the end of this fiscal year	3	509
The Japan Atomic Power Company Co., Ltd., Tsuruga Power station *14	Generation in this fiscal year		0
	Storage at the end of this fiscal year		170

*14 : Stored in the "reactor containment top head storage space"
*15 : The storage container includes the reactor containment top head and the reactor core internals.
*16 : Stored in the "solid waste storage space." Includes the reactor containment top head storage space.

iii) Feedwater Heater Storage, etc.

Power Station	Item	Feedwater Heaters (number of units)	Production or storage (m^3)
The Japan Atomic Power Company Co., Ltd., Tokai No. 2 Power Station	Generation in this fiscal year	0	0
	Storage at the end of this fiscal year	3	311

Power Station	Item	Turbine rotar (m^3)
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	Generation in this fiscal year	630
	Storage at the end of this fiscal year	630

XVI

iv) Spent Fuel Pool, Storage Bunker, Tank, etc.

BWR

Power Station	Item	Spent Fuel Pool/Storage Bunker			Tank, etc.
		Control Rods (number of units)	Channel Box, etc. (number of units)	Others (m^3)	Resin, etc. (m^3)
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	Generation in this fiscal year	23	0	0	17
	Reduction in this fiscal year	0	0	0	29
	Storage at the end of this fiscal year	231	3,112	1	487
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station	Generation in this fiscal year	0	0	0	4
	Reduction in this fiscal year	0	0	0	0
	Storage at the end of this fiscal year	67	644	0	126
Tohoku Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	Generation in this fiscal year	0	0	0	2
	Reduction in this fiscal year	0	0	0	0
	Storage at the end of this fiscal year	1,394	21,628	186	3,519
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	Generation in this fiscal year	0	0	0	27
	Reduction in this fiscal year	0	0	0	0
	Storage at the end of this fiscal year	699	9,233	43	5,231
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	Generation in this fiscal year	27	408	0	56
	Reduction in this fiscal year	0	38	0	0
	Storage at the end of this fiscal year	800	13,547	0	2,541
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station *17	Generation in this fiscal year	1	13	0.5	7
	Reduction in this fiscal year	0	0	0	0
	Storage at the end of this fiscal year	550	11,020	32	2,651
Hokuriku Electric Power Co., Shika Nuclear Power Station	Generation in this fiscal year	12	0	0	7
	Reduction in this fiscal year	0	0	0	1
	Storage at the end of this fiscal year	69	1,138	0	155
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	Generation in this fiscal year	16	8	0	7
	Reduction in this fiscal year	0	0	0	12
	Storage at the end of this fiscal year	285	4,478	56	852
The Japan Atomic Power Company Co., Ltd., Tokai No. 2 Power Station	Generation in this fiscal year	33	25	1	14
	Reduction in this fiscal year	0	0	0	0
	Storage at the end of this fiscal year	306	3,621	17	898
The Japan Atomic Power Co., Ltd., Tsuruga Power Station (Unit 1)	Generation in this fiscal year	8	0	0	12.5
	Reduction in this fiscal year	0	0	0	0
	Storage at the end of this fiscal year	173	1,850	49	845

Note: In addition, 348 m^3 of miscellaneous solid waste is stored in the miscellaneous solid waste storage room of Onagawa Nuclear Power Station and 304 m^3 of miscellaneous solid waste is stored in the miscellaneous solid waste storage room of Hamaoka Nuclear Power Station, respectively.

*17 : Transferred 34 units of channel boxes from the fuel pool to the storage banker in FY 2012.

PWR

Power Station	Item	Spent Fuel Pool Control Rods (number of units)	Tank, etc. Resin, etc. (m^3)
Hokkaido Electric Power Co., Inc., Tomari Power Station	Generation in this fiscal year	2	3
	Reduction in this fiscal year	0	0
	Storage at the end of this fiscal year	312	98
The Kansai Electric Power Co., Inc., Mihama Power Station	Generation in this fiscal year	0	1
	Reduction in this fiscal year	0	9
	Storage at the end of this fiscal year	696	100
The Kansai Electric Power Co., Inc., Takahama Power Station	Generation in this fiscal year	0	2
	Reduction in this fiscal year	0	0
	Storage at the end of this fiscal year	1,336	120
The Kansai Electric Power Co., Inc., Ohi Power Station	Generation in this fiscal year	22	4
	Reduction in this fiscal year	0	0
	Storage at the end of this fiscal year	1,134	109
Shikoku Electric Power Co., Inc., Ikata Power Station	Generation in this fiscal year	0	2
	Reduction in this fiscal year	0	0
	Storage at the end of this fiscal year	686	161
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	Generation in this fiscal year	0	4
	Reduction in this fiscal year	14	0.2
	Storage at the end of this fiscal year	778	172
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	Generation in this fiscal year	0	2
	Reduction in this fiscal year	0	0
	Storage at the end of this fiscal year	460	148
The Japan Atomic Power Co., Ltd., Tsuruga Power Station (Unit 2)	Generation in this fiscal year	0	1
	Reduction in this fiscal year	0	0
	Storage at the end of this fiscal year	353	92

GCR

Power Station	Item	Bunker Control Rods, etc. (m^3)	Bunker Others (m^3)	Tank Ion Exchange Resin (m^3)
The Japan Atomic Power Company Co., Ltd., Tokai Power Station	Generation in this fiscal year	0	0	0.1
	Reduction in this fiscal year	0	4	0
	Storage at the end of this fiscal year	91	1,295	60

(2) Nuclear Power Reactor Facilities in the Research and Development Stage

i) Solid Waste Storage

Facility	Item	Drums (number of drums)			Others *18 (equivalent number of drums)	Total (equivalent number of drums) *1	Storage Equipment Capacity (equivalent number of drums)
		Homogeneous and Uniform Solidified Wastes	Container Filled and Solidified Wastes	Miscellaneous Solid Waste			
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center	Storage at the end of previous fiscal year	2,016		6,809	10,376	19,201	21,500
	Generation in this fiscal year	0		112	492	604	
	Reduction in this fiscal year	0		4	512	516	
	Reduction in the station	0		4	512	516	
	Reduction outside the station	0		0	0	0	
	Storage at the end of this fiscal year	2,016		6,917	10,356	19,289	
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	Storage at the end of previous fiscal year	20	0	2,920	2,280	5,220	23,000
	Generation in this fiscal year	0	0	4	176	180	
	Reduction in this fiscal year	0	0	0	0	0	
	Reduction in the station	0	0	0	0	0	
	Reduction outside the station	0	0	0	0	0	
	Storage at the end of this fiscal year	20	0	2,924	2,456	5,400	

*18 : The containers are made of steel at the Fugen Decommissioning Engineering Center and iron at Fast Breeder Reactor Research and Development Center (equivalent to four 200-liter drums).

ii) Spent Fuel Pool, Tank, Solid Waste Storage Pool, Fuel Pond, etc.

Facility	Item	Spent Fuel Pool			Tank, etc.
		Control Rods (number of units)	Neutron Detector (number of units)	Others (number of units)	Resin, etc. (m^3)
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center	Generation in this fiscal year	0	0	—	0.1
	Reduction in this fiscal year	0	0	—	0
	Storage at the end of this fiscal year	54	128	—	216.2

Facility	Item	Solid waste storage pools		Fuel pond
		Control Rod Drive Mechanism Guide tube, etc. (number of units)	Others (m^3)	Assembly, etc. (number of units)
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	Generation in this fiscal year	0	0	0
	Reduction in this fiscal year	0	0	0
	Storage at the end of this fiscal year	5	0	0

(3) Fuel Manufacturing Facilities

i) Solid Radioactive Waste

Facility	Item	Low-level Solid Radioactive Waste (number of drums)		Total (equivalent number of drums) *1	Storage Equipment Capacity (equivalent number of drums)
		Drums (200 L)	Other Types (equivalent number of drums) *1		
Global Nuclear Fuel-Japan Co., Ltd.	Storage at the end of previous fiscal year	16,245	2,596	18,841	24,800
	Generation in this fiscal year	153	37	190	
	Reduction in this fiscal year	165	40	205	
	Storage at the end of this fiscal year	16,233	2,593	18,826	
Mitsubishi Nuclear Fuel Co., Ltd.	Storage at the end of previous fiscal year	9,795	748	10,543	11,600
	Generation in this fiscal year	773	110	883	
	Reduction in this fiscal year	861	252	1,113	
	Storage at the end of this fiscal year	9,707	606	10,313	
Nuclear Fuel Industries, Ltd., Tokai Works	Storage at the end of previous fiscal year	5,627	803	6,430	8,500
	Generation in this fiscal year	219	34	253	
	Reduction in this fiscal year	271	5	276	
	Storage at the end of this fiscal year	5,575	833	6,408	
Nuclear Fuel Industries, Ltd., Kumatori Works	Storage at the end of previous fiscal year	7,188	51	7,239	11,520
	Generation in this fiscal year	724	22	746	
	Reduction in this fiscal year	32	0	32	
	Storage at the end of this fiscal year	7,880	73	7,953	
Japan Atomic Energy Agency, Uranium Enrichment Demonstration Plant	Storage at the end of previous fiscal year	510	56	566	800
	Generation in this fiscal year	1	0	1	
	Reduction in this fiscal year	0	0	0	
	Storage at the end of this fiscal year	511	56	567	
*19, *20 Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Uranium Enrichment Plant)	Storage at the end of previous fiscal year	(304) 4,887	1,200	6,125	16,900
	Generation in this fiscal year	(16) 144	200	346	
	Reduction in this fiscal year	(0) 0	0	0	
	Storage at the end of this fiscal year	(320) 5,031	1,400	6,471	

ii) Other Radioactive Waste

Facility		Low-level Liquid Radioactive (m^3)	Storage Equipment Capacity (m^3)	Gaseous Radioactive Waste (converted to number of 80 kg cylinder)	Storage Equipment Capacity (equivalent number of drums)
Global Nuclear Fuel-Japan Co., Ltd.	Generation in this fiscal year	0.24	0.6		
	Reduction in this fiscal year	0.26			
	Storage at the end of this fiscal year	0.10			
Mitsubishi Nuclear Fuel Co., Ltd.	Generation in this fiscal year	0.00	3		
	Reduction in this fiscal year	0.00			
	Storage at the end of this fiscal year	1.80			
Nuclear Fuel Industries, Ltd., Tokai Works	Generation in this fiscal year	0.20	9.60		
	Reduction in this fiscal year	0.50			
	Storage at the end of this fiscal year	6.65			
Nuclear Fuel Industries, Ltd., Kumatori Works	Generation in this fiscal year	0.4	20.0		
	Reduction in this fiscal year	0.0			
	Storage at the end of this fiscal year	12.4			
Japan Atomic Energy Agency, Uranium Enrichment Demonstration Plant	Generation in this fiscal year	—	—		
	Reduction in this fiscal year	—			
	Storage at the end of this fiscal year	—			
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Uranium Enrichment Plant)	Generation in this fiscal year	0.20	6.10	0	27
	Reduction in this fiscal year	0.00		0	
	Storage at the end of this fiscal year	1.87		0	

*19: The number in parentheses indicates the number of 20-liter drums. The total was calculated assuming that roughly eight 20-liter drums equals one 200-liter drum, with the fractions rounded up.
*20: Stores the spent metal-bilge centrifuge which was generated as low-level solid waste in FY 2010 with radiation equivalent to 75 tSWU/y.

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(4) Reprocessing Facilities

i) Radioactive Solid Waste

Facility	Item	Low-level Solid Radioactive Waste (number of drums)				Total (equivalent number of drums) *1	Storage Equipment Capacity (equivalent number of drums)
		Drum	Asphalt-Solidified Waste	Plastic-Solidified Waste	Other Types (equivalent number of drums) *1		
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Storage at the end of previous fiscal year	32,078	29,967	1,812	11,973	75,830	92,140
	Generation in this fiscal year	125	0	0	96	221	
	Reduction in this fiscal year	112	0	0	0	112	
	Storage at the end of this fiscal year	32,091	29,967	1,812	12,069	75,939	
*21 Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	Storage at the end of previous fiscal year	14,130			18,650	32,780	*22 75,180
	Generation in this fiscal year	1,224			1,174	2,398	
	Reduction in this fiscal year	4			0	4	
	Storage at the end of this fiscal year	15,350			19,823	35,173	

Facility	Item	Low-level Solid Radioactive Waste (number of drums)	High-level Solid Radioactive Waste (equivalent number of drums)*1			Total (equivalent number of drums) *1	Storage Equipment Capacity (equivalent number of drums)
		Sheared Pieces of Cladding Materials, etc.		Spent Filters, etc.	Sampling Jars, etc.		
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Generation in this fiscal year		0	0	2	2	10,320
	Reduction in this fiscal year		0	0	0	0	
	Storage at the end of this fiscal year		4,958	302	1,358	6,618	
Japan Nuclear Fuel Ltd., *23 Reprocessing Plant (Reprocessing Facility)	Generation in this fiscal year	0				0	2,000
	Reduction in this fiscal year	0				0	
	Storage at the end of this fiscal year	219				219	

ii) Radioactive Liquid

Facility	Item	*24 Vitrified waste (number of canisters)	Low-level Liquid Radioactive Waste (m^3)			High-level Liquid Radioactive Liquid Waste(m^3)
			Low-level Concentrated Liquid Radioactive Waste	Sludge	Solvent Waste	
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Generation in this fiscal year	0	*25 59	2	0	0
	Reduction in this fiscal year	0	0	0	0	0
	Storage at the end of this fiscal year	247	*26 2,840	1,155	103	392
Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	Generation in this fiscal year	170				
	Reduction in this fiscal year	0				
	Storage at the end of this fiscal year	295				

*21 : The value includes the amount of spent resin, spent sludge, channel boxes, burnable poisons, spent filters, sampling jars, and so forth.
The sum of the amount of storage at the end of the previous fiscal year and the amount generated in this fiscal year do not precisely match due to rounding error after performing the conversion.

*22 : The storage capacity includes the capacity of the spent resin storage tank, equivalent to 4,250 drums (approx. 190 m^3 × 3 units, approx. 80 m^3 × 2 units, and approx. 120 m^3 × 1 unit).

*23 : Sheared pieces of cladding materials, etc. are stored in 1,000-liter drums.

*24 : The vitrified waste at the Reprocessing facility, Japan Atomic Energy Agency is stored in 120-liter drums.
The vitrified waste at the Reprocessing Plant (Reprocessing facility) of Japan Nuclear Fuel Ltd. is stored in canisters of approx. 1,340 mm in height and approx. 430 mm in diameter.

*25 : Includes liquid waste, the line cleaning water, etc. in the storage of spent fuel at low-level radioactive concentrated liquid waste storage.

*26 : Increase of $12m^3$ was achieved by the instrument correction and transfer between tanks.

5) Waste Burial Facilities, Waste Management Facilities

i) Solid Radioactive

Facility	Item	Low-level Solid Radioactive Waste (number of drums)			Total (equivalent number of drums) *1	Storage Equipment Capacity (equivalent number of drums)
		Drum	Asphalt-Solidified Waste	Other Types (equivalent number of drums) *1		
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office(Low-Level Radioactive Waste Disposal Center)	Storage at the end of previous fiscal year	0	—	0	0	80
	Generation in this fiscal year	0	—	0	0	
	Reduction in this fiscal year	0	—	0	0	
	Storage at the end of this fiscal year	0	—	0	0	
Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)	Storage at the end of previous fiscal year	1,108	—	44	1,152	1,200
	Generation in this fiscal year	264	—	0	264	
	Reduction in this fiscal year	300	—	0	300	
	Storage at the end of this fiscal year	1,072	—	44	1,116	
*27,*28 Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Science Research Institute,Radioactive Waste Disposal Facility	Storage at the end of previous fiscal year	—	—	—	—	—
	Generation in this fiscal year	—	—	—	—	
	Reduction in this fiscal year	—	—	—	—	
	Storage at the end of this fiscal year	—	—	—	—	
*28,*29 Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Storage at the end of previous fiscal year	(676) 17,071	540	(42) 11,750	(718) 29,361	42,795
	Generation in this fiscal year	(4) 67	(0) 0	(722) 1	(4) 68	
	Reduction in this fiscal year	0	0	0	0	
	Storage at the end of this fiscal year	(680) 17,138	(0) 540	(42) 11,751	(722) 29,429	

ii) Radioactive Liquid

Facility	Item	Low-level Liquid Radioactive Waste (m^3)
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office(Low-Level Radioactive Waste Disposal Center)	Generation in this fiscal year	—
	Reduction in this fiscal year	—
	Storage at the end of this fiscal year	—
Japan Nuclear Fuel Ltd., Reprocessing Plant(Waste Storage Facility)	Generation in this fiscal year	1.34
	Reduction in this fiscal year	0
	Storage at the end of this fiscal year	1.34
*27 Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Science Research Institute,Radioactive Waste Disposal Facility	Generation in this fiscal year	—
	Reduction in this fiscal year	—
	Storage at the end of this fiscal year	—
Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Generation in this fiscal year	—
	Reduction in this fiscal year	—
	Storage at the end of this fiscal year	—

*27: No radioactive solid waste was generated.
Roughly 1,670 tons of solid waste associated with the dismantling of JPDR have already been buried.
*28: The amount of generated waste, the amount in storage, and the storage capacity include corresponding figures of the fabrication, waste disposal, and waste management facilities.
*29: The numbers in parentheses indicate the amount generated at the facility, and are included in the total amount shown below the numbers. The numbers on the bottom are the total amount of waste managed at the management facilities.

Reference Material 1: Release of Radioactive Noble Gas in Gaseous Radioactive Waste by Fiscal Year (FY2003-FY2012)

(1) Commercial Nuclear Power Reactor Facilities (Unit: Bq)

Power Station \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hokkaido Electric Power Co., Inc., Tomari Power Station	5.1E+09	3.4E+09	2.8E+09	3.3E+09	3.1E+09	4.4E+09	7.7E+09	6.5E+09	1.7E+09	N.D.
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 5.4E+12	*1 4.2E+11	N.D.
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	2.8E+07	N.D.	3.8E+08	1.5E+08	2.2E+08	N.D.	N.D.	*2 —	*2 —	*2、3 —
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 3.6E+12	*1 1.3E+10	N.D.
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
The Kansai Electric Power Co., Inc., Mihama Power Station	6.1E+09	1.9E+09	1.2E+09	2.3E+09	4.6E+09	2.8E+09	4.7E+09	3.8E+10	3.4E+09	5.4E+07
The Kansai Electric Power Co., Inc., Takahama Power Station	1.1E+10	1.6E+10	1.2E+10	1.5E+10	1.8E+10	9.3E+11	3.3E+11	9.6E+09	1.7E+09	4.5E+08
The Kansai Electric Power Co., Inc., Ohi Power Station	1.8E+10	4.1E+11	6.2E+09	2.9E+09	2.2E+09	1.9E+10	5.0E+11	9.0E+11	6.8E+10	N.D.
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Shikoku Electric Power Co., Inc., Ikata Power Station	7.5E+09	3.9E+09	7.4E+09	6.9E+11	8.7E+11	1.5E+10	2.6E+11	1.7E+11	1.5E+10	N.D.
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	9.9E+09	1.6E+10	5.1E+11	8.1E+11	4.6E+10	2.6E+10	2.5E+10	2.6E+11	4.5E+10	1.3E+10
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	3.1E+10	4.4E+10	2.7E+10	1.6E+10	1.5E+10	1.3E+10	9.4E+09	1.2E+10	9.1E+09	3.5E+09
The Japan Atomic Power Company, Tokai Power Station										
The Japan Atomic Power Company, Tokai No. 2 Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 5.6E+10	N.D.	N.D.
The Japan Atomic Power Company, Tsuruga Power station	1.6E+09	7.4E+08	N.D.	N.D.	N.D.	N.D.	7.4E+08	N.D.	4.9E+09	N.D.
Total (excluding N.D.)	9.0E+10	5.0E+11	5.7E+11	1.5E+12	9.6E+11	1.0E+12	1.1E+12	*4 1.0E+13	*4 5.8E+11	*4 1.7E+10

*1: Available data suggests that these values are attributable to the accidents at the Fukushima Daiichi Nuclear Power Station.
*2: Currently undergoing evaluation by the licensee associated with the Tohoku District – off the Pacific Ocean Earthquake.
*3: Measured additional release amount of radioactive gaseous waste from units at points immeasurable at exhaust ports or discharge monitoring equipment due to influence of the Tohoku District - off the Pacific Ocean Earthquake. It is evaluated that the total released amount is roughly 87.6 billion Bq a year.
*4: Values excludes those of the Fukushima Daiichi Nuclear Power Station, which was undergoing evaluation by the licensee.

(2) Nuclear Power Reactor Facilities in the Research and Development Stage (Unit: Bq)

Facility \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total (excluding N.D.)	–	–	–	–	–	–	–	–	–	–

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Reference Material 2: Release of Radioactive Iodine in Gaseous RadioactiveWaste by Fiscal Year (FY2003-FY2012)

(1) Commercial Nuclear Power Reactor Facilities (Unit: Bq)

Power Station \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hokkaido Electric Power Co., Inc., Tomari Power Station	N.D.	N.D.	N.D.	N.D.	1.2E+05	N.D.	8.7E+04	N.D.	*1 6.9E+05	N.D.
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 2.7E+10	*1 1.0E+09	N.D.
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 8.8E+05	N.D.
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	5.3E+05	*2 —	*2 —	*2、3 —
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 6.2E+11	*1 1.9E+10	N.D.
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	2.3E+07	N.D.	N.D.	*1 1.6E+07	*5 8.4E+06	N.D.
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	N.D.	N.D.	2.0E+03	N.D.	N.D.	N.D.	3.0E+05	*1 7.9E+08	*1 4.0E+07	N.D.
Hokuriku Electric Power Co., Shika Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
The Kansai Electric Power Co., Mihama Power Station	2.3E+05	N.D.	N.D.	N.D.	N.D.	1.2E+05	8.4E+04	1.2E+05	*1 1.2E+06	N.D.
The Kansai Electric Power Co., Takahama Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 1.4E+04	*1 1.4E+06	N.D.
The Kansai Electric Power Co., Ohi Power Station	N.D.	1.9E+08	N.D.	N.D.	N.D.	1.7E+06	N.D.	*1 2.7E+05	*1 2.2E+06	N.D.
The Chugoku Electric Power Co., Shimane Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 2.5E+06	N.D.
Shikoku Electric Power Co., Inc., Ikata Power Station	N.D.	N.D.	N.D.	7.3E+05	1.1E+05	N.D.	9.9E+04	*1 1.7E+04	*1 9.5E+05	N.D.
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	N.D.	N.D.	4.6E+06	3.9E+06	N.D.	N.D.	N.D.	*1 3.2E+06	*1 8.4E+05	N.D.
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 1.6E+05	N.D.
The Japan Atomic Power Company, Tokai Power Station										
The Japan Atomic Power Company, Tokai No. 2 Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 6.1E+09	*1 4.9E+08	N.D.
The Japan Atomic Power Company, Tsuruga Power station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 6.8E+05	N.D.
Total (excluding N.D.)	2.3E+05	1.9E+08	4.6E+06	4.6E+06	2.3E+07	1.8E+06	1.1E+06	*4 6.5E+11	*4 2.1E+10	*4 —

Note: At the Tokai Power Station of the Japan Atomic Power Company, the available data suggests that the amounts of radioactivity measured in FY 2010 and 2011.(FY 2010:2.4E+08 and FY 2011: 1.4E+07) are attributable to the accidents at the Fukushima Daiichi Nuclear Power Station.

*5 : Including the release that is presumably associated with the accidents at the Fukushima Daiichi Nuclear Power Station. (FY 2011: 7.7E+0.6)

(2) Nuclear Power Reactor Facilities in the Research and Development Stage (Unit: Bq)

Facility \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 2.0E+05	N.D.
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	*1 9.8E+04	*1 2.1E+03	N.D.
Total (excluding N.D.)	－	－	－	－	－	－	－	9.8E+04	2.0E+05	－

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Reference Material 3: Release of Radioactivity (Excluding Tritium) in Liquid Radioactive Waste by Fiscal Year (FY2003-FY2012)

(1) Commercial Nuclear Power Reactor Facilities (Unit: Bq)

Power Station \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hokkaido Electric Power Co., Inc., Tomari Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station	—	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	[*2] —	[*2] —	There was no managed release.
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	[*1] 1.6E+06	N.D.
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	N.D.	N.D.	N.D.	2.7E+04	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
The Kansai Electric Power Co., Inc., Mihama Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
The Kansai Electric Power Co., Inc., Takahama Power Station	N.D.	3.1E+05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
The Kansai Electric Power Co., Inc., Ohi Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Shikoku Electric Power Co., Inc., Ikata Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
The Japan Atomic Power Company, Tokai Power Station	8.9E+04	2.8E+04	N.D.	7.2E+03	N.D.	N.D.	9.3E+04	8.7E+04	4.3E+03	3.9E+05
The Japan Atomic Power Company, Tokai No. 2 Power Station	N.D.	N.D.	N.D.	N.D.	2.2E+05	3.4E+08	1.3E+07	[*6] 2.0E+07	[*6] 1.0E+07	1.5E+06
The Japan Atomic Power Company, Tsuruga Power station	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total (excluding N.D.)	8.9E+04	3.4E+05	—	3.4E+04	2.2E+05	3.4E+08	1.3E+07	[*4] 2.0E+07	[*4] 1.2E+07	1.9E+06

Note: The "managed release" at Fukushima Daiichi Nuclear Power Station is that of liquid radioactive waste released from drainage equipment in a properly managed condition. The release affected by the Tohoku District - off the Pacific Ocean Earthquake - is not included.

*6: Including the release that is presumably associated with the accidents at the Fukushima Daiichi Nuclear Power Station. (FY 2010: 1.7E+07 and FY 2011: 7.7E+06)

(2) Nuclear Power Reactor Facilities in the Research and Development Stage (Unit: Bq)

Facility \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total (excluding N.D.)	–	–	–	–	–	–	–	–	–	–

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Reference Material 4: Release of Tritium in Liquid Radioactive Waste by Fiscal Year (FY2003-FY2012)

(1) Commercial Nuclear Power Reactor Facilities (Unit: Bq)

Power Station \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hokkaido Electric Power Co., Inc., Tomari Power Station	2.2E+13	1.9E+13	3.1E+13	2.9E+13	2.7E+13	2.0E+13	3.0E+13	3.3E+13	3.8E+13	8.7E+12
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	5.6E+09	8.0E+08	2.1E+09	5.4E+09	5.1E+09	6.7E+09	6.6E+10	2.2E+10	8.4E+09	1.7E+10
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station	—	9.4E+08	3.9E+10	3.4E+10	5.3E+10	9.0E+10	2.3E+11	3.0E+10	1.6E+11	4.5E+10
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	1.4E+12	1.0E+12	1.3E+12	*7 2.6E+12	1.4E+12	1.6E+12	2.0E+12	*2 —	*2 —	There was no managed release.
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	3.8E+11	3.5E+11	9.6E+11	6.6E+11	7.3E+11	5.0E+11	9.8E+11	1.6E+12	2.3E+12	8.0E+11
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	8.5E+11	4.9E+11	8.1E+11	8.8E+11	8.8E+11	9.2E+11	5.4E+11	6.6E+11	4.6E+11	2.6E+11
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	5.9E+11	4.6E+11	7.5E+11	6.8E+11	6.0E+11	7.3E+11	6.4E+11	6.4E+11	4.6E+11	2.0E+11
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	2.2E+11	1.2E+11	1.8E+11	1.8E+11	2.5E+10	7.6E+10	3.9E+11	2.8E+11	2.1E+11	1.1E+10
The Kansai Electric Power Co., Inc., Mihama Power Station	2.3E+13	1.6E+13	1.5E+13	1.4E+13	2.0E+13	1.8E+13	2.3E+13	1.3E+13	2.2E+13	4.3E+12
The Kansai Electric Power Co., Inc., Takahama Power Station	5.9E+13	6.3E+13	6.9E+13	6.8E+13	6.0E+13	4.0E+13	4.3E+13	6.5E+13	3.8E+13	6.8E+12
The Kansai Electric Power Co., Inc., Ohi Power Station	9.0E+13	9.8E+13	6.6E+13	7.7E+13	8.9E+13	7.4E+13	8.1E+13	5.6E+13	5.6E+13	2.2E+13
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	5.2E+11	6.3E+11	6.3E+11	3.0E+11	6.6E+11	2.8E+11	2.2E+11	2.3E+11	3.4E+11	1.5E+11
Shikoku Electric Power Co., Inc., Ikata Power Station	5.4E+13	6.8E+13	5.3E+13	4.6E+13	6.6E+13	5.8E+13	5.7E+13	5.1E+13	5.3E+13	1.8E+12
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	9.5E+13	7.3E+13	7.4E+13	9.9E+13	8.6E+13	6.9E+13	8.1E+13	1.0E+14	5.6E+13	2.0E+12
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	3.8E+13	5.1E+13	4.8E+13	3.5E+13	3.8E+13	5.3E+13	5.0E+13	3.0E+13	3.7E+13	1.0E+12
The Japan Atomic Power Company, Tokai Power Station	3.7E+06	N.D.	4.1E+08	2.0E+08	1.0E+09	1.3E+09	7.5E+07	*8 N.D.	*8 N.D.	*8 N.D.
The Japan Atomic Power Company, Tokai No. 2 Power Station	8.5E+11	6.1E+11	7.4E+11	6.2E+11	5.8E+11	5.5E+11	7.0E+11	4.2E+11	8.7E+11	4.1E+10
The Japan Atomic Power Company, Tsuruga Power station	2.2E+13	2.6E+13	9.2E+12	1.5E+13	1.3E+13	4.9E+12	1.5E+13	1.2E+13	6.0E+12	9.3E+11
Total	4.1E+14	4.2E+14	3.7E+14	3.9E+14	4.0E+14	3.4E+14	3.9E+14	*4 3.6E+14	*4 3.1E+14	4.9E+13

Note: The data for PWR power stations includes the amount of tritium released from secondary sources. The "managed release" at Fukushima Daiichi Nuclear Power Station is that of liquid radioactive waste released from drainage equipment in a properly managed condition. The release affected by the Tohoku District - off the Pacific Ocean Earthquake - is not included.

*7: Condensate make-up water system with the indoor steam system and the reactor auxiliary cooling system of Unit 1.

*8: Tritium detection limit: 2E-01 or less

(2) Nuclear Power Reactor Facilities in the Research and Development Stage (Unit: Bq)

Facility \ FY	2004	2005	2006	2007	2008	2009	2010	2011	2011	2012
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center	3.7E+11	8.4E+11	1.0E+12	1.4E+12	8.9E+11	2.6E+12	2.1E+12	8.6E+11	8.6E+11	3.1E+11
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	4.9E+08	1.3E+08	4.7E+08	2.0E+08	2.1E+07	2.1E+08	2.7E+08	1.5E+08	7.7E+07	1.5E+08
Total (excluding N.D.)	3.7E+11	8.4E+11	1.0E+12	1.4E+12	8.9E+11	2.6E+12	2.1E+12	8.6E+11	8.6E+11	3.1E+11

XVI

Reference Material 5: Management Status of Solid Radioactive Waste (Solid Waste Storage) by Fiscal Year (FY2003-FY2012)

(1) Commercial Nuclear Power Reactor Facilities

(Unit: equivalent number of drums)

Power Station		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hokkaido Electric Power Co., Inc., Tomari Power Station	Generation in this fiscal year	307	436	516	387	412	845	796	884	825	667
	Reduction in this fiscal year	135	0	1	0	0	801	30	1	95	182
	Reduction in the station	135	0	1	0	0	65	30	1	95	182
	Reduction outside the station	0	0	0	0	0	736	0	0	0	0
	Storage at the end of this fiscal year	4,007	*1 4,442	4,957	*1 5,343	5,755	5,799	*1 6,564	*1 7,446	8,176	8,661
	Storage equipment capacity	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	Generation in this fiscal year	2,692	3,876	3,116	2,704	3,720	5,320	4,532	7,097	3,128	6,296
	Reduction in this fiscal year	1,664	532	1,520	3,648	2,844	3,012	5,540	6,637	3,604	6,044
	Reduction in the station	1,664	532	1,520	3,648	1,852	2,052	4,900	6,317	3,604	6,044
	Reduction outside the station	0	0	0	0	992	960	640	320	0	0
	Storage at the end of this fiscal year	20,436	23,780	25,376	24,432	25,308	27,616	26,608	27,068	26,592	26,844
	Storage equipment capacity	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,132
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station	Generation in this fiscal year		0	580	720	1,224	2,144	2,028	1,164	1,168	392
	Reduction in this fiscal year		0	0	0	0	0	0	0	0	0
	Reduction in the station		0	0	0	0	0	0	0	0	0
	Reduction outside the station		0	0	0	0	0	0	0	0	0
	Storage at the end of this fiscal year		0	580	1,300	2,524	4,668	6,696	7,860	9,028	9,420
	Storage equipment capacity		9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,120	18,360
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	Generation in this fiscal year	19,835	18,397	20,169	18,129	16,694	16,626	16,938	*2 11,850	*3 0	0
	Reduction in this fiscal year	22,441	19,691	13,574	16,448	11,484	14,549	13,615	*2 10,893	*3 0	0
	Reduction in the station	16,481	15,691	10,374	12,448	11,484	12,629	10,607	*2 8,845	*3 0	0
	Reduction outside the station	5,960	4,000	3,200	4,000	0	1,920	3,008	*2 2,048	*3 0	0
	Storage at the end of this fiscal year	167,101	165,807	172,402	174,083	179,293	181,370	184,693	*2 185,650	*3 185,650	185,650
	Storage equipment capacity	284,500	284,500	284,500	284,500	284,500	284,500	284,500	*2 284,500	*3 284,500	284,500
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	Generation in this fiscal year	3,390	3,566	4,760	2,871	3,259	2,302	2,471	2,397	71	1,191
	Reduction in this fiscal year	6,161	5,101	2,860	1,794	1,257	3,021	1,285	3,472	0	0
	Reduction in the station	4,161	3,101	1,900	1,794	1,257	1,021	1,285	1,472	0	0
	Reduction outside the station	2,000	2,000	960	0	0	2,000	0	2,000	0	0
	Storage at the end of this fiscal year	14,474	12,939	14,839	15,916	17,918	17,199	18,385	17,310	17,381	18,572
	Storage equipment capacity	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	Generation in this fiscal year	980	2,114	4,127	3,474	691	2,083	4,224	3,387	3,141	4,525
	Reduction in this fiscal year	50	0	18	13	27	53	56	40	2,066	5,007
	Reduction in the station	50	0	18	13	27	53	56	40	2,066	3,607
	Reduction outside the station	0	0	0	0	0	0	0	0	0	1,400
	Storage at the end of this fiscal year	12,030	14,144	18,253	21,714	22,378	24,408	28,576	31,923	32,998	32,516
	Storage equipment capacity	30,000	30,000	30,000	30,000	30,000	45,000	45,000	45,000	45,000	45,000
Chubu Electric Power Co., Inc. Hamaoka Nuclear Power Station	Generation in this fiscal year	4,157	3,436	3,506	4,280	3,736	5,300	5,444	5,284	3,632	4,908
	Reduction in this fiscal year	4,412	3,876	3,592	3,682	3,282	5,880	5,712	5,664	4,040	4,956
	Reduction in the station	3,332	2,900	2,512	2,602	2,202	4,800	4,632	4,464	2,840	3,756
	Reduction outside the station	1,080	976	1,080	1,080	1,080	1,080	1,080	1,200	1,200	1,200
	Storage at the end of this fiscal year	35,512	35,072	34,986	35,584	36,038	35,458	35,190	34,810	34,402	34,354
	Storage equipment capacity	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000

*1: The sum of the amount of storage at the end of the previous fiscal year and the amount generated in this fiscal year do not precisely match due to rounding error after performing the conversion.

*2: They were undergoing evaluation by the licensee associated with the influence of Tohoku District-off the Pacific Ocean Earthquake. On April 26, 2013, they were reported.
The data was summed up by the 3rd quarter in FY 2010.

*3: They were undergoing evaluation by the licensee associated with the influence of Tohoku District-off the Pacific Ocean Earthquake. On April 26, 2013, they were reported.

(Unit: equivalent number of drums)

Power Station		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	Generation in this fiscal year	268	420	460	744	993	1,000	1,162	1,388	1,364	1,080
	Reduction in this fiscal year	0	0	0	392	477	768	476	1,056	648	868
	Reduction in the station	0	0	0	392	477	368	476	576	648	388
	Reduction outside the station	0	0	0	0	0	400	0	480	0	480
	Storage at the end of this fiscal year	2,536	2,956	3,416	3,768	4,284	4,516	5,202	5,534	6,250	6,462
	Storage equipment capacity	5,000	5,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
The Kansai Electric Power Co., Inc., Mihama Power Station	Generation in this fiscal year	4,337	2,698	3,260	3,856	3,235	4,444	4,086	5,388	3,963	4,209
	Reduction in this fiscal year	5,527	3,143	3,008	3,431	3,544	3,729	3,715	4,759	4,219	4,750
	Reduction in the station	3,983	1,703	1,576	2,191	2,344	2,369	2,515	3,399	2,779	2,806
	Reduction outside the station	1,544	1,440	1,432	1,240	1,200	1,360	1,200	1,360	1,440	1,944
	Storage at the end of this fiscal year	27,258	26,813	27,065	27,490	27,181	27,897	*1 28,267	28,896	28,640	*1 28,100
	Storage equipment capacity	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000
The Kansai Electric Power Co., Inc., Takahama Power Station	Generation in this fiscal year	1,724	1,893	3,557	3,721	2,706	3,810	4,563	3,244	2,440	1,658
	Reduction in this fiscal year	606	653	2,027	1,280	1,256	1,711	1,201	1,844	2,817	2,736
	Reduction in the station	606	653	2,027	1,280	1,256	1,711	1,201	1,844	2,377	2,736
	Reduction outside the station	0	0	0	0	0	0	0	0	440	0
	Storage at the end of this fiscal year	33,116	34,356	35,886	38,327	39,777	41,876	45,238	46,638	*1 46,262	45,184
	Storage equipment capacity	50,600	50,600	50,600	50,600	50,600	50,600	50,600	50,600	50,600	50,600
The Kansai Electric Power Co., Inc., Ohi Power Station	Generation in this fiscal year	3,377	3,592	3,344	3,336	3,329	3,544	5,490	4,750	3,729	2,570
	Reduction in this fiscal year	3,934	3,891	3,673	3,476	1,580	1,375	1,615	2,992	3,449	3,189
	Reduction in the station	2,582	2,395	2,177	1,980	1,580	1,375	1,615	1,576	1,449	1,157
	Reduction outside the station	1,352	1,496	1,496	1,496	0	0	0	1,416	2,000	2,032
	Storage at the end of this fiscal year	24,257	23,958	*1 23,628	*1 23,488	25,237	*1 27,407	*1 31,283	33,041	33,321	32,702
	Storage equipment capacity	38,900	38,900	38,900	38,900	38,900	38,900	38,900	38,900	38,900	38,900
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	Generation in this fiscal year	4,434	4,075	2,674	4,312	4,128	3,350	3,286	3,984	3,461	3,276
	Reduction in this fiscal year	3,585	4,297	4,313	4,614	3,373	3,462	4,074	2,767	3,596	3,877
	Reduction in the station	3,585	3,409	3,033	3,334	2,333	3,462	2,794	2,767	2,316	3,261
	Reduction outside the station	0	888	1,280	1,280	1,040	0	1,280	0	1,280	616
	Storage at the end of this fiscal year	28,807	28,585	26,946	26,644	27,399	27,287	26,499	27,716	27,581	26,980
	Storage equipment capacity	35,500	35,500	35,500	35,500	35,500	35,500	35,500	35,500	35,500	35,500
Shikoku Electric Power Co., Inc., Ikata Power Station	Generation in this fiscal year	2,233	3,509	4,253	2,804	2,492	2,632	2,625	3,124	3,138	3,219
	Reduction in this fiscal year	1,264	1,080	845	1,357	2,247	1,326	2,456	2,600	3,333	4,251
	Reduction in the station	1,264	1,080	845	1,357	1,367	1,326	1,872	2,600	2,693	3,291
	Reduction outside the station	0	0	0	0	880	0	584	0	640	960
	Storage at the end of this fiscal year	*1 20,492	22,921	26,329	27,776	28,021	29,327	*1 29,495	30,019	29,824	28,792
	Storage equipment capacity	38,500	38,500	38,500	38,500	38,500	38,500	38,500	38,500	38,500	38,500

(Unit: equivalent number of drums)

Power Station		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	Generation in this fiscal year	2,347	4,066	3,078	2,259	2,242	3,266	4,140	5,362	5,359	5,170
	Reduction in this fiscal year	1,801	1,051	845	611	402	641	923	2,275	3,791	6,113
	Reduction in the station	1,801	1,051	845	611	402	641	923	1,955	3,351	5,073
	Reduction outside the station	0	0	0	0	0	0	0	320	440	1,040
	Storage at the end of this fiscal year	20,480	23,495	25,728	27,376	29,216	31,841	35,058	38,145	39,713	38,770
	Storage equipment capacity	29,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000	49,000
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	Generation in this fiscal year	1,170	1,005	1,039	1,504	2,580	3,485	1,533	1,541	2,112	723
	Reduction in this fiscal year	147	438	1,031	1,301	649	228	594	642	771	610
	Reduction in the station	147	438	1,031	1,301	649	228	594	642	451	610
	Reduction outside the station	0	0	0	0	0	0	0	0	320	0
	Storage at the end of this fiscal year	11,173	11,740	11,748	11,951	13,882	17,139	18,078	18,977	20,318	20,431
	Storage equipment capacity	17,000	17,000	17,000	17,000	17,000	37,000	37,000	37,000	37,000	37,000
The Japan Atomic Power Company Co., Ltd., Tokai Power Station	Generation in this fiscal year	280	651	4,730	799	2,167	2,000	1,253	780	648	959
	Reduction in this fiscal year	156	879	3,794	795	1,770	2,012	1,233	748	680	905
	Reduction in the station *4	156	879	3,794	639	1,678	1,784	1,233	748	680	825
	Reduction outside the station	0	0	0	*5 156	*5 92	*5 228	0	0	0	*5 80
	Storage at the end of this fiscal year	284	56	992	996	1,393	1,381	1,401	1,433	1,401	1,455
	Storage equipment capacity	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
The Japan Atomic Power Company Co., Ltd., Tokai No. 2 Power Station	Generation in this fiscal year	1,660	1,264	1,702	1,585	1,277	2,587	4,821	3,135	3,599	2,565
	Reduction in this fiscal year	700	0	26	1,812	2,420	2,714	5,039	2,748	2,677	2,705
	Reduction in the station *6	700	0	26	1,812	2,420	2,498	4,519	2,284	2,677	2,629
	Reduction outside the station	0	0	0	0	0	*8 216	*8 520	464	0	76
	Storage at the end of this fiscal year *7	43,366	45,509	50,979	51,391	51,926	53,583	54,598	55,733	57,335	58,020
	Storage equipment capacity	73,000	73,000	73,000	73,000	73,000	73,000	73,000	73,000	73,000	73,000
The Japan Atomic Power Company Co., Ltd., Tsuruga Power station	Generation in this fiscal year	1,920	2,272	2,290	1,952	2,321	2,884	3,033	3,482	5,621	3,016
	Reduction in this fiscal year	3,860	1,384	2,080	1,256	1,333	2,468	1,948	2,024	3,592	3,107
	Reduction in the station	2,748	1,384	1,784	1,256	1,333	2,084	1,948	2,024	3,400	3,107
	Reduction outside the station	1,112	0	296	0	0	384	0	0	192	0
	Storage at the end of this fiscal year	62,339	63,227	63,437	64,133	65,121	65,537	66,622	68,080	70,109	70,018
	Storage equipment capacity	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000
Grand Total	Generation in this fiscal year	55,111	57,270	67,161	59,437	57,206	67,622	72,425	68,241	47,399	46,424
	Reduction in this fiscal year	56,287	45,137	39,413	45,271	36,267	45,966	48,279	50,414	38,698	48,475
	Reduction in the station *9	43,239	34,337	29,669	36,019	30,983	36,682	39,967	40,806	30,746	38,647
	Reduction outside the station	13,048	10,800	9,744	*10 9,252	*10 5,284	*10 9,284	*10 8,312	*10 9,608	7,952	*10 9,828
	Storage at the end of this fiscal year	*1 527,668	*1 539,800	*1 567,547	*1 581,712	602,651	*1 624,309	*1 648,453	*1 666,279	*1 674,981	*1 672,931
	Storage equipment capacity	845,600	874,600	879,600	879,600	879,600	914,600	914,600	914,600	914,720	924,092

* 4: Reduction achieved by transferring waste to the Tokai No.2 Power Station
* 5: Reduction achieved by clearance treatment
* 6: Includes the reduction achieved at the Tokai Power Station.
* 7: Includes the waste transferred from the Tokai Power Station.
* 8: The amount of shipped waste for burial includes the waste from the Tokai Power Station. (72 drums in FY 2008, 72 drums in FY 2009)
* 9: Does not include the reduction achieved by transfer from the Tokai Power Station to Tokai No.2 Power Station.
*10: Includes the reduction achieved by clearance treatment at the Tokai Power Station
(156 drums in FY 2006, 92 drums in FY 2007, 252 drums in FY 2008, 336 drums in FY 2009, 144 drums in FY 2010, and 156 drums in FY 2012)

(2) Nuclear Power Reactor Facilities in the Research and Development Stage (Unit: equivalent number of drums)

Facility		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center	Generation in this fiscal year	394	456	315	562	462	573	888	844	635	604
	Reduction in this fiscal year	90	134	225	728	808	541	730	636	738	516
	Reduction in the station	90	134	225	728	808	541	730	636	738	516
	Reduction outside the station	0	0	0	0	0	0	0	0	0	0
	Storage at the end of this fiscal year	19,006	19,328	19,418	19,252	18,906	18,938	19,096	19,304	19,201	19,289
	Storage equipment capacity	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	Generation in this fiscal year	216	328	256	320	232	236	584	532	256	180
	Reduction in this fiscal year	0	0	0	0	0	0	0	0	0	0
	Reduction in the station	0	0	0	0	0	0	0	0	0	0
	Reduction outside the station	0	0	0	0	0	0	0	0	0	0
	Storage at the end of this fiscal year	2,476	2,804	3,060	3,380	3,612	3,848	4,432	4,964	5,220	5,400
	Storage equipment capacity	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000	23,000
Total	Generation in this fiscal year	610	784	571	882	694	809	1,472	1,376	891	784
	Reduction in this fiscal year	90	134	225	728	808	541	730	636	738	516
	Reduction in the station	90	134	225	728	808	541	730	636	738	516
	Reduction outside the station	0	0	0	0	0	0	0	0	0	0
	Storage at the end of this fiscal year	21,482	22,132	22,478	22,632	22,518	22,786	23,528	24,268	24,421	24,689
	Storage equipment capacity	44,500	44,500	44,500	44,500	44,500	44,500	44,500	44,500	44,500	44,500

(3) Fuel Manufacturing Facilities (Unit: equivalent number of drums)

Facility		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Global Nuclear Fuel-Japan Co., Ltd.	Generation in this fiscal year	268	183	2,663	296	1,673	1,739	1,775	1,296	755	190
	Reduction in this fiscal year	255	228	191	1,003	551	669	834	643	308	205
	Storage at the end of this fiscal year	12,888	12,843	15,315	14,608	15,730	16,800	17,741	18,394	18,841	18,826
	Storage equipment capacity	16,260	16,260	18,460	18,460	20,250	21,550	23,200	23,200	24,800	24,800
Mitsubishi Nuclear Fuel Co., Ltd.	Generation in this fiscal year	1,178	871	901	1,134	749	961	1,116	875	1,034	883
	Reduction in this fiscal year	1,136	824	629	1,048	796	1,072	1,040	910	1,022	1,113
	Storage at the end of this fiscal year	10,243	10,290	10,562	10,648	10,601	10,490	10,566	10,531	10,543	10,313
	Storage equipment capacity	11,600	11,600	11,600	11,600	11,600	11,600	11,600	11,600	11,600	11,600
Nuclear Fuel Industries, Ltd., Tokai Works	Generation in this fiscal year	603	510	604	834	638	627	493	378	268	253
	Reduction in this fiscal year	489	391	389	380	398	466	424	340	220	276
	Storage at the end of this fiscal year	5,086	5,205	5,420	5,874	6,114	6,275	6,344	6,382	6,430	*1 6,408
	Storage equipment capacity	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500
Nuclear Fuel Industries, Ltd., Kumatori Works	Generation in this fiscal year	767	1,249	1,204	691	390	348	428	401	295	746
	Reduction in this fiscal year	618	535	670	172	1	70	226	288	257	32
	Storage at the end of this fiscal year	4,452	5,166	5,700	6,219	6,608	6,886	7,088	7,201	7,239	7,953
	Storage equipment capacity	7,500	7,500	7,500	7,500	11,520	11,520	11,520	11,520	11,520	11,520
Japan Atomic Energy Agency, Uranium Enrichment Demonstration Plant	Generation in this fiscal year	92	77	0	48	43	0	27	0	13	1
	Reduction in this fiscal year	0	0	0	0	103	0	0	0	27	0
	Storage at the end of this fiscal year	488	565	565	613	553	553	580	580	566	567
	Storage equipment capacity	800	800	800	800	800	800	800	800	800	800
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Uranium Enrichment Plant)	Generation in this fiscal year	163	134	152	224	77	252	190	1,004	147	346
	Reduction in this fiscal year	0	0	0	0	0	0	0	0	0	0
	Storage at the end of this fiscal year	*1 3,947	4,081	*1 4,232	4,456	4,533	4,785	*1 4,974	5,978	6,125	6,471
	Storage equipment capacity	6,700	6,700	6,700	6,700	6,700	6,700	6,700	9,900	9,900	16,900
Total	Generation in this fiscal year	3,071	3,024	5,524	3,227	3,570	3,927	4,029	3,954	2,512	2,419
	Reduction in this fiscal year	2,498	1,978	1,879	2,603	1,849	2,277	2,524	2,181	1,834	1,626
	Storage at the end of this fiscal year	*1 37,104	38,150	*1 41,794	42,418	44,139	45,789	*1 47,293	49,066	49,744	*1 50,538
	Storage equipment capacity	51,360	51,360	53,560	53,560	59,370	60,670	62,320	65,520	67,120	74,120

(4) Reprocessing Facilities

(Unit: equivalent number of drums)

Facility		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Generation in this fiscal year	1,029	879	830	424	423	381	343	393	197	223
	Reduction in this fiscal year	920	920	0	0	52	228	144	152	104	112
	Storage at the end of this fiscal year	80,176	80,135	80,965	81,389	81,760	81,913	82,112	82,353	82,446	82,557
*11	Storage equipment capacity	102,460	102,460	102,460	102,460	102,460	102,460	102,460	102,460	102,460	102,460
Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	Generation in this fiscal year	3,924	960	1,805	6,109	4,503	1,771	7,821	*14 7761	6,183	2,398
	Reduction in this fiscal year	0	0	0	0	0	0	*14 5,552	5,808	0	4
	Storage at the end of this fiscal year	7,228	8,188	9,993	*1 116,101	20,604	22,375	*14 24,644	*14 26,597	32,780	*1 35,173
*13	Storage at the end of this fiscal year*12	11,350	61,350	66,350	74,750	74,750	74,750	74,750	74,750	75,180	75,180
Total	Generation in this fiscal year	4,953	1,839	2,635	6,533	4,926	2,152	8,164	*14 8,154	6,380	2,621
	Reduction in this fiscal year	920	920	0	0	52	228	*14 5,696	5,960	104	116
	Storage at the end of this fiscal year	87,404	88,323	90,958	*1 97,490	102,364	104,288	*14 106,756	*14 108,950	115,226	117,730
	Storage equipment capacity	113,810	163,810	168,810	177,210	177,210	177,210	177,210	177,210	177,640	177,640

*11: The value excludes the amount of vitrified waste. At the end of FY 2012, 247 canisters of vitrified were stored, compared to the storage capacity of 420 canisters.

*12: The storage capacity includes the capacity of the spent resin storage tank, equivalent to 4,250 drums (approx. 190 m^3 × 3 units, approx. 80 m^3 × 2 units, and approx. 120 m^3 × 1 unit).

*13: Other waste including sheared pieces of cladding materials classified as low-level radioactive solid waste equivalent to 219 1,000-liter drums was stored, compared to the capacity of 2,000 drums.
At the end of FY 2012, 295 canisters of vitrified were stored, compared to the storage capacity of 3,195 canisters.

*14: An amount equivalent to 1,280 drums of waste that was shipped from the primary low-level radioactive waste storage building in FY 2009 to the primary low-level radioactive waste storage building in FY 2010 for waste arrangement is not included in the reduction in FY 2009 or not included in the Generation in FY 2010 and is included in the storage for the end of FY 2009 and FY 2010.

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(5) Waste Burial Facilities and Waste Management Facilities

(Unit: equivalent number of drums)

Facility		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office(Low-Level Radioactive Waste Disposal Center)	Generation in this fiscal year	0	0	0	0	0	0	0	0	0	0
	Reduction in this fiscal year	0	0	0	0	0	0	0	0	0	0
	Storage at the end of this fiscal year	0	0	0	0	0	0	0	0	0	0
	Storage equipment capacity	80	80	80	80	80	80	80	80	80	80
Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)	Generation in this fiscal year	44	32	68	44	120	172	56	96	144	264
	Reduction in this fiscal year	0	0	0	0	0	0	0	0	100	300
	Storage at the end of this fiscal year	520	552	620	664	784	956	1,012	1,108	1,152	1,116
	Storage equipment capacity	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Science Research Institute, Radioactive Waste Disposal Facility	Generation in this fiscal year	—	—	—	—	—	—	—	—	—	—
	Reduction in this fiscal year	—	—	—	—	—	—	—	—	—	—
	Storage at the end of this fiscal year	—	—	—	—	—	—	—	—	—	—
*15	Storage equipment capacity	—	—	—	—	—	—	—	—	—	—
Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Generation in this fiscal year	(24) 473	(28) 561	(20) 317	(13) 426	(35) 517	(10) 336	(97) 343	(11) 239	(47) 286	(4) 68
	Reduction in this fiscal year	0	0	0	0	0	0	0	0	0	0
	Storage at the end of this fiscal year	(457) 26,336	(485) 26,897	(505) 27,214	(518) 27,640	(553) 28,157	(563) 28,493	(660) 28,836	(671) 29,075	(718) 29,361	(722) 29,429
*16	Storage equipment capacity	42,795	42,795	42,795	42,795	42,795	42,795	42,795	42,795	42,795	42,795
Total	Generation in this fiscal year	517	593	385	470	637	508	399	335	430	332
	Reduction in this fiscal year	0	0	0	0	0	0	0	0	100	300
	Storage at the end of this fiscal year	26,856	27,449	27,834	28,304	28,941	29,449	29,848	30,183	30,513	30,545
	Storage equipment capacity	44,075	44,075	44,075	44,075	44,075	44,075	44,075	44,075	44,075	44,075

*15: There is no storage equipment.
*16: The numbers in parentheses indicate the amount of generated waste from the respective facilities and are included in the total amount of waste managed by these management facilities, which is displayed immediately below.

Reference Material 6: Amount of Waste Transported to the Low-Level Radioactive Waste Burial Center by Fiscal Year (FY2003-FY2012)

(Unit: number of drums)

Power Station \ FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Cumulative amount
Hokkaido Electric Power Co., Inc., Tomari Power Station	0	0	0	0	0	736	0	0	0	0	1,400
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	0	0	0	0	992	960	640	320	0	0	7,160
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station		0	0	0	0	0	0	0	0	0	0
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	5,960 (5,960)	4,000 (4,000)	3,200 (3,200)	4,000 (4,000)	0	1,920 (1,600)	3,008 (2,048)	3,456 (2,496)	0	0	91,398 (31,704)
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	2,000 (2,000)	2,000 (2,000)	960 (960)	0	0	2,000 (2,000)	0	2,000 (2,000)	0	0	13,032 (10,960)
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	0	0	0	0	0	0	0	0	0	1,400 (1,400)	1,400 (1,400)
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	1,080 (1,080)	976 (976)	1,080 (1,080)	1,080 (1,080)	1,080 (1,080)	1,080 (1,080)	1,080 (1,080)	1,200 (1,200)	1,200 (1,200)	1,200 (1,200)	27,613 (13,696)
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	0	0	0	0	0	400 (400)	0	480 (480)	0	480 (480)	1,360 (1,360)
The Kansai Electric Power Co., Inc., Mihama Power Station	1,544 (1,440)	1,440 (1,440)	1,432 (1,080)	1,240 (1,104)	1,200 (1,200)	1,360 (1,200)	1,200 (1,200)	1,360 (1,200)	1,440 (1,440)	1,944 (1,744)	23,856 (13,768)
The Kansai Electric Power Co., Inc., Takahama Power Station	0	0	0	0	1,080 (1,080)	1,200 (1,200)	1,160 (1,160)	0	2,880 (2,440)	2,000 (2,000)	18,496 (7,880)
The Kansai Electric Power Co., Inc., Ohi Power Station	1,352 (1,352)	1,496 (1,496)	1,496 (1,496)	1,496 (1,496)	0	0	0	1,416 (1,416)	2,000 (2,000)	2,032 (2,032)	21,984 (14,504)
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	0	888 (888)	1,280 (1,280)	1,280 (1,280)	1,040 (1,040)	0	1,280 (1,280)	0	1,280 (1,280)	616 (616)	18,024 (7,664)
Shikoku Electric Power Co., Inc., Ikata Power Station	0	0	0	0	880	0	584	0	640 (640)	960 (640)	6,032 (1,280)
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	0	0	0	0	0	0	0	320	440 (440)	1,040 (720)	8,336 (1,160)
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	0	0	0	0	0	0	0	0	320	0	320
The Japan Atomic Power Company, Tokai Power Station	0	0	0	0	0	72 (72)	72 (72)	0	0	0	144 (144)
The Japan Atomic Power Company, Tokai No. 2 Power Station	0	0	0	0	0	120 (120)	112 (56)	320	0	0	5,744 (176)
The Japan Atomic Power Company, Tsuruga Power station	1,112	0	296	0	0	384	0	0	192 (40)	0	6,624 (40)
Grand Total	13,048 (11,832)	10,800 (10,800)	9,744 (9,096)	9,096 (8,960)	6,272 (4,400)	10,232 (7,672)	9,136 (6,896)	10,872 (8,792)	10,392 (9,480)	11,672 (10,832)	252,923 (105,736)

Note 1: Homogeneous and uniform solidified wastes has been shipped to the Low-Level Radioactive Waste Burial Center since FY 1992.

Note 2: Container-filled and solidified wastes has been shipped to the center as solid waste since FY 2000. The amount is shown in parentheses, and is included in the total amount of waste.

Reference Material 7: Trends in Burial Amount of Radioactive Waste at the Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center), Japan Nuclear Fuel Ltd., by Fiscal Year (FY2003-FY2012)

(Unit: number of drums)

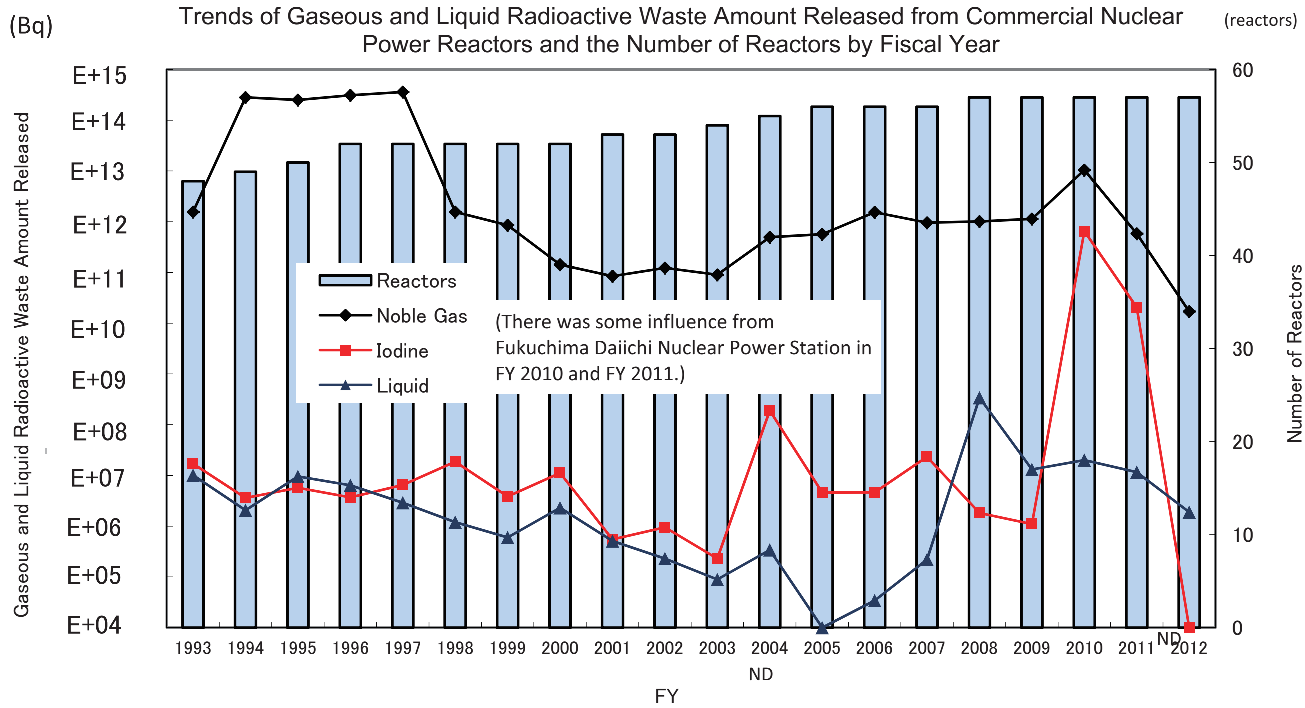
FY		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Burial capacity (equivalent number of drums)
Waste Burial Facility No. 2	Received quantity	1,216	0	648	136	1,872	2,560	2,240	2,080	912	840	204,800
	Disposed quantity	1,216	0	648	136	1,872	2,240	1,600	2,880	952	640	
	Total number of disposed drums	135,899	135,899	136,547	136,683	138,555	140,795	142,395	145,275	146,227	146,867	
Waste Burial Facility No. 2	Received quantity	11,832	10,800	9,096	8,960	4,400	7,672	6,896	8,792	9,480	10,832	207,360
	Disposed quantity	10,080	12,600	9,000	8,152	6,400	5,248	9,000	7,560	10,800	10,440	
	Total number of disposed drums	25,912	38,512	47,512	55,664	62,064	67,312	76,312	83,872	94,672	105,112	
Total	Received quantity	13,048	10,800	9,744	9,096	6,272	10,232	9,136	10,872	10,392	11,672	412,160
	Disposed quantity	11,296	12,600	9,648	8,288	8,272	7,488	10,600	10,440	11,752	11,080	
	Total number of disposed drums	161,811	174,411	184,059	192,347	200,619	208,107	218,707	229,147	240,899	251,979	

Note: The burial capacity is the maximum burial capacity of the waste burial site.

Reference Material 8: Management Status of High-Level Radioactive Waste (Returned Vitrified Waste) at the Reprocessing Plant (Waste Storage Facility), Japan Nuclear Fuel Ltd. by Fiscal Year (FY2003-FY2012)

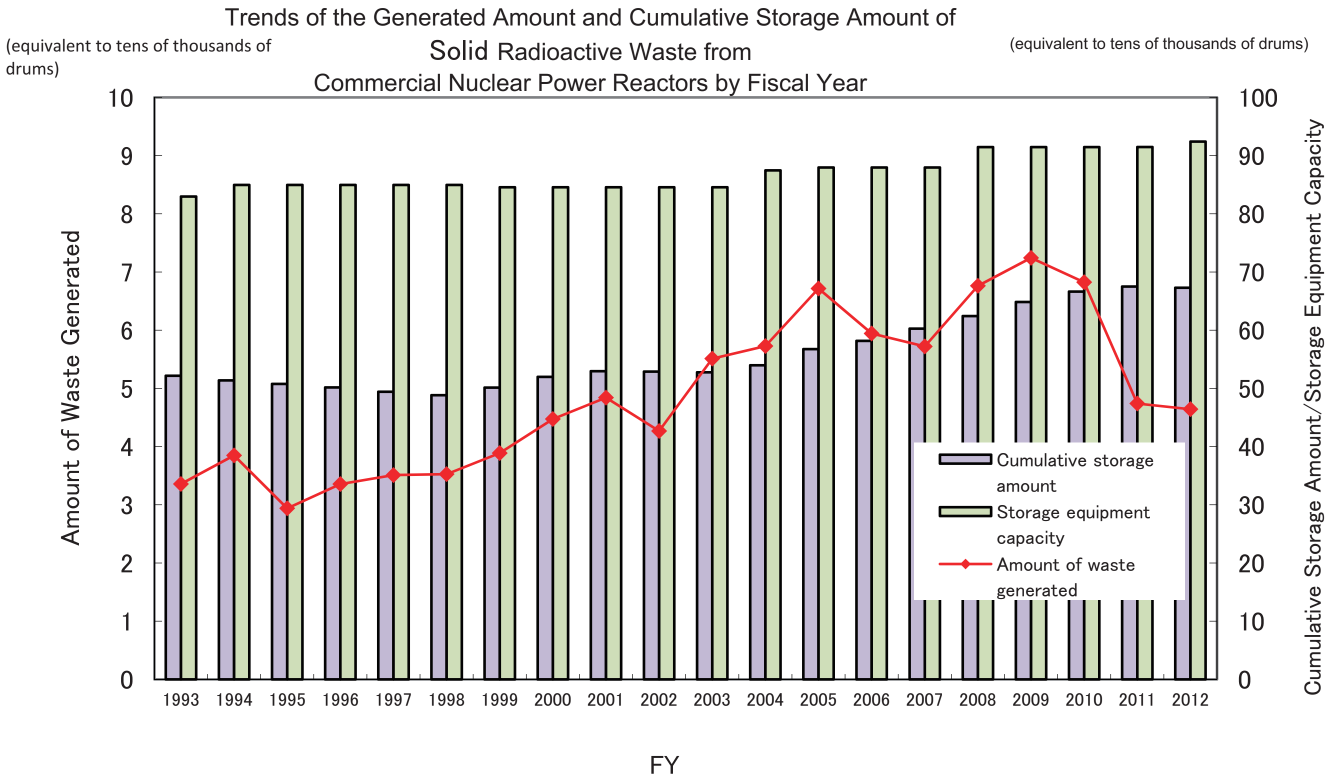
(Unit: number of drums)

FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Storage equipment capacity
Received quantity in this fiscal year	276	0	288	130	0	0	28	0	76	28	2,880
Total received quantity	892	892	1,180	1,310	1,310	1,310	1,338	1,338	1,414	1,442	



*Data for Fukushima Daiichi Nuclear Power Station are excluded from gaseous and liquid radioactive waste for FY 2010 and FY 2011 and gaseous radioactive waste for FY 2012 as they were undergoing evaluation by the licensee associated with the Tohoku District-off the Pacific Ocean Earthquake.

*There was no managed release of liquid radioactive waste from Fukushima Daiichi in FY 2012.(The “managed release” is that of liquid radioactive waste released from drainage equipment in a properly managed condition. The release affected by the Tohoku District - off the Pacific Ocean Earthquake - is not included.)



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XVI-2 Status of Occupational Radiation Exposure Control

Dose management for radiation workers is conducted by each facility. This leads us to the following conclusion.

・The Nuclear Reactor Regulation Act mandates the licensees, etc. to control the dose for radiation workers in nuclear facilities to a level below the dose limit prescribed by the notice issued in pursuant to the Act.
The dose for radiation workers in nuclear facilities in FY 2012 was below the limit (Note 2) at all plants excluding one person engaged in the specific high-dose work(Note 1) at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.

Note 1: Person engaged in emergency work stipulated in Article 7 of the Rules for Prevention of Hazards from Ionizing Radiation (the emergency exposure limit is 100 mSv.)

Note 2: Dose limit for radiation workers: 100 millisieverts over a five-year period and 50 millisieverts per year. The dose limit has been in effect since FY 2001 after revision of the relevant laws in response to the recommendation by the ICRP in 1990.
(The dose limit for female personnel as defined in Article 9-2 of the Rules for Commercial Nuclear Power Reactors concerning the Installation, Operation, etc., is 5 millisieverts per three months in addition to the abovementioned limit.)

・The status of dose management for FY 2012 is as follows.

- The total number of radiation workers at commercial nuclear reactor facilities in FY 2012 was approximately 62,400, compared to roughly 87,800 in the previous fiscal year. The collective dose was 90.16 person-sieverts compared to 225.93 person-sieverts in the previous fiscal year.
The average dose per radiation worker was 1.4 millisieverts (2.6 millisieverts in the previous fiscal year).

- The total number of personnel engaged in radiation work at power reactor facilities in the research and development stage in FY 2012 was roughly 1,800 compared to roughly 1,800 in the previous fiscal year. The collective dose was 0.15 person-sieverts compared with 0.13 person-sieverts in the previous fiscal year.
The average dose per person was 0.1 millisieverts (0.1 millisieverts in the previous fiscal year).

- The total number of radiation workers at fuel manufacturing facilities in FY 2012 was approximately 2,900, compared to roughly 3,000 in the previous fiscal year. The collective dose was 0.24 person-sieverts compared to 0.29 person-sieverts in the previous fiscal year.
The average dose per person was 0.1 millisieverts (0.1 millisieverts in the previous fiscal year).

- The total number of radiation workers at reprocessing facilities in FY 2012 was approximately 6,600, compared to roughly 6,800 in the previous fiscal year. The collective dose was 0.25 person-sieverts compared to 0.33 person-sieverts in the previous fiscal year.
The average dose per person was 0.0 millisieverts (0.0 millisieverts in the previous fiscal year).

- The total number of radiation workers at waste burial facilities and waste management facilities in FY 2012 was approximately 1,500 compared to roughly 1,600 in the previous fiscal year. The collective dose was 0.00 person-sieverts, the same as 0.01 person-sieverts in the previous fiscal year.
The average dose per person was 0.0 millisieverts (0.0 millisieverts in the previous fiscal year).

- The dose limit was set to 100 millisieverts for the five-year period starting from April 1, 2001. As of the end of FY 2012, no radiation workers had been exposed to a dose exceeding this limit, excluding those at Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc., who are subject to an exemption of the Rules for Prevention of Hazards from Ionizing Radiation.

- The dose limit for female radiation workers as defined in Article 9-2 of the Rules for Commercial Nuclear Power Reactors concerning the Installation, Operation, etc., engaged in radiation work was set to 5 millisieverts per three months. In FY 2012, no female radiation workers had been exposed to a dose exceeding the limit.

・Dose management for radiation workers in nuclear facilities is conducted by each facility.

Proper radiation management is maintained even when a radiation worker works at multiple nuclear plants, as each of the plants keeps track of the exposure record of the worker in other facilities.

The registry management and retention of records of exposure dose of radiation workers are managed in an integrated fashion by the Radiation Dose Registration Center of the Radiation Effects Association.

・The dose distribution for radiation workers in FY 2012, as well as the dose distribution of female radiation workers (as defined in Article 9-2 of the Rules for Commercial Nuclear Power Reactors concerning the Installation, Operation, etc.) for a three-month period are shown as follows.

Additionally, the dose for radiation workers at nuclear facilities in each fiscal year since FY 2003 is presented in the reference material.

Note the following while referring to the tables.

1) The total number of radiation workers is derived by summing up all numbers recorded at each respective nuclear facility. Therefore, workers who have worked at multiple facilities are counted more than once.
2) The "collective dose" values for "employees" and for "others" were rounded down from three decimal places to two. Accordingly, the sum of values for "employees" and "others" sometimes does not precisely match the "total" due to the said rounding error.
3) The "average dose" values were rounded to a single decimal place.
4) The "maximum dose" value is the actual dose at the facility
5) The number of radiation workers and their corresponding dose exposures have been tallied since the designation of controlled areas.
6) The data corresponding to plants that have "usage facilities" in which nuclear fuel materials are handled as defined in the Nuclear Reactor Regulation Act includes redundant data regarding some of the radiation workers who work at these facilities.

(1) The Dose Distribution for Radiation Workers in FY 2012

1) Commercial Nuclear Power Reactor Facilities

Power Station	Categories of Radiation Workers	Number of Radiation Workers (persons)					
		5 mSv or less	Greater than 5 mSv and no more than 10 mSv	Greater than 10 mSv and no more than 15 mSv	Greater than 15 mSv and no more than 20 mSv	Greater than 20 mSv and no more than 25 mSv	Greater than 25 mSv and no more than 30 mSv
Hokkaido Electric Power Co., Inc., Tomari Power Station	Employee	417	0	0	0	0	0
	Others	2,181	20	0	0	0	0
	Total	2,598	20	0	0	0	0
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	Employee	479	0	0	0	0	0
	Others	3,479	43	4	0	0	0
	Total	3,958	43	4	0	0	0
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station	Employee	289	0	0	0	0	0
	Others	747	0	0	0	0	0
	Total	1,036	0	0	0	0	0
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	Employee	1,165	266	90	39	23	16
	Others	7,567	1,875	1,231	769	254	206
	Total	8,732	2,141	1,321	808	277	222
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	Employee	642	0	0	0	0	0
	Others	2,452	17	6	1	0	0
	Total	3,094	17	6	1	0	0
Tokyo Electric Power Co., Inc., Kashiwazaki- Kariwa Nuclear Power Station	Employee	1,150	0	0	0	0	0
	Others	4,965	31	3	0	0	0
	Total	6,115	31	3	0	0	0
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	Employee	791	0	0	0	0	0
	Others	3,980	38	15	0	0	0
	Total	4,771	38	15	0	0	0
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	Employee	401	0	0	0	0	0
	Others	1,174	0	0	0	0	0
	Total	1,575	0	0	0	0	0
The Kansai Electric Power Co., Inc., Mihama Power Station	Employee	457	0	0	0	0	0
	Others	2,314	7	0	0	0	0
	Total	2,771	7	0	0	0	0
The Kansai Electric Power Co., Inc., Takahama Power Station	Employee	517	0	0	0	0	0
	Others	2,938	16	0	0	0	0
	Total	3,455	16	0	0	0	0
The Kansai Electric Power Co., Inc., Ohi Power Station	Employee	516	4	0	0	0	0
	Others	2,636	46	3	0	0	0
	Total	3,152	50	3	0	0	0
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	Employee	527	0	0	0	0	0
	Others	2,117	67	0	0	0	0
	Total	2,644	67	0	0	0	0
Shikoku Electric Power Co., Inc., Ikata Power Station	Employee	350	0	0	0	0	0
	Others	1,662	0	0	0	0	0
	Total	2,012	0	0	0	0	0
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	Employee	523	0	0	0	0	0
	Others	2,348	1	0	0	0	0
	Total	2,871	1	0	0	0	0
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	Employee	293	0	0	0	0	0
	Others	1,390	0	0	0	0	0
	Total	1,683	0	0	0	0	0
The Japan Atomic Power Company, Tokai Power Station	Employee	309	0	0	0	0	0
	Others	1,016	0	0	0	0	0
	Total	1,325	0	0	0	0	0
The Japan Atomic Power Company, Tokai No. 2 Power Station	Employee	354	0	0	0	0	0
	Others	2,092	2	0	0	0	0
	Total	2,446	2	0	0	0	0
The Japan Atomic Power Company, Tsuruga Power station	Employee	439	0	0	0	0	0
	Others	2,360	1	0	0	0	0
	Total	2,799	1	0	0	0	0
Grand Total	Employee	9,619	270	90	39	23	16
	Others	47,418	2,164	1,262	770	254	206
	Total	57,037	2,434	1,352	809	277	222

Number of Radiation Workers (persons)						Collective Dose (person-Sv)	Average Individual Dose (mSv)	Maximum Individual Dose (mSv)
Greater than 30 mSv and no more than 35 mSv	Greater than 35 mSv and no more than 40 mSv	Greater than 40 mSv and no more than 45 mSv	Greater than 45 mSv and no more than 50 mSv	Greater than 50 mSv	Total			
0	0	0	0	0	417	0.01	0.0	1.9
0	0	0	0	0	2,201	0.54	0.2	8.3
0	0	0	0	0	2,618	0.55	0.2	8.3
0	0	0	0	0	479	0.01	0.0	0.9
0	0	0	0	0	3,526	1.10	0.3	12.1
0	0	0	0	0	4,005	1.12	0.3	12.1
0	0	0	0	0	289	0.00	0.0	0.1
0	0	0	0	0	747	0.01	0.0	1.1
0	0	0	0	0	1,036	0.01	0.0	1.1
9	10	2	2	*1 1	1,623	7.30	4.5	54.1
95	104	16	0	0	12,117	71.51	5.9	43.3
104	114	18	2	*1 1	13,740	78.81	5.7	54.1
0	0	0	0	0	642	0.06	0.1	1.5
0	0	0	0	0	2,476	0.71	0.3	17.2
0	0	0	0	0	3,118	0.77	0.2	17.2
0	0	0	0	0	1,150	0.10	0.1	4.3
0	0	0	0	0	4,999	1.51	0.3	11.4
0	0	0	0	0	6,149	1.61	0.3	11.4
0	0	0	0	0	791	0.06	0.1	3.0
0	0	0	0	0	4,033	1.45	0.4	15.0
0	0	0	0	0	4,824	1.51	0.3	15.0
0	0	0	0	0	401	0.01	0.0	0.6
0	0	0	0	0	1,174	0.11	0.1	2.5
0	0	0	0	0	1,575	0.12	0.1	2.5
0	0	0	0	0	457	0.02	0.0	1.0
0	0	0	0	0	2,321	0.50	0.2	6.3
0	0	0	0	0	2,778	0.52	0.2	6.3
0	0	0	0	0	517	0.03	0.1	1.0
0	0	0	0	0	2,954	0.88	0.3	9.0
0	0	0	0	0	3,471	0.91	0.3	9.0
0	0	0	0	0	520	0.20	0.4	7.9
0	0	0	0	0	2,685	1.24	0.5	12.0
0	0	0	0	0	3,205	1.44	0.4	12.0
0	0	0	0	0	527	0.02	0.0	1.5
0	0	0	0	0	2,184	1.32	0.6	7.6
0	0	0	0	0	2,711	1.34	0.5	7.6
0	0	0	0	0	350	0.01	0.0	0.7
0	0	0	0	0	1,662	0.16	0.1	2.8
0	0	0	0	0	2,012	0.17	0.1	2.8
0	0	0	0	0	523	0.01	0.0	1.1
0	0	0	0	0	2,349	0.38	0.2	5.3
0	0	0	0	0	2,872	0.39	0.1	5.3
0	0	0	0	0	293	0.01	0.0	0.8
0	0	0	0	0	1,390	0.13	0.1	2.5
0	0	0	0	0	1,683	0.14	0.1	2.5
0	0	0	0	0	309	0.00	0.0	0.6
0	0	0	0	0	1,016	0.07	0.1	4.5
0	0	0	0	0	1,325	0.07	0.1	4.5
0	0	0	0	0	354	0.04	0.1	2.2
0	0	0	0	0	2,094	0.32	0.2	5.7
0	0	0	0	0	2,448	0.36	0.1	5.7
0	0	0	0	0	439	0.02	0.1	1.3
0	0	0	0	0	2,361	0.30	0.1	5.4
0	0	0	0	0	2,800	0.32	0.1	5.4
9	10	2	2	*1 1	10,081	7.91	0.8	54.1
95	104	16	0	0	52,289	82.24	1.6	43.3
104	114	18	2	*1 1	62,370	90.16	1.4	54.1

*1: Person engaged in the specific high-dose work (Person engaged in emergency work stipulated in Article 7 of the Rules for Prevention of Hazards from Ionizing Radiation)

(2) Nuclear Power Reactor Facilities in the Research and Development Stage

Facility	Categories of Radiation Workers	Number of Radiation Workers (persons)					
		5mSv or less	Greater than 5 mSv and no more than 10 mSv	Greater than 10 mSv and no more than 15 mSv	Greater than 15 mSv and no more than 20 mSv	Greater than 20 mSv and no more than 25 mSv	Greater than 25 mSv and no more than 30 mSv
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering	Employee	116	0	0	0	0	0
	Others	402	5	0	0	0	0
	Total	518	5	0	0	0	0
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	Employee	368	0	0	0	0	0
	Others	869	0	0	0	0	0
	Total	1,237	0	0	0	0	0
Grand Total	Employee	484	0	0	0	0	0
	Others	1,271	5	0	0	0	0
	Total	1,755	5	0	0	0	0

(3) Fuel Manufacturing Facilities

Facility	Categories of Radiation Workers	Number of Radiation Workers (persons)					
		5mSv or less	Greater than 5 mSv and no more than 10 mSv	Greater than 10 mSv and no more than 15 mSv	Greater than 15 mSv and no more than 20 mSv	Greater than 20 mSv and no more than 25 mSv	Greater than 25 mSv and no more than 30 mSv
Global Nuclear Fuel-Japan Co., Ltd.	Employee	353	0	0	0	0	0
	Others	183	0	0	0	0	0
	Total	536	0	0	0	0	0
Mitsubishi Nuclear Fuel Co., Ltd.	Employee	430	0	0	0	0	0
	Others	101	0	0	0	0	0
	Total	531	0	0	0	0	0
Nuclear Fuel Industries, Ltd., Tokai Works	Employee	238	0	0	0	0	0
	Others	91	0	0	0	0	0
	Total	329	0	0	0	0	0
Nuclear Fuel Industries, Ltd., Kumatori Works	Employee	305	0	0	0	0	0
	Others	165	0	0	0	0	0
	Total	470	0	0	0	0	0
Japan Atomic Energy Agency, Uranium Enrichment Demonstration Plant	Employee	66	0	0	0	0	0
	Others	121	0	0	0	0	0
	Total	187	0	0	0	0	0
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Uranium Enrichment Plant)	Employee	191	0	0	0	0	0
	Others	652	0	0	0	0	0
	Total	843	0	0	0	0	0
Grand Total	Employee	1,583	0	0	0	0	0
	Others	1,313	0	0	0	0	0
	Total	2,896	0	0	0	0	0

Greater than 30 mSv and no more than 35 mSv	Greater than 35 mSv and no more than 40 mSv	Greater than 40 mSv and no more than 45 mSv	Greater than 45 mSv and no more than 50 mSv	Greater than 50 mSv	Total	Collective Dose (person-Sv)	Average Individual Dose (mSv)	Maximum Individual Dose (mSv)
Number of Radiation Workers (persons)								
0	0	0	0	0	116	0.01	0.1	2.8
0	0	0	0	0	407	0.13	0.3	9.4
0	0	0	0	0	523	0.15	0.3	9.4
0	0	0	0	0	368	0.00	0.0	0.0
0	0	0	0	0	869	0.00	0.0	0.0
0	0	0	0	0	1,237	0.00	0.0	0.0
0	0	0	0	0	484	0.01	0.0	2.8
0	0	0	0	0	1,276	0.13	0.1	9.4
0	0	0	0	0	1,760	0.15	0.1	9.4

Greater than 30 mSv and no more than 35 mSv	Greater than 35 mSv and no more than 40 mSv	Greater than 40 mSv and no more than 45 mSv	Greater than 45 mSv and no more than 50 mSv	Greater than 50 mSv	Total	Collective Dose (person-Sv)	Average Individual Dose (mSv)	Maximum Individual Dose (mSv)
Number of Radiation Workers (persons)								
0	0	0	0	0	353	0.02	0.1	1.0
0	0	0	0	0	183	0.00	0.0	0.1
0	0	0	0	0	536	0.02	0.1	1.0
0	0	0	0	0	430	0.09	0.2	3.7
0	0	0	0	0	101	0.00	0.0	0.5
0	0	0	0	0	531	0.09	0.2	3.7
0	0	0	0	0	238	0.05	0.2	1.7
0	0	0	0	0	91	0.01	0.1	1.1
0	0	0	0	0	329	0.06	0.2	1.7
0	0	0	0	0	305	0.07	0.2	1.9
0	0	0	0	0	165	0.00	0.0	1.0
0	0	0	0	0	470	0.07	0.1	1.9
0	0	0	0	0	66	0.00	0.0	0.1
0	0	0	0	0	121	0.00	0.0	0.5
0	0	0	0	0	187	0.00	0.0	0.5
0	0	0	0	0	191	0.00	0.0	0.2
0	0	0	0	0	652	0.00	0.0	0.1
0	0	0	0	0	843	0.00	0.0	0.2
0	0	0	0	0	1,583	0.23	0.1	3.7
0	0	0	0	0	1,313	0.01	0.0	1.1
0	0	0	0	0	2,896	0.24	0.1	3.7

XVI

(4) Reprocessing Facilities

Facility	Categories of Radiation Workers	Number of Radiation Workers (persons)					
		5mSv or less	Greater than 5 mSv and no more than 10 mSv	Greater than 10 mSv and no more than 15 mSv	Greater than 15 mSv and no more than 20 mSv	Greater than 20 mSv and no more than 25 mSv	Greater than 25 mSv and no more than 30 mSv
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	Employee	405	0	0	0	0	0
	Others	828	0	0	0	0	0
	Total	1,233	0	0	0	0	0
Japan Nuclear Fuel Ltd., Reprocessing Plant(Reprocessing Facility)	Employee	1,274	0	0	0	0	0
	Others	4,118	1	0	0	0	0
	Total	5,392	1	0	0	0	0
Grand Total	Employee	1,679	0	0	0	0	0
	Others	4,946	1	0	0	0	0
	Total	6,625	1	0	0	0	0

(5) Waste Burial Facilities and Waste Management Facilities

Facility	Categories of Radiation Workers	Number of Radiation Workers (persons)					
		5mSv or less	Greater than 5 mSv and no more than 10 mSv	Greater than 10 mSv and no more than 15 mSv	Greater than 15 mSv and no more than 20 mSv	Greater than 20 mSv and no more than 25 mSv	Greater than 25 mSv and no more than 30 mSv
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office(Low-Level Radioactive Waste Disposal Center)	Employee	69	0	0	0	0	0
	Others	167	0	0	0	0	0
	Total	236	0	0	0	0	0
Japan Nuclear Fuel Ltd., Reprocessing Plant(Waste Storage Facility)	Employee	222	0	0	0	0	0
	Others	840	0	0	0	0	0
	Total	1,062	0	0	0	0	0
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Science Research Institute, Radioactive Waste Disposal Facility	Employee						
	Others						
	Total						
Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	Employee	32	0	0	0	0	0
	Others	138	0	0	0	0	0
	Total	170	0	0	0	0	0
Grand Total	Employee	323	0	0	0	0	0
	Others	1,145	0	0	0	0	0
	Total	1,468	0	0	0	0	0

Number of Radiation Workers (persons)						Collective Dose (person-Sv)	Average Individual Dose (mSv)	Maximum Individual Dose (mSv)
Greater than 30 mSv and no more than 35 mSv	Greater than 35 mSv and no more than 40 mSv	Greater than 40 mSv and no more than 45 mSv	Greater than 45 mSv and no more than 50 mSv	Greater than 50 mSv	Total			
0	0	0	0	0	405	0.02	0.0	2.1
0	0	0	0	0	828	0.04	0.0	2.5
0	0	0	0	0	1,233	0.06	0.0	2.5
0	0	0	0	0	1,274	0.01	0.0	0.5
0	0	0	0	0	4,119	0.18	0.0	5.4
0	0	0	0	0	5,393	0.19	0.0	5.4
0	0	0	0	0	1,679	0.03	0.0	2.1
0	0	0	0	0	4,947	0.22	0.0	5.4
0	0	0	0	0	6,626	0.25	0.0	5.4

Number of Radiation Workers (persons)						Collective Dose (person-Sv)	Average Individual Dose (mSv)	Maximum Individual Dose (mSv)
Greater than 30 mSv and no more than 35 mSv	Greater than 35 mSv and no more than 40 mSv	Greater than 40 mSv and no more than 45 mSv	Greater than 45 mSv and no more than 50 mSv	Greater than 50 mSv	Total			
0	0	0	0	0	69	0.00	0.0	0.1
0	0	0	0	0	167	0.00	0.0	0.0
0	0	0	0	0	236	0.00	0.0	0.1
0	0	0	0	0	222	0.00	0.0	0.0
0	0	0	0	0	840	0.00	0.0	0.0
0	0	0	0	0	1,062	0.00	0.0	0.0
0	0	0	0	0	32	0.00	0.0	0.2
0	0	0	0	0	138	0.00	0.0	0.2
0	0	0	0	0	170	0.00	0.0	0.2
0	0	0	0	0	323	0.00	0.0	0.2
0	0	0	0	0	1,145	0.00	0.0	0.2
0	0	0	0	0	1,468	0.00	0.0	0.2

(2) Three-month Dose Distribution of Female Personnel Engaged in Radiation Work

(1) Commercial Nuclear Power Reactor Facilities (persons)

Power Station	Period	Number of Radiation Workers (measured at abdomen, persons)				Total
		1 mSv or less	Greater than 1 mSv and 2 mSv or less	Greater than 2 mSv and 5 mSv or less	Greater than 5mSv	
Hokkaido Electric Power Co., Inc., Tomari Power Station	The first quarter	7	0	0	0	7
	The second quarter	4	0	0	0	4
	The third quarter	9	0	0	0	9
	The fourth quarter	4	0	0	0	4
Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station	The first quarter	17	0	0	0	17
	The second quarter	16	0	0	0	16
	The third quarter	9	0	0	0	9
	The fourth quarter	15	0	0	0	15
Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station	The first quarter	2	0	0	0	2
	The second quarter	3	0	0	0	3
	The third quarter	4	0	0	0	4
	The fourth quarter	3	0	0	0	3
Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station	The first quarter	0	0	0	0	0
	The second quarter	7	0	0	0	7
	The third quarter	6	0	0	0	6
	The fourth quarter	8	0	0	0	8
Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station	The first quarter	38	0	0	0	38
	The second quarter	37	0	0	0	37
	The third quarter	43	0	0	0	43
	The fourth quarter	34	0	0	0	34
Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station	The first quarter	55	0	0	0	55
	The second quarter	53	0	0	0	53
	The third quarter	53	0	0	0	53
	The fourth quarter	48	0	0	0	48
Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station	The first quarter	37	0	0	0	37
	The second quarter	37	0	0	0	37
	The third quarter	42	0	0	0	42
	The fourth quarter	42	0	0	0	42
Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station	The first quarter	6	0	0	0	6
	The second quarter	5	0	0	0	5
	The third quarter	4	0	0	0	4
	The fourth quarter	6	0	0	0	6
The Kansai Electric Power Co., Inc., Mihama Power Station	The first quarter	3	0	0	0	3
	The second quarter	3	0	0	0	3
	The third quarter	2	0	0	0	2
	The fourth quarter	5	0	0	0	5
The Kansai Electric Power Co., Inc., Takahama Power Station	The first quarter	1	0	0	0	1
	The second quarter	2	0	0	0	2
	The third quarter	3	0	0	0	3
	The fourth quarter	1	0	0	0	1
The Kansai Electric Power Co., Inc., Ohi Power Station	The first quarter	5	0	0	0	5
	The second quarter	3	0	0	0	3
	The third quarter	3	0	0	0	3
	The fourth quarter	4	0	0	0	4

*1: Currently undergoing evaluation by the licensee associated with the Tohoku District – off the Pacific Ocean Earthquake.

(persons)

Power Station	Period	Number of Radiation Workers (measured at abdomen, persons)				Total
		1 mSv or less	Greater than 1 mSv and 2 mSv or less	Greater than 2 mSv and 5 mSv or less	Greater than 5mSv	
The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station	The first quarter	11	0	0	0	11
	The second quarter	11	0	0	0	11
	The third quarter	10	0	0	0	10
	The fourth quarter	21	0	0	0	21
Shikoku Electric Power Co., Inc., Ikata Power Station	The first quarter	7	0	0	0	7
	The second quarter	9	0	0	0	9
	The third quarter	14	0	0	0	14
	The fourth quarter	8	0	0	0	8
Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station	The first quarter	6	0	0	0	6
	The second quarter	9	0	0	0	9
	The third quarter	10	0	0	0	10
	The fourth quarter	8	0	0	0	8
Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station	The first quarter	0	0	0	0	0
	The second quarter	5	0	0	0	5
	The third quarter	1	0	0	0	1
	The fourth quarter	6	0	0	0	6
The Japan Atomic Power Company, Tokai Power Station	The first quarter	15	0	0	0	15
	The second quarter	13	0	0	0	13
	The third quarter	6	0	0	0	6
	The fourth quarter	7	0	0	0	7
The Japan Atomic Power Company, Tokai No. 2 Power Station	The first quarter	22	0	0	0	22
	The second quarter	16	0	0	0	16
	The third quarter	20	0	0	0	20
	The fourth quarter	16	0	0	0	16
The Japan Atomic Power Company, Tsuruga Power station	The first quarter	12	0	0	0	12
	The second quarter	14	0	0	0	14
	The third quarter	13	0	0	0	13
	The fourth quarter	9	0	0	0	9
Grand Total	The first quarter	244	0	0	0	244
	The second quarter	247	0	0	0	247
	The third quarter	252	0	0	0	252
	The fourth quarter	245	0	0	0	245

(2) Nuclear Power Reactor Facilities in the Research and Development Stage (persons)

Facility	Period	Number of Radiation Workers (measured at abdomen, persons)				Total
		1 mSv or less	Greater than 1 mSv and 2 mSv or less	Greater than 2 mSv and 5 mSv or less	Greater than 5mSv	
Japan Atomic Energy Agency, Tsuruga Head Office, Fugen Decommissioning Engineering Center	The first quarter	1	0	0	0	1
	The second quarter	1	0	0	0	1
	The third quarter	2	0	0	0	2
	The fourth quarter	2	0	0	0	2
Japan Atomic Energy Agency, Tsuruga Head Office, Fast Breeder Reactor Research and Development Center	The first quarter	10	0	0	0	10
	The second quarter	10	0	0	0	10
	The third quarter	9	0	0	0	9
	The fourth quarter	8	0	0	0	8
Grand Total	The first quarter	11	0	0	0	11
	The second quarter	11	0	0	0	11
	The third quarter	11	0	0	0	11
	The fourth quarter	10	0	0	0	10

(3) Fuel Manufacturing Facilities (persons)

Facility	Period	Number of Radiation Workers (measured at abdomen, persons)				Total
		1 mSv or less	Greater than 1 mSv and 2 mSv or less	Greater than 2 mSv and 5 mSv or less	Greater than 5mSv	
Global Nuclear Fuel-Japan Co., Ltd.	The first quarter	26	0	0	0	26
	The second quarter	26	0	0	0	26
	The third quarter	25	0	0	0	25
	The fourth quarter	25	0	0	0	25
Mitsubishi Nuclear Fuel Co., Ltd.	The first quarter	9	0	0	0	9
	The second quarter	9	0	0	0	9
	The third quarter	9	0	0	0	9
	The fourth quarter	9	0	0	0	9
Nuclear Fuel Industries, Ltd., Tokai Works	The first quarter	10	0	0	0	10
	The second quarter	10	0	0	0	10
	The third quarter	9	0	0	0	9
	The fourth quarter	9	0	0	0	9
Nuclear Fuel Industries, Ltd., Kumatori Works	The first quarter	21	0	0	0	21
	The second quarter	22	0	0	0	22
	The third quarter	23	0	0	0	23
	The fourth quarter	22	0	0	0	22
Japan Atomic Energy Agency, Uranium Enrichment Demonstration Plant	The first quarter	5	0	0	0	5
	The second quarter	5	0	0	0	5
	The third quarter	5	0	0	0	5
	The fourth quarter	5	0	0	0	5
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office (Uranium Enrichment Plant)	The first quarter	8	0	0	0	8
	The second quarter	6	0	0	0	6
	The third quarter	6	0	0	0	6
	The fourth quarter	6	0	0	0	6
Grand Total	The first quarter	79	0	0	0	79
	The second quarter	78	0	0	0	78
	The third quarter	77	0	0	0	77
	The fourth quarter	76	0	0	0	76

(4) Reprocessing Facilities (persons)

Facility	Period	Number of Radiation Workers (measured at abdomen, persons)				Total
		1 mSv or less	Greater than 1 mSv and 2 mSv or less	Greater than 2 mSv and 5 mSv or less	Greater than 5mSv	
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility	The first quarter	10	0	0	0	10
	The second quarter	12	0	0	0	12
	The third quarter	10	0	0	0	10
	The fourth quarter	15	0	0	0	15
Japan Nuclear Fuel Ltd., Reprocessing Plant (Reprocessing Facility)	The first quarter	71	0	0	0	71
	The second quarter	81	0	0	0	81
	The third quarter	66	0	0	0	66
	The fourth quarter	69	0	0	0	69
Grand Total	The first quarter	81	0	0	0	81
	The second quarter	93	0	0	0	93
	The third quarter	76	0	0	0	76
	The fourth quarter	84	0	0	0	84

(5) Waste Burial Facilities and Waste Management Facilities (persons)

Facility	Period	Number of Radiation Workers (measured at abdomen, persons)				Total
		1 mSv or less	Greater than 1 mSv and 2 mSv or less	Greater than 2 mSv and 5 mSv or less	Greater than 5mSv	
Japan Nuclear Fuel Ltd., Enrichment and Disposal Office(Low-Level Radioactive Waste Disposal Center)	The first quarter	1	0	0	0	1
	The second quarter	1	0	0	0	1
	The third quarter	1	0	0	0	1
	The fourth quarter	1	0	0	0	1
Japan Nuclear Fuel Ltd., Reprocessing Plant (Waste Storage Facility)	The first quarter	10	0	0	0	10
	The second quarter	13	0	0	0	13
	The third quarter	13	0	0	0	13
	The fourth quarter	9	0	0	0	9
Japan Atomic Energy Agency, Tokai Research and Development Center, Nuclear Science Research Institute, Radioactive Waste Disposal Facility	The first quarter					
	The second quarter					
	The third quarter					
	The fourth quarter					
Japan Atomic Energy Agency, Oarai Research and Development Center, Radioactive Waste Management Facility	The first quarter	5	0	0	0	5
	The second quarter	5	0	0	0	5
	The third quarter	5	0	0	0	5
	The fourth quarter	5	0	0	0	5
Grand Total	The first quarter	16	0	0	0	16
	The second quarter	19	0	0	0	19
	The third quarter	19	0	0	0	19
	The fourth quarter	15	0	0	0	15

Reference Material: Radiation Dose of Radiation Workers by Fiscal Year (FY2003-FY2012)

(1) Radiation Dose at the Tomari Power Station, Hokkaido Electric Power Co., Inc.

Item \ FY		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	301	297	294	289	292	376	377	367	392	417
	Others	1,662	1,699	1,508	1,226	1,729	2,885	2,637	2,178	2,132	2,201
	Total	1,963	1,996	1,802	1,515	2,021	3,261	3,014	2,545	2,524	2,618
Collective Dose (person-Sv)	Employee	0.05	0.05	0.05	0.02	0.04	0.04	0.06	0.04	0.04	0.01
	Others	1.24	1.37	0.99	0.63	1.21	2.99	2.27	0.99	1.16	0.54
	Total	1.30	1.42	1.04	0.66	1.24	3.03	2.33	1.03	1.19	0.55
Average Individual Dose (mSv)	Employee	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	Others	0.8	0.8	0.7	0.5	0.7	1.0	0.9	0.5	0.5	0.2
	Total	0.7	0.7	0.6	0.4	0.6	0.9	0.8	0.4	0.5	0.2
Number of Reactors		2	2	2	2	2	3	3	3	3	3

(2) Radiation Dose at the Onagawa Nuclear Power Station, Tohoku Electric Power Co., Inc.

Item \ FY		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	407	404	443	451	425	475	461	486	499	479
	Others	2,324	3,033	2,782	2,401	3,139	4,190	3,877	3,698	3,614	3,526
	Total	2,731	3,437	3,225	2,852	3,564	4,665	4,338	4,184	4,113	4,005
Collective Dose (person-Sv)	Employee	0.08	0.09	0.07	0.07	0.09	0.06	0.09	0.09	0.02	0.01
	Others	2.64	1.87	1.05	0.85	2.99	2.57	2.50	2.70	1.41	1.10
	Total	2.72	1.96	1.12	0.92	3.08	2.63	2.59	2.78	1.43	1.12
Average Individual Dose (mSv)	Employee	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.0
	Others	1.1	0.6	0.4	0.4	1.0	0.6	0.7	0.7	0.4	0.3
	Total	1.0	0.6	0.4	0.3	0.9	0.6	0.6	0.7	0.4	0.3
Number of Reactors		3	3	3	3	3	3	3	3	3	3

(3) Radiation Dose at the Higashidori Nuclear Power Station, Tohoku Electric Power Co., Inc.

Item \ FY		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee		176	229	241	247	250	250	271	282	289
	Others		720	1088	1,579	1,292	1,770	1,789	1,948	1,977	747
	Total		896	1317	1,820	1,539	2,020	2,039	2,219	2,259	1,036
Collective Dose (person-Sv)	Employee		0.00	0.01	0.02	0.02	0.03	0.04	0.03	0.01	0.00
	Others		0.00	0.02	0.13	0.04	0.36	0.42	0.35	0.26	0.01
	Total		0.00	0.03	0.15	0.06	0.39	0.46	0.38	0.27	0.01
Average Individual Dose (mSv)	Employee		0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0
	Others		0.0	0.0	0.1	0.0	0.2	0.2	0.2	0.1	0.0
	Total		0.0	0.0	0.1	0.0	0.2	0.2	0.2	0.1	0.0
Number of Reactors			1	1	1	1	1	1	1	1	1

(4) Radiation Dose at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc.

Item \ FY		2003	2004	2005	2006	2007	2008	2009	2010 *1	2011 *1	2012
Number of Radiation Workers (persons)	Employee	921	923	1,018	1,071	1,080	1,096	1,108	1,936	2,903	1,623
	Others	8,988	7,285	7,580	8,159	8,707	9,260	9,195	12,127	16,993	12,117
	Total	9,909	8,208	8,598	9,230	9,787	10,356	10,303	14,063	19,896	13,740
Collective Dose (person-Sv)	Employee	0.97	0.69	0.76	0.90	0.78	0.75	0.85	53.66	32.01	7.30
	Others	21.66	20.36	14.73	16.60	15.30	14.05	14.00	59.14	145.54	71.51
	Total	22.63	21.04	15.50	17.50	16.08	14.80	14.85	112.80	177.55	78.81
Average Individual Dose (mSv)	Employee	1.0	0.7	0.7	0.8	0.7	0.7	0.8	27.7	11.0	4.5
	Others	2.4	2.8	1.9	2.0	1.8	1.5	1.5	4.9	8.6	5.9
	Total	2.3	2.6	1.8	1.9	1.6	1.4	1.4	8.0	8.9	5.7
Number of Reactors		6	6	6	6	6	6	6	6	6	6

*1: The values of the year were undergoing evaluation by the licensee associated with the influence of Tohoku District-off the Pacific Ocean Earthquake. On April 26, 2013, they were reported. On July 5, 2013, revision was amended.

(5) Radiation Dose at the Fukushima Daini Nuclear Power Station, Tokyo Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011 *3	2012
Number of Radiation Workers (persons)	Employee	629	626	619	663	682	685	699	*2 1,485	1,155	642
	Others	5,971	6,202	5,669	5,626	6,588	5,459	6,575	*2 6,422	3,634	2,476
	Total	6,600	6,828	6,288	6,289	7,270	6,144	7,274	*2 7,907	4,789	3,118
Collective Dose (person-Sv)	Employee	0.19	0.16	0.16	0.18	0.22	0.21	0.19	0.39	0.18	0.06
	Others	8.24	5.45	4.15	3.44	6.60	3.58	3.67	*2 4.43	1.86	0.71
	Total	8.43	5.61	4.31	3.62	6.83	3.79	3.87	*2 4.82	2.04	0.77
Average Individual Dose (mSv)	Employee	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1
	Others	1.4	0.9	0.7	0.6	1.0	0.7	0.6	0.7	0.5	0.3
	Total	1.3	0.8	0.7	0.6	0.9	0.6	0.5	0.6	0.4	0.2
Number of Reactors		4	4	4	4	4	4	4	4	4	4

*2: Amendment was reported by the licensee on January 18, 2013.
*3: The values of the year were undergoing evaluation by the licensee associated with the influence of Tohoku District-off the Pacific Ocean Earthquake. On April 26, 2013, they were reported.

(6) Radiation Dose at the Kashiwazaki-Kariwa Nuclear Power Station, Tokyo Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	994	997	1,051	1,085	1,197	1,153	1,169	1,161	1,190	1,150
	Others	6,331	5,822	7,048	6,673	7,294	9,616	9,417	7,775	7,292	4,999
	Total	7,325	6,819	8,099	7,758	8,491	10,769	10,586	8,936	8,482	6,149
Collective Dose (person-Sv)	Employee	0.53	0.40	0.42	0.37	0.31	0.23	0.28	0.27	0.29	0.10
	Others	13.78	5.24	8.96	6.24	7.31	10.48	5.43	4.32	4.84	1.51
	Total	14.31	5.64	9.38	6.61	7.62	10.72	5.71	4.59	5.13	1.61
Average Individual Dose (mSv)	Employee	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.1
	Others	2.2	0.9	1.3	0.9	1.0	1.1	0.6	0.6	0.7	0.3
	Total	2.0	0.8	1.2	0.9	0.9	1.0	0.5	0.5	0.6	0.3
Number of Reactors		7	7	7	7	7	7	7	7	7	7

(7) Radiation Dose at the Hamaoka Nuclear Power Station, Chubu Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	714	717	657	666	673	671	715	737	758	791
	Others	4,340	4,618	3,854	3,936	3,893	3,579	3,712	3,862	2,996	4,033
	Total	5,054	5,335	4,511	4,602	4,566	4,250	4,427	4,599	3,754	4,824
Collective Dose (person-Sv)	Employee	0.44	0.36	0.34	0.35	0.37	0.29	0.28	0.27	0.09	0.06
	Others	10.61	6.66	3.14	6.31	5.08	1.74	3.09	4.46	0.75	1.45
	Total	11.05	7.03	3.49	6.66	5.45	2.03	3.36	4.72	0.84	1.51
Average Individual Dose (mSv)	Employee	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.1	0.1
	Others	2.4	1.4	0.8	1.6	1.3	0.5	0.8	1.2	0.3	0.4
	Total	2.2	1.3	0.8	1.4	1.2	0.5	0.8	1.0	0.2	0.3
Number of Reactors		5	5	5	5	5	5	5	5	5	5

(8) Radiation Dose at the Shika Nuclear Power Station, Hokuriku Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	274	335	315	309	366	354	373	393	413	401
	Others	2,035	2,165	2,455	2,732	2,345	2,273	2,413	2,913	3,336	1,174
	Total	2,309	2,500	2,770	3,041	2,711	2,627	2,786	3,306	3,749	1,575
Collective Dose (person-Sv)	Employee	0.10	0.08	0.04	0.07	0.01	0.09	0.05	0.11	0.06	0.01
	Others	3.25	1.17	0.68	0.86	0.46	2.29	0.26	1.55	1.49	0.11
	Total	3.36	1.25	0.73	0.93	0.47	2.37	0.32	1.66	1.55	0.12
Average Individual Dose (mSv)	Employee	0.4	0.2	0.1	0.2	0.0	0.2	0.1	0.3	0.1	0.0
	Others	1.6	0.5	0.3	0.3	0.2	1.0	0.1	0.5	0.4	0.1
	Total	1.5	0.5	0.3	0.3	0.2	0.9	0.1	0.5	0.4	0.1
Number of Reactors		1	1	2	2	2	2	2	2	2	2

(9) Radiation Dose at the Mihama Power Station, The Kansai Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	404	398	431	426	436	446	455	465	456	457
	Others	2,920	2,224	2,625	2,500	2,978	2,821	3,637	3,261	3,300	2,321
	Total	3,324	2,622	3,056	2,926	3,414	3,267	4,092	3,726	3,756	2,778
Collective Dose (person-Sv)	Employee	0.12	0.06	0.07	0.08	0.08	0.08	0.13	0.12	0.08	0.02
	Others	2.68	0.95	1.85	1.58	2.37	2.93	3.83	3.53	2.26	0.50
	Total	2.80	1.01	1.92	1.66	2.45	3.01	3.96	3.65	2.34	0.52
Average Individual Dose (mSv)	Employee	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.0
	Others	0.9	0.4	0.7	0.6	0.8	1.0	1.1	1.1	0.7	0.2
	Total	0.8	0.4	0.6	0.6	0.7	0.9	1.0	1.0	0.6	0.2
Number of Reactors		3	3	3	3	3	3	3	3	3	3

(10) Radiation Dose at the Takahama Power Station, The Kansai Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	476	459	489	473	482	525	484	524	514	517
	Others	3,407	3,092	2,779	3,121	3,877	4,232	4,148	4,475	4,061	2,954
	Total	3,883	3,551	3,268	3,594	4,359	4,757	4,632	4,999	4,575	3,471
Collective Dose (person-Sv)	Employee	0.15	0.13	0.14	0.12	0.15	0.14	0.13	0.12	0.07	0.03
	Others	4.63	3.92	3.48	3.57	6.93	8.55	7.05	6.05	4.28	0.88
	Total	4.77	4.05	3.62	3.69	7.08	8.69	7.18	6.17	4.35	0.91
Average Individual Dose (mSv)	Employee	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.1
	Others	1.4	1.3	1.3	1.1	1.8	2.0	1.7	1.4	1.1	0.3
	Total	1.2	1.1	1.1	1.0	1.6	1.8	1.5	1.2	1.0	0.3
Number of Reactors		4	4	4	4	4	4	4	4	4	4

(11) Radiation Dose at the Ohi Power Station, The Kansai Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	488	453	514	517	492	493	501	503	516	520
	Others	3,037	3,894	3,220	3,536	3,459	4,040	4,662	5,157	3,907	2,685
	Total	3,525	4,347	3,734	4,053	3,951	4,533	5,163	5,660	4,423	3,205
Collective Dose (person-Sv)	Employee	0.22	0.31	0.33	0.31	0.27	0.35	0.32	0.37	0.18	0.20
	Others	4.81	6.43	6.03	8.64	6.93	8.65	14.50	14.17	5.99	1.24
	Total	5.03	6.74	6.36	8.96	7.20	9.00	14.82	14.54	6.17	1.44
Average Individual Dose (mSv)	Employee	0.5	0.7	0.6	0.6	0.5	0.7	0.6	0.7	0.4	0.4
	Others	1.6	1.7	1.9	2.4	2.0	2.1	3.1	2.7	1.5	0.5
	Total	1.4	1.6	1.7	2.2	1.8	2.0	2.9	2.6	1.4	0.4
Number of Reactors		4	4	4	4	4	4	4	4	4	4

(12) Radiation Dose at the Shimane Nuclear Power Station, The Chugoku Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	338	309	275	337	359	363	383	538	550	527
	Others	2,507	2,621	2,078	2,326	2,660	2,158	2,439	3,194	2,836	2,184
	Total	2,845	2,930	2,353	2,663	3,019	2,521	2,822	3,732	3,386	2,711
Collective Dose (person-Sv)	Employee	0.29	0.16	0.13	0.20	0.24	0.20	0.22	0.13	0.10	0.02
	Others	4.01	3.73	2.02	1.97	4.78	2.56	3.03	6.07	3.12	1.32
	Total	4.30	3.88	2.15	2.17	5.01	2.77	3.25	6.20	3.22	1.34
Average Individual Dose (mSv)	Employee	0.9	0.5	0.5	0.6	0.7	0.6	0.6	0.2	0.2	0.0
	Others	1.6	1.4	1.0	0.8	1.8	1.2	1.2	1.9	1.1	0.6
	Total	1.5	1.3	0.9	0.8	1.7	1.1	1.2	1.7	1.0	0.5
Number of Reactors		2	2	2	2	2	2	2	2	2	2

(13) Radiation Dose at the Ikata Power Station, Shikoku Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	401	288	294	279	280	289	321	352	358	350
	Others	2,392	2,909	2,696	2,380	2,417	2,688	2,485	2,240	2,330	1,662
	Total	2,793	3,197	2,990	2,659	2,697	2,977	2,806	2,592	2,688	2,012
Collective Dose (person-Sv)	Employee	0.09	0.05	0.03	0.04	0.04	0.04	0.04	0.03	0.06	0.01
	Others	2.62	3.88	3.52	3.36	2.41	3.02	1.99	1.00	1.92	0.16
	Total	2.71	3.93	3.55	3.40	2.46	3.06	2.03	1.03	1.98	0.17
Average Individual Dose (mSv)	Employee	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.0
	Others	1.1	1.3	1.3	1.4	1.0	1.1	0.8	0.4	0.8	0.1
	Total	1.0	1.2	1.2	1.3	0.9	1.0	0.7	0.4	0.7	0.1
Number of Reactors		3	3	3	3	3	3	3	3	3	3

(14) Radiation Dose at the Genkai Nuclear Power Station, Kyushu Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	461	476	469	472	487	514	536	544	535	523
	Others	2,935	3,220	3,091	3,316	3,187	3,404	4,023	4,218	3,730	2,349
	Total	3,396	3,696	3,560	3,788	3,674	3,918	4,559	4,762	4,265	2,872
Collective Dose (person-Sv)	Employee	0.06	0.08	0.14	0.13	0.06	0.06	0.10	0.09	0.04	0.01
	Others	2.73	3.47	3.75	3.99	2.73	2.69	4.26	4.88	2.47	0.38
	Total	2.79	3.56	3.89	4.12	2.79	2.76	4.36	4.97	2.51	0.39
Average Individual Dose (mSv)	Employee	0.1	0.2	0.3	0.3	0.1	0.1	0.2	0.2	0.1	0.0
	Others	0.9	1.1	1.2	1.2	0.9	0.8	1.1	1.2	0.7	0.2
	Total	0.8	1.0	1.1	1.1	0.8	0.7	1.0	1.0	0.6	0.1
Number of Reactors		4	4	4	4	4	4	4	4	4	4

(15) Radiation Dose at the Sendai Nuclear Power Station, Kyushu Electric Power Co., Inc.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	252	247	251	254	261	293	287	280	295	293
	Others	2,074	2,238	1,707	1,612	2,842	3,659	2,225	2,325	2,721	1,390
	Total	2,326	2,485	1,958	1,866	3,103	3,952	2,512	2,605	3,016	1,683
Collective Dose (person-Sv)	Employee	0.09	0.09	0.05	0.05	0.09	0.10	0.04	0.05	0.06	0.01
	Others	3.59	4.32	1.65	1.19	4.94	6.44	2.92	2.44	3.28	0.13
	Total	3.68	4.41	1.70	1.23	5.03	6.53	2.96	2.50	3.34	0.14
Average Individual Dose (mSv)	Employee	0.4	0.3	0.2	0.2	0.4	0.3	0.1	0.2	0.2	0.0
	Others	1.7	1.9	1.0	0.7	1.7	1.8	1.3	1.1	1.2	0.1
	Total	1.6	1.8	0.9	0.7	1.6	1.7	1.2	1.0	1.1	0.1
Number of Reactors		2	2	2	2	2	2	2	2	2	2

(16) Radiation Dose at the Tokai Power Station of The Japan Atomic Power Co., Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	292	295	324	307	307	301	292	289	287	309
	Others	694	899	1,027	986	1,094	1,026	1,401	1,025	1,092	1,016
	Total	986	1,194	1,351	1,293	1,401	1,327	1,693	1,314	1,379	1,325
Collective Dose (person-Sv)	Employee	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
	Others	0.02	0.04	0.10	0.03	0.02	0.01	0.02	0.05	0.05	0.07
	Total	0.02	0.05	0.10	0.03	0.03	0.02	0.02	0.05	0.05	0.07
Average Individual Dose (mSv)	Employee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Others	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Number of Reactors		1	1	1	1	1	1	1	1	1	1

(17) Radiation Dose at the Tokai No. 2 Power Stationof The Japan Atomic Power Co., Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	396	352	405	360	382	409	378	356	356	354
	Others	3,429	2,171	3,885	2,617	2,586	3,517	5,065	1,931	3,717	2,094
	Total	3,825	2,523	4,290	2,977	2,968	3,926	5,443	2,287	4,073	2,448
Collective Dose (person-Sv)	Employee	0.21	0.18	0.21	0.18	0.17	0.22	0.21	0.12	0.14	0.04
	Others	3.02	0.67	5.70	1.72	0.84	3.37	6.54	0.48	5.34	0.32
	Total	3.23	0.85	5.91	1.90	1.01	3.59	6.74	0.60	5.48	0.36
Average Individual Dose (mSv)	Employee	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.3	0.4	0.1
	Others	0.9	0.3	1.5	0.7	0.3	1.0	1.3	0.2	1.4	0.2
	Total	0.8	0.3	1.4	0.6	0.3	0.9	1.2	0.3	1.3	0.1
Number of Reactors		1	1	1	1	1	1	1	1	1	1

(18) Radiation Dose at the Tsuruga Power Station of The Japan Atomic Power Co., Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	423	442	444	452	442	439	421	435	471	439
	Others	3,396	3,698	2,708	3,517	4,047	3,975	4,579	5,060	6,168	2,361
	Total	3,819	4,140	3,152	3,969	4,489	4,414	5,000	5,495	6,639	2,800
Collective Dose (person-Sv)	Employee	0.21	0.22	0.17	0.19	0.17	0.13	0.09	0.13	0.10	0.02
	Others	3.07	5.21	1.94	3.03	4.12	4.72	3.17	6.12	6.39	0.30
	Total	3.28	5.43	2.11	3.22	4.29	4.85	3.27	6.25	6.49	0.32
Average Individual Dose (mSv)	Employee	0.5	0.5	0.4	0.4	0.4	0.3	0.2	0.3	0.2	0.1
	Others	0.9	1.4	0.7	0.9	1.0	1.2	0.7	1.2	1.0	0.1
	Total	0.9	1.3	0.7	0.8	1.0	1.1	0.7	1.1	1.0	0.1
Number of Reactors		2	2	2	2	2	2	2	2	2	2

(19) Total Radiation Dose for All BWRs

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010 *4	2011 *4	2012
Number of Radiation Workers (persons)	Employee	5,041	5,215	5,426	5,568	5,807	5,838	5,906	7,740	8,508	6,633
	Others	38,236	36,989	38,871	38,561	40,898	44,799	47,832	47,250	50,957	35,140
	Total	43,277	42,204	44,297	44,129	46,705	50,637	53,738	54,990	59,465	41,773
Collective Dose (person-Sv)	Employee	2.96	2.27	2.28	2.46	2.33	2.17	2.28	55.15	32.95	7.61
	Others	68.89	46.76	42.19	39.97	44.77	44.11	41.22	87.32	169.82	78.23
	Total	71.86	49.02	44.51	42.43	47.10	46.29	43.50	142.45	202.76	85.85
Average Individual Dose (mSv)	Employee	0.6	0.4	0.4	0.4	0.4	0.4	0.4	7.1	3.9	1.1
	Others	1.8	1.3	1.1	1.0	1.1	1.0	0.9	1.8	3.3	2.2
	Total	1.7	1.2	1.0	1.0	1.0	0.9	0.8	2.6	3.4	2.1
Number of Reactors		30	31	32	32	32	32	32	32	32	32

*4: The data were undergoing evaluation by the licensee associated with the influence of Tohoku District-off the Pacific Ocean Earthquake in FY 2010 and FY 2011. Data for the Fukushima Daiichi were reported on April 26, 2013 and July 5, 2013. Data for the Fukushima Daini were reported on January 18, 2013.

(20) Total Radiation Dose for All PWRs

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	3,129	2,966	3,081	3,085	3,103	3,304	3,290	3,413	3,440	3,436
	Others	20,415	21,485	18,719	19,633	23,122	25,739	26,178	27,022	25,742	17,016
	Total	23,544	24,451	21,800	22,718	26,225	29,043	29,468	30,435	29,182	20,452
Collective Dose (person-Sv)	Employee	0.83	0.84	0.84	0.82	0.78	0.85	0.85	0.87	0.58	0.3
	Others	23.69	27.93	21.46	24.13	30.27	36.88	37.71	35.36	22.54	3.94
	Total	24.52	28.78	22.30	24.97	31.05	37.73	38.56	36.24	23.12	4.24
Average Individual Dose (mSv)	Employee	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1
	Others	1.2	1.3	1.1	1.2	1.3	1.4	1.4	1.3	0.9	0.2
	Total	1.0	1.2	1.0	1.1	1.2	1.3	1.3	1.2	0.8	0.2
Number of Reactors		23	23	23	23	23	24	24	24	24	24

(21) Total Radiation Dose for All Commercial Nuclear Power Reactors

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010 *4	2011 *4	2012
Number of Radiation Workers (persons)	Employee	8,171	8,194	8,522	8,652	8,890	9,132	9,210	11,122	11,930	10,081
	Others	58,442	58,510	57,800	58,243	64,134	70,552	74,279	73,809	75,836	52,289
	Total	66,613	66,704	66,322	66,895	73,024	79,684	83,489	84,931	87,766	62,370
Collective Dose (person-Sv)	Employee	3.80	3.12	3.12	3.28	3.11	3.03	3.13	56.02	33.53	7.91
	Others	92.60	74.74	63.76	64.14	75.06	81.00	78.95	122.73	192.41	82.24
	Total	96.41	77.86	66.91	67.43	78.18	84.04	82.08	178.74	225.93	90.16
Average Individual Dose (mSv)	Employee	0.5	0.4	0.4	0.4	0.3	0.3	0.3	5.0	2.8	0.8
	Others	1.6	1.3	1.1	1.1	1.2	1.1	1.1	1.7	2.5	1.6
	Total	1.4	1.2	1.0	1.0	1.1	1.1	1.0	2.1	2.6	1.4
Number of Reactors		54	55	56	56	56	57	57	57	57	57

(22) Radiation Dose at the Fugen Decommissioning Engineering Center, Tsuruga Head Office, JAEA

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	144	112	103	104	105	103	108	119	113	116
	Others	701	522	596	505	424	599	497	325	371	407
	Total	845	634	699	609	529	702	605	444	484	523
Collective Dose (person-Sv)	Employee	0.06	0.03	0.01	0.02	0.01	0.04	0.02	0.03	0.02	0.01
	Others	0.40	0.34	0.15	0.18	0.08	0.39	0.10	0.08	0.11	0.13
	Total	0.46	0.37	0.16	0.20	0.09	0.43	0.11	0.11	0.13	0.15
Average Individual Dose (mSv)	Employee	0.4	0.2	0.1	0.2	0.1	0.4	0.1	0.2	0.2	0.1
	Others	0.6	0.7	0.3	0.4	0.2	0.7	0.2	0.3	0.3	0.3
	Total	0.5	0.6	0.2	0.3	0.2	0.6	0.2	0.3	0.3	0.3
Number of Reactors		1	1	1	1	1	1	1	1	1	1

(23) Radiation Dose at the Fast Breeder Reactor Research and Development Center, Tsuruga Head Office, JAEA

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	232	236	242	251	255	314	331	360	339	368
	Others	670	629	949	1,044	906	1,022	1,081	1,412	1,025	869
	Total	902	865	1,191	1,295	1,161	1,336	1,412	1,772	1,364	1,237
Collective Dose (person-Sv)	Employee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Individual Dose (mSv)	Employee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Number of Reactors		1	1	1	1	1	1	1	1	1	1

(24) Radiation Dose at Global Nuclear Fuel-Japan Co., Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	346	341	350	387	390	405	417	427	460	353
	Others	295	326	380	348	273	263	277	244	216	183
	Total	641	667	730	735	663	668	694	671	676	536
Collective Dose (person-Sv)	Employee	0.10	0.07	0.04	0.07	0.08	0.09	0.08	0.06	0.04	0.02
	Others	0.03	0.01	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.00
	Total	0.13	0.08	0.04	0.09	0.09	0.10	0.08	0.06	0.05	0.02
Average Individual Dose (mSv)	Employee	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1
	Others	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

(25) Radiation Dose at Mitsubishi Nuclear Fuel Co., Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	274	272	284	335	350	379	397	414	417	430
	Others	80	94	83	65	52	71	84	107	202	101
	Total	354	366	367	400	402	450	481	521	619	531
Collective Dose (person-Sv)	Employee	0.11	0.08	0.08	0.10	0.10	0.10	0.07	0.08	0.10	0.09
	Others	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.13	0.10	0.10	0.10	0.10	0.10	0.07	0.09	0.10	0.09
Average Individual Dose (mSv)	Employee	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
	Others	0.3	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2

(26) Radiation Dose at the Tokai Works, Nuclear Fuel Industries, Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	219	223	218	212	220	223	233	252	244	238
	Others	100	141	226	156	153	218	138	137	123	91
	Total	319	364	444	368	373	441	371	389	367	329
Collective Dose (person-Sv)	Employee	0.07	0.05	0.06	0.06	0.05	0.06	0.07	0.07	0.06	0.05
	Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	Total	0.07	0.05	0.06	0.06	0.05	0.06	0.07	0.07	0.06	0.06
Average Individual Dose (mSv)	Employee	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2
	Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Total	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2

(27) Radiation Dose at the Kumatori Works, Nuclear Fuel Industries, Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	254	283	260	254	237	257	227	249	292	305
	Others	217	221	235	195	200	163	130	145	158	165
	Total	471	504	495	449	437	420	357	394	450	470
Collective Dose (person-Sv)	Employee	0.05	0.06	0.04	0.04	0.04	0.04	0.05	0.05	0.08	0.07
	Others	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
	Total	0.08	0.07	0.05	0.05	0.05	0.05	0.05	0.05	0.08	0.07
Average Individual Dose (mSv)	Employee	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2
	Others	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	Total	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1

(28) Radiation Dose at the Uranium Enrichment Demonstration Plant, Ningyo-toge Environmental Engineering Center,JAEA

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	69	65	64	57	57	64	64	63	66	66
	Others	171	179	147	115	90	118	110	126	125	121
	Total	240	244	211	172	147	182	174	189	191	187
Collective Dose (person-Sv)	Employee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Individual Dose (mSv)	Employee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(29) Radiation Dose at the Enrichment and Disposal Office (Uranium Enrichment Plant), Japan Nuclear Fuel Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	160	135	119	103	110	142	157	181	180	191
	Others	364	304	272	294	308	477	464	730	556	652
	Total	524	439	391	397	418	619	621	911	736	843
Collective Dose (person-Sv)	Employee	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Others	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Average Individual Dose (mSv)	Employee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(30) Radiation Dose at the Reprocessing Facility, Nuclear Fuel Cycle Engineering Laboratories, Tokai Research and Development Center, JAEA

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	492	474	483	453	447	465	443	443	447	405
	Others	1,617	1,539	1,387	1,254	1,103	1,098	1,126	951	860	828
	Total	2,109	2,013	1,870	1,707	1,550	1,563	1,569	1,394	1,307	1,233
Collective Dose (person-Sv)	Employee	0.05	0.05	0.03	0.04	0.02	0.03	0.04	0.04	0.04	0.02
	Others	0.15	0.13	0.12	0.11	0.07	0.07	0.11	0.11	0.07	0.04
	Total	0.20	0.18	0.15	0.15	0.09	0.10	0.15	0.15	0.11	0.06
Average Individual Dose (mSv)	Employee	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0
	Others	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	Total	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0

(31) Radiation Dose at the Reprocessing Plant (Reprocessing Facility), Japan Nuclear Fuel Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	618	1,042	1,258	1,472	1,605	1,392	1,314	1,269	1,220	1,274
	Others	3,416	3,235	4,671	4,473	4,839	4,178	4,336	4,246	4,279	4,119
	Total	4,034	4,277	5,929	5,945	6,444	5,570	5,650	5,515	5,499	5,393
Collective Dose (person-Sv)	Employee	0.04	0.01	0.01	0.02	0.05	0.02	0.04	0.03	0.01	0.01
	Others	1.84	0.17	0.12	0.19	1.01	0.28	0.48	0.41	0.21	0.18
	Total	1.88	0.18	0.13	0.21	1.05	0.30	0.52	0.43	0.22	0.19
Average Individual Dose (mSv)	Employee	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Others	0.5	0.1	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.0
	Total	0.5	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.0

(32) Radiation Dose at the Enrichment and Disposal Office (Low-Level Radioactive Waste Disposal Center), Japan Nuclear Fuel Ltd.

Item	FY	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	64	65	58	55	52	54	57	62	60	69
	Others	119	136	101	143	179	130	256	194	212	167
	Total	183	201	159	198	231	184	313	256	272	236
Collective Dose (person-Sv)	Employee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Average Individual Dose (mSv)	Employee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(33) Radiation Dose at the Reprocessing Plant (Waste Storage Facility), Japan Nuclear Fuel Ltd.

Item \ FY		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	198	194	189	182	232	201	199	240	234	222
	Others	485	562	605	569	842	669	760	865	850	840
	Total	683	756	794	751	1,074	870	959	1,105	1,084	1,062
Collective Dose (person-Sv)	Employee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average Individual Dose (mSv)	Employee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(34) Radiation Dose at the Radioactive Waste Disposal Facility, Nuclear Science Research Institute, Tokai Research and Development Center, Japan Atomic Energy Agency

Item \ FY		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee										
	Others										
	Total										
Collective Dose (person-Sv)	Employee										
	Others										
	Total										
Average Individual Dose (mSv)	Employee										
	Others										
	Total										

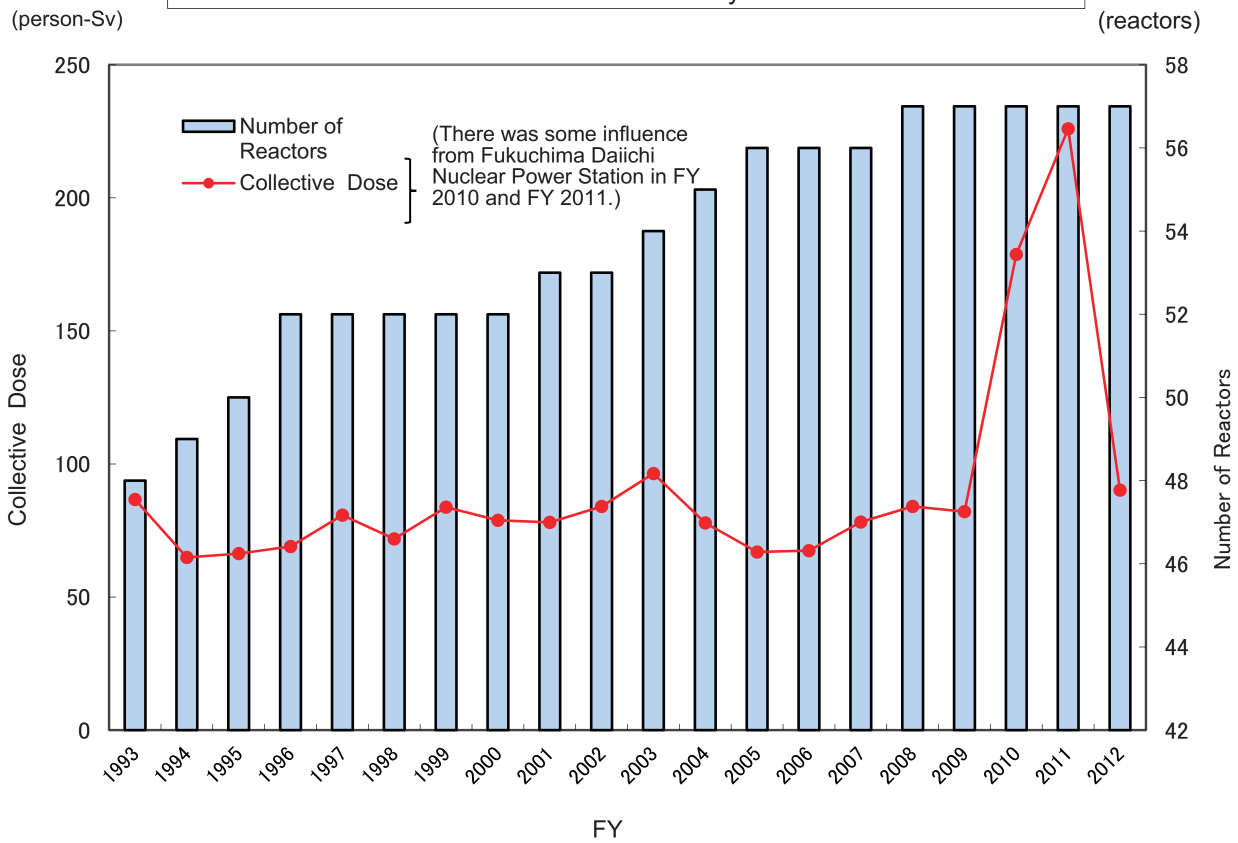
(35) Radiation Dose at the Radioactive Waste Management Facility, Oarai Research and Development Center, Japan Atomic Energy Agency

Item \ FY		2003	2004	2005 *5	2006	2007	2008	2009	2010	2011	2012
Number of Radiation Workers (persons)	Employee	22	20	27	28	27	30	31	33	31	32
	Others	244	246	195	192	181	172	235	163	254	138
	Total	266	266	213	220	208	202	266	196	285	170
Collective Dose (person-Sv)	Employee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Others	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
	Total	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Average Individual Dose (mSv)	Employee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Others	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0
	Total	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0

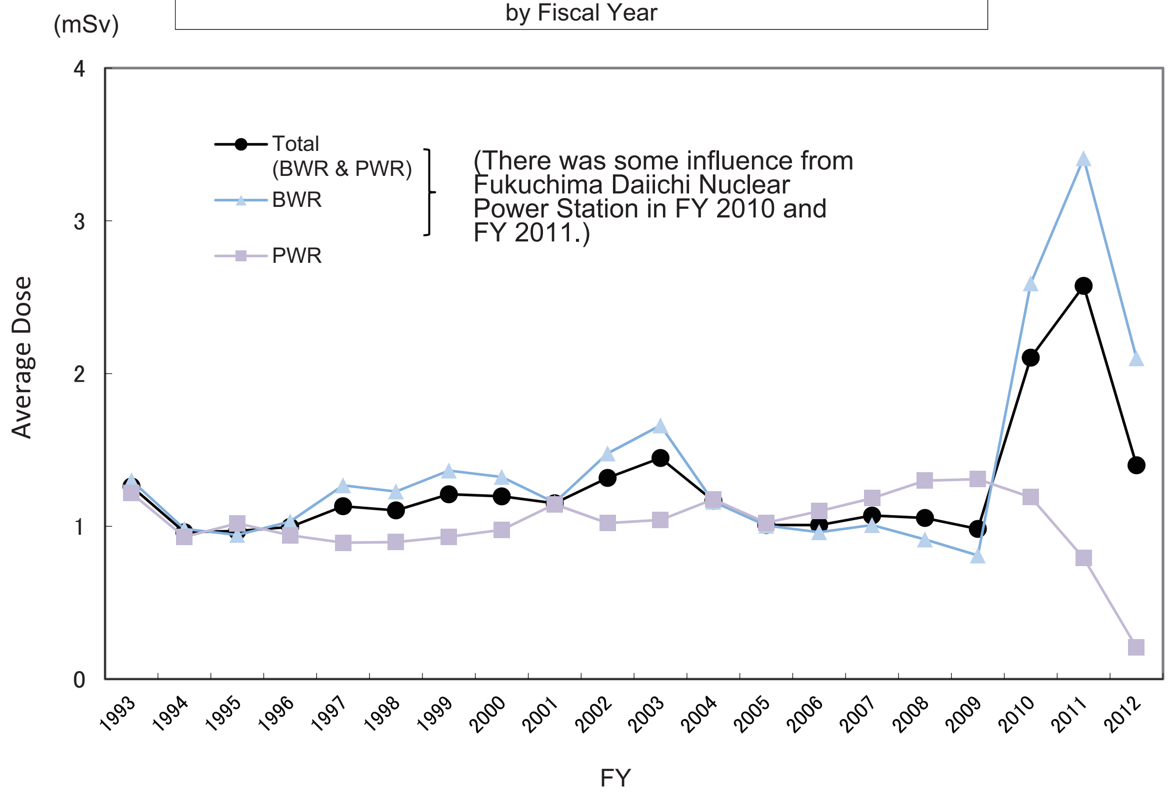
*5 : This facility used to belong to the former Japan Atomic Energy Research Institute. The personnel working at the facility are respectively classified as “Others” and “Employee” before and after the merger with the Japan Nuclear Cycle Development Institute. In FY 2005, there were nine workers who were classified as both “Employee” and “Others.” The number was subtracted from the total number

(Reference)

Trends of Collective Radiation Dose at Commercial Nuclear Power Reactors and the Number of Reactors by Fiscal Year



Trends of Average Radiation Dose at Commercial Nuclear Power Reactors by Fiscal Year



XVI

XVI-3 Information System on Occupational Exposure (ISOE)

1. ISOE History and Objectives

The Committee on Radiation Protection and Public Health (CRPPH) of OECD/Nuclear Energy Agency (NEA) launched the Information System on Occupational Exposure (ISOE) program on 1 January 1992 after two-year pilot program to provide a forum for radiation protection experts from both nuclear electricity utilities and national regulatory authorities to discuss, promote and co-ordinate international co-operative undertaking for the radiological protection of workers at nuclear power plants.

Since 1993, The International Atomic Energy Agency (IAEA) has co-sponsored the ISOE Program for those non-NEA member countries.

In 1997, the NEA and IAEA formed a Joint Secretariat.

Japan has been a member since April 1992.

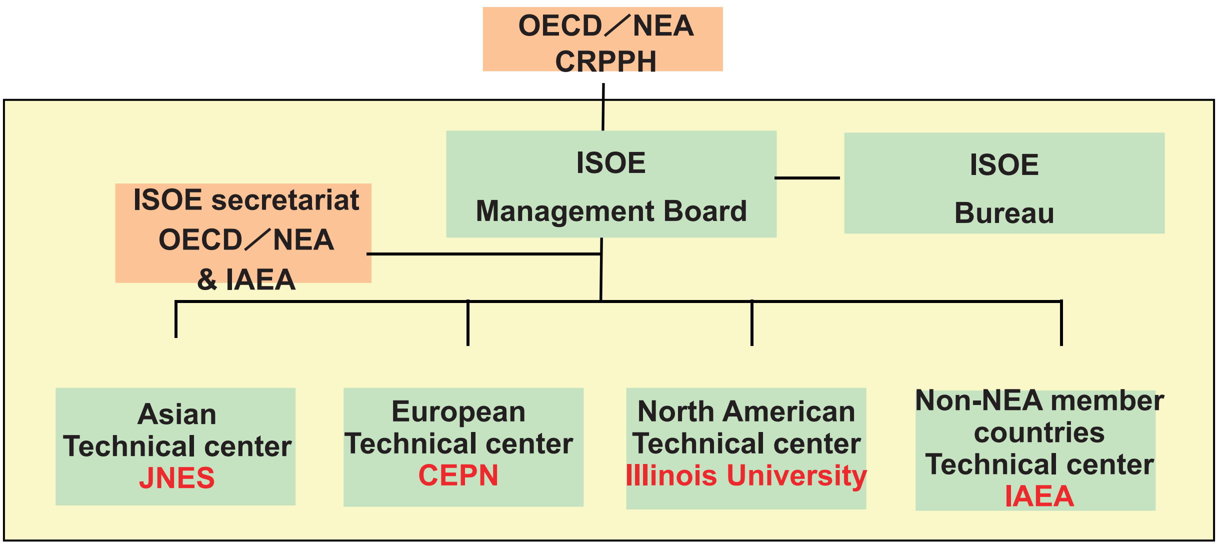
Republic of Korea has been a member since October 1996.

ISOE provides a worldwide information exchange system for the optimization of radiological protection of workers at nuclear power plants and the implementation of the ALARA (As Low As Reasonably Achievable) principle.

2. ISOE Structure and Organization

The annual Management Board Meeting, consisted of regulatory authority and utility representatives from all participating countries, supported by the joint OECD/NEA and IAEA Secretariat, provides overall direction of the ISOE.
Furthermore, to promote the execution of timely actions regarding various ISOE activities, the ISOE Bureau Meetings, which comprise, as a minimum, the Chairperson, the Chairperson-Elect, the Vice-Chairperson are held twice to three times a year. The ISOE Technical Centers are generally invited to attend the meetings. Four ISOE Technical Centers established in Asia, Europe, North America and IAEA, manage the day-to-day technical operations in support of the membership in the four regions. At the end of 2011, the ISOE program included 70 participating utilities in 29 countries, as well as the regulatory authorities of 24 countries.

ISOE Program Management Structure



*CEPN (French Nuclear Protection Evaluation Center)

3. Main Activities and Achievements

- ISOE international and regional symposia

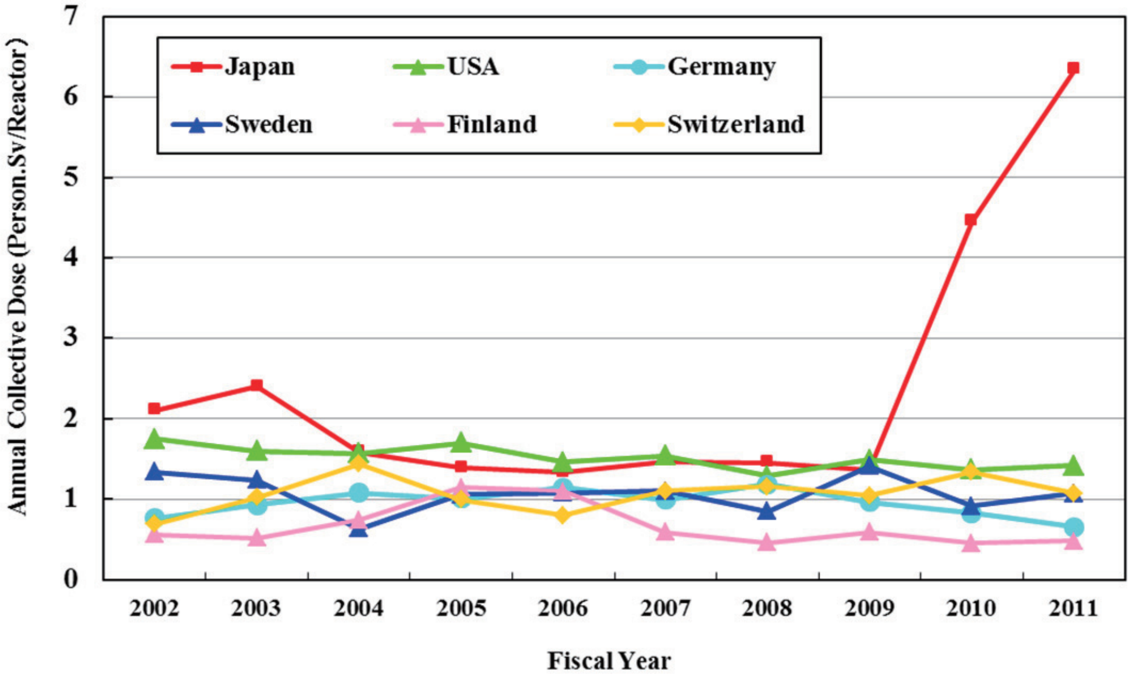
  Each technical center holds symposia to provide important forums to exchange practical information on radiation protection such as good practices, and promotes ISOE activities by membership countries.

Asian Technical Center	
August, 2013 (Tokyo, Japan)	2013 ISOE International ALARA Symposium
September, 2012 (Tokyo, Japan)	2012 ISOE Asian ALARA Symposium
August, 2010 (Gyeongju,South Korea)	2010 ISOE Asian ALARA Symposium
September, 2009 (Aomori, Japan)	2009 ISOE Asian ALARA Symposium
November, 2008 (Tsuruga, Japan)	2008 ISOE International ALARA Symposium
September, 2007 (Seoul, South Korea)	2007 ISOE Asian ALARA Symposium
October, 2006 (Yuzawa, Japan)	2006 ISOE Asian ALARA Symposium
November, 2005 (Hamaoka, Japan)	2005 ISOE Asian ALARA Symposium
European Technical Center	
June, 2012 (Prague, Czech Republic)	2012 ISOE European ALARA Symposium
November,2010(Cambridge,United Kingdom)	2010 ISOE International ALARA Symposium
June, 2008 (Turku, Finland)	2008 ISOE European ALARA Symposium
March, 2006 (Essen, Germany)	2006 ISOE International ALARA Symposium
North American Technical Center	
January, 2013 (Ft. Lauderdale, FL, USA)	2013 ISOE North American ALARA Symposium
January, 2012 (Ft. Lauderdale, FL, USA)	2012 ISOE International ALARA Symposium
January, 2011 (Ft. Lauderdale, FL, USA)	2011 ISOE North American ALARA Symposium
January, 2010 (Ft. Lauderdale, FL, USA)	2010 ISOE North American ALARA Symposium
January, 2009 (Ft. Lauderdale, FL, USA)	2009 ISOE North American ALARA Symposium
January, 2008 (Ft. Lauderdale, FL, USA)	2008 ISOE North American ALARA Symposium
January, 2007 (Ft. Lauderdale, FL, USA)	2007 ISOE International ALARA Symposium
January, 2006 (Ft. Lauderdale, FL, USA)	2006 ISOE North American ALARA Symposium
January, 2005 (Ft. Lauderdale, FL, USA)	2005 ISOE International ALARA Symposium
IAEA Technical Center	
October 2009 (Vienna, Austria)	2009 ISOE International ALARA Symposium

* Symposia held since 2005 are listed (for related documents, refer to the ISOE Network web site)

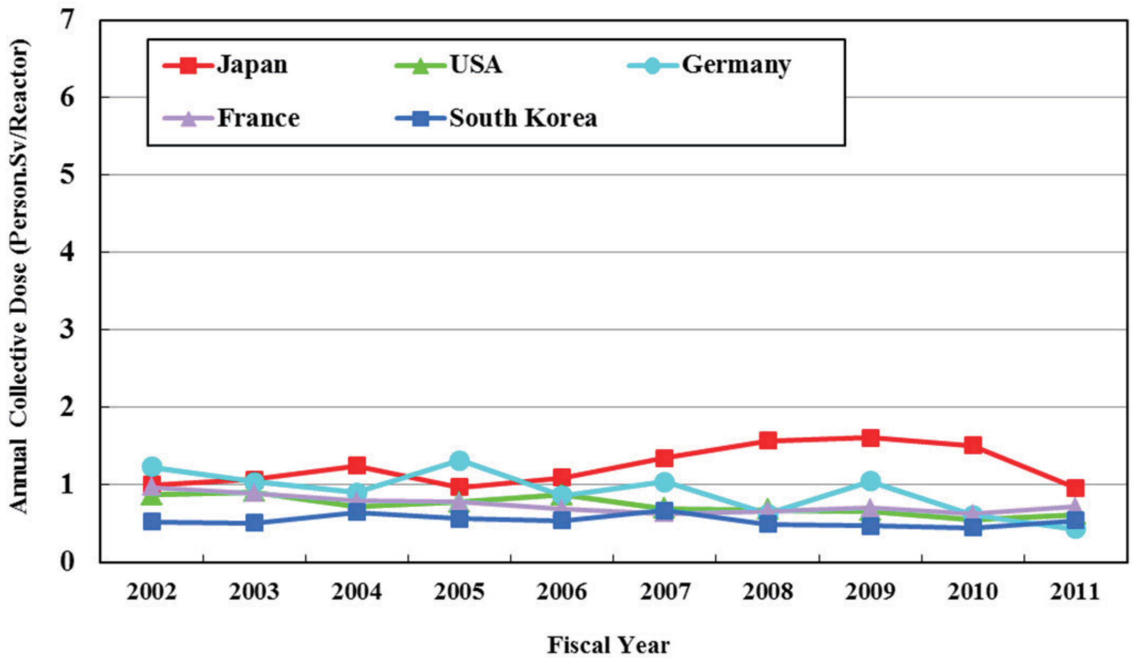
ISOE Network http://www.isoe-network.net

BWR average annual collective dose per reactor by country (2002-2011)

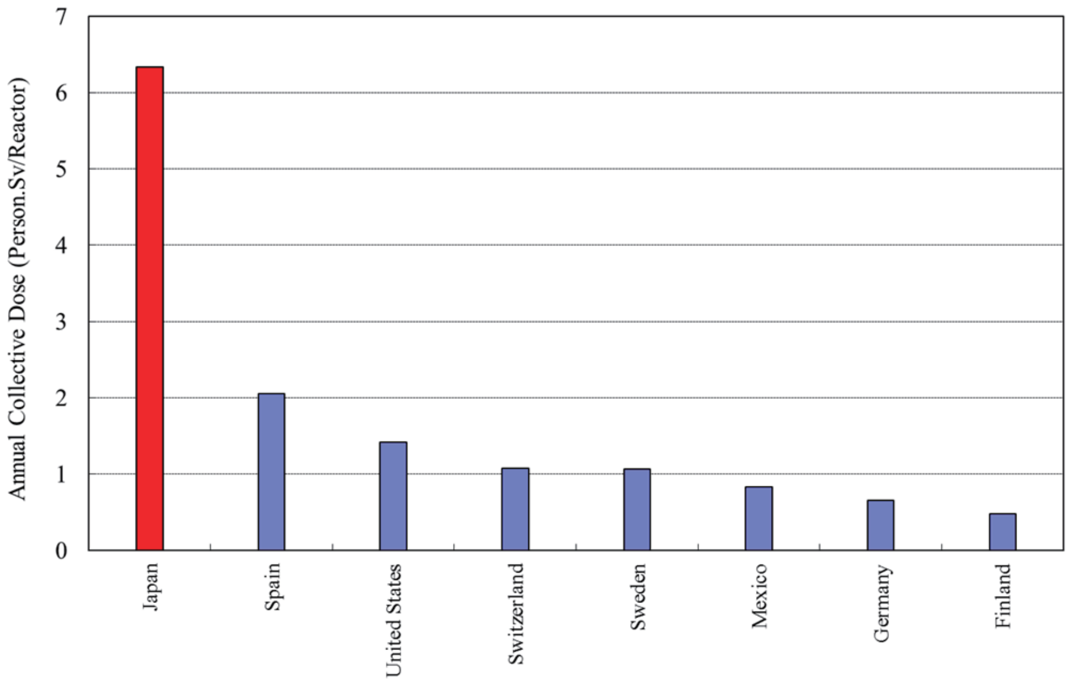


Note: All data for Japan include Fukushima Dai-ichi Nuclear Power Station

PWR average annual collective dose per reactor by country (2002-2011)

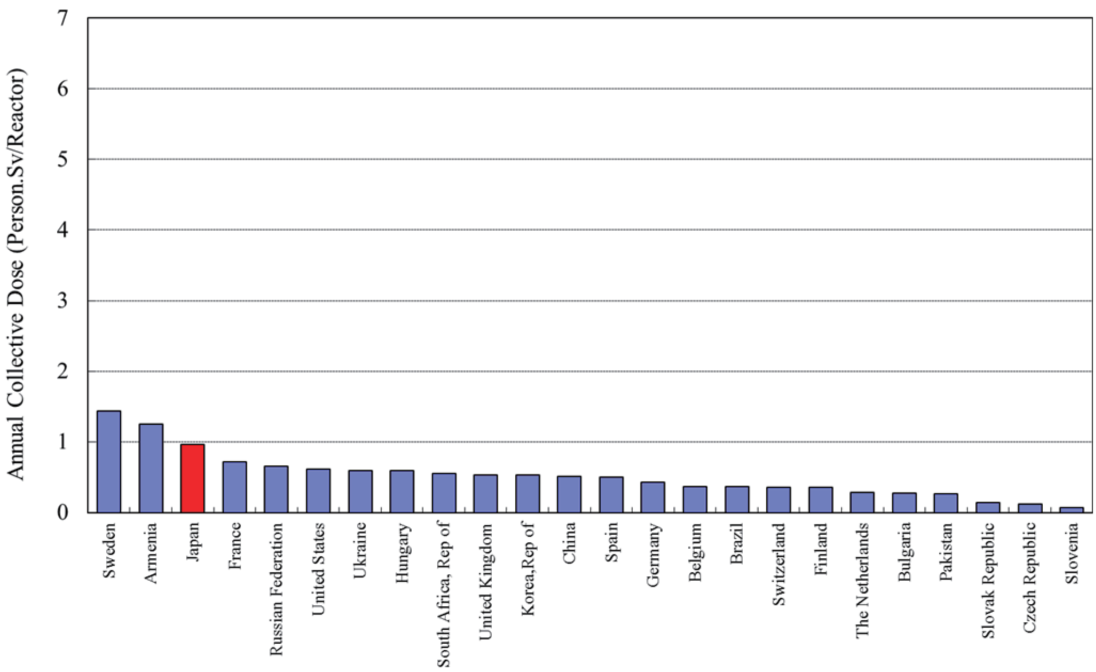


2011 BWR average collective dose per reactor by country



Note: Data for Japan include Fukushima Dai-ichi Nuclear Power Station

2011 PWR average collective dose per reactor by country



XVII SAFETY REGULATION ADMINISTRATION

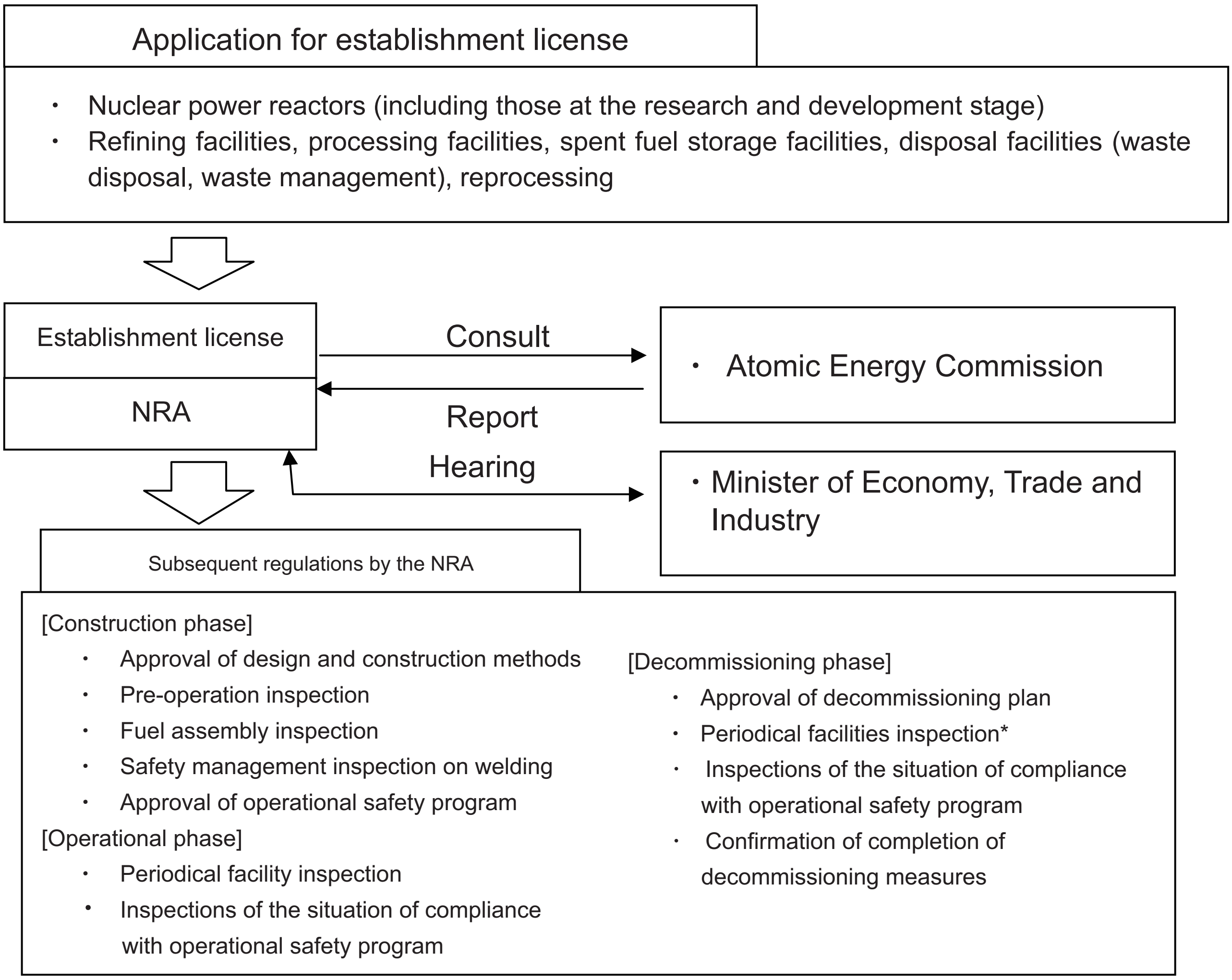
XVII-1 Overview of Safety Regulation Administration

In the wake of the accident at Tokyo Electric Power Co., Inc.'s Fukushima Daiichi Nuclear Power Station, the Safety Regulation Administration is being performed under the new system. The Nuclear Regulation Authority Establishment Act was approved by the Diet on June 20, 2012. On September 19, the Nuclear Regulation Authority (hereinafter NRA) was established. (See the attached for main points of the Nuclear Regulation Authority Establishment Act.)

XVII-1-1 Overview of Safety Regulations

When a nuclear facility is established and operated, the facility operator must independently establish a safety management system to ensure the safety of the facility. On the other hand, in order to ensure public safety, the NRA implements strict safety regulations through the designation and approval of nuclear businesses (approval of reactor establishment), approval of design and construction methods, pre-service inspections, welding inspections, approval of operational safety program, periodical inspections of facilities investigations into the status of compliance with operational safety program and management and supervision of facility operation, after their operation has commenced, according to the Act for the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors (hereinafter referred to as the "Nuclear Reactor Regulation Act"). Figure XVII-1-1 shows an overview of the safety regulations.

With regard to nuclear power reactors, the approval of construction plans, pre-service inspections, welding inspections, fuel assembly inspections, and periodical inspections were enforced based on the Electricity Utilities Industry Act but these safety regulations has been unified into the Nuclear Reactor Regulation Act.



* Conducted when nuclear fuel material exists within reactor facilities

Figure XVII-1-1 Overview of Safety Regulations of Nuclear Facilities

XVII-1-2 Safety Regulations of Nuclear Power Reactor

Safety regulations of nuclear power reactors are implemented according to the Nuclear Reactor Regulation Act. The main flow of the safety regulations of nuclear power reactors is shown in Figure XVII-1-2.

1. Reactor Establishment License

Those planning to establish a power reactor (hereinafter referred to as "establishers") must obtain approval for the reactor establishment from the Nuclear Regulation Authority (NRA) according to Article 43-3-5 of the Nuclear Reactor Regulation Act.

Once an application for a reactor establishment license is received from an establisher, the NRA examines whether the basic design of the reactor presents any obstacles to disaster prevention and others. At that time, experts on the Committee of the Reactor Safety Examination are consulted on technical issues as needed. The NRA then asks the Atomic Energy Commission and the Minister of Economy, Trade and Industry for opinions on the examination results, and grants a license to the establisher.

To obtain a reactor establishment license, the reactor must satisfy the following requirements:

(1) There is no possibility of nuclear power reactors being used for anything other than peaceful purposes.

(2) The applicant has technical competence and basic knowledge of accounting required to establish a reactor.

(3) The applicant also has sufficient technical competency to prevent major accidents occurring and spreading, such as severe damage to nuclear power reactor cores and other major accidents specified in the regulations of the NRA and other technical competencies to correctly operate a nuclear power reactor.

(4) The location, structure and equipment of the nuclear reactor facility are such that they will not hinder measures to prevent disasters resulting from nuclear fuel materials, materials contaminated by the same, or nuclear power reactors, conforming to the requirements of NRA regulations.

2. Technical Standards

Technical standards on nuclear power regulation under Article 43-3-14 of the Reactor Regulation Act include:

- Establishment license: Regulation concerning the location, structure and equipment of nuclear power reactors and their facilities (NRA regulation No. 5)
- Technical standards of Commercial Power Reactors: Regulation for the technical standards concerning commercial power reactors and their facilities (NRA regulations No. 6)
- Technical standards on nuclear fuel: Regulation for the technical standards concerning nuclear fuel of commercial power reactors (NRA regulation No. 7)
- Technical standards on the quality control of commercial power reactors: Regulation for the organization technical standards of quality control method and inspection for design and construction of commercial power reactor by nuclear power reactor establisher (NRA regulation No. 8)

The establisher must maintain commercial nuclear power reactor facilities to conform to these technical standards. These technical standards are crucial in that they set out standards as the basis on which orders are issued under Article 43-3-9 of Approval of Construction Plans, Article 43-3-10 of Report of Construction Plans, Article 43-3-11 of Qualification Standard of Pre-service Inspections, and Article 43-3-15 of Qualification Standard of Periodical Inspections according to the Nuclear Regulation Act.

3. Approval and report of construction plan

For construction or reconstruction of nuclear power reactor facilities, approval must be obtained for the plans for such construction (Article 43-3-9 of the Nuclear Reactor Regulation Act).

Requirements that such plans must satisfy to obtain approval are specified in Paragraph 3, Article 43-3-9 of the Nuclear Reactor Regulation Act. These requirements are listed below:

(1) The construction plan must conform to what was approved according to Paragraph 1, Article 43-3-5.

(2) Nuclear power reactor facilities must conform to the technical standards stipulated in Article 43-3-14.
(3) The quality control method related to the design and construction and organization for the inspection must conform to the technical standards stipulated in the regulations of the Nuclear Regulation Authority.

In addition, establishers planning to establish or modify power reactor facilities stipulated in NRA regulations must report to NRA. This also applies in cases when they change the plan (excluding minor changes stipulated in NRA regulations). (Article 43-3-10 of the Nuclear Reactor Regulation Act)

4. Inspections of Nuclear Power Plant Facilities

Along with the construction plan permission and reporting system and independent safety systems, inspections provide another means of ensuring the safety of nuclear power plant facilities. The Nuclear Reactor Regulation Act contains provisions concerning pre-service inspections, fuel assembly inspections, safety management inspections on welding, periodical facility inspections, periodical safety management inspections, inspections of compliance status of operational safety program (operational safety inspections), and on-the-spot inspections.

(1) Pre-operation inspection (Article 43-3-11 of the Nuclear Reactor Regulation Act)

1) Purpose

A pre-service inspection is intended to check whether or not the construction of an nuclear power plant has been carried out according to the construction plan approved and reported in response to the relevant regulations.

2) Inspection objects

Pre-service inspections are to be conducted on nuclear power reactor facilities installed or modified upon obtaining an approval pursuant to Paragraph 1 or 2, Article 43-3-9 of the Nuclear Reactor Regulation Act or installed or modified upon reporting pursuant to Paragraph 1, Article 43-3-10 of the law.

3) Acceptance criteria

The acceptance criteria of a pre-service inspection are stipulated in Paragraph 2, Article 43-3-11 of the Nuclear Reactor Regulation Act, and the nuclear power reactor facilities must satisfy all the following requirements to pass a pre-service inspection:

a. The nuclear power reactor facilities must have been constructed according to a permitted or reported plan.
b. The facilities must conform to the technical standards stipulated by the NRA in Article 43-3-14 of the Nuclear Reactor Regulation Act.

4) Inspection timing and methods

Such facilities must undergo pre-service inspections in each of the construction processes specified in Article 16 of the rules for installation, operation, etc., of nuclear power reactors (hereinafter “Rules for Commercial Power Reactors”). This is because a determination on whether some acceptance criteria cannot be made until they are under construction, and some must be checked in certain processes to ensure their safety.

A pre-service inspection is intended to check items specified separately for each construction process, and what is inspected and by what method, as well as other details, depending on construction specifics. In a nuclear power plant, pre-service inspections are conducted in the following construction processes:

a. When the reactor itself, nuclear fuel material handling and storage facilities, the reactor cooling system facility (excluding steam turbines), the instrumentation and control system facilities (excluding control equipment to manage the operation of nuclear power reactors), the radioactive waste disposal facility (excluding ventilation stack), the radiation management facility, or the reactor containment facility are ready to undergo a structural inspection, strength inspection or leakage inspection.
b. For the steam turbine, when the lower half of the shell casing of the steam turbine is installed and when the assembly of the auxiliary boiler itself is completed.
c. When the nuclear power reactor is ready to be loaded with fuel assemblies.

An inspection to verify nuclear fuel material handling and storage facilities, the reactor cooling system facility, instrumentation and control system facility, the radioactive waste disposal facility, the radiation management facility, the reactor containment facility, the emergency power supply facility, the ordinary power supply facility, the fire protection facility, the flood protection facility, the fuel equipment for driving auxiliary machine, the emergency water intake facility, the civil engineering structure on the premises and functions and performances on the site emergency station required in the case where the nuclear power reactor is loaded with a fuel assembly

d. When the nuclear power reactor's criticality response operation can be initiated

An inspection to examine the functions and performances of the reactor itself, the reactor cooling system facility, the instrumentation and control system facility and the generator required when the nuclear power reactor goes critical.

e. When construction related to the construction plan is completed.

An inspection required to verify the completion of the inspection to verify the general performance of the nuclear power reactor facilities in the output operation of nuclear power reactors and other works

(2) Fuel assembly inspection (Article 43-3-12 of the Nuclear Reactor Regulation Act)

Nuclear fuel materials used to fuel nuclear power reactors must undergo inspections specified by the NRA in each process. This inspection is called a fuel assembly inspection and covers not only fuel materials and clads, but also other fuel assembly components.

(3) Safety management inspection on welding (Article 43-3-13 of the Nuclear Reactor Regulation Act)

1) Purpose

The break of a containment vessel which contains a high concentration of radioactive materials or a vessel and pipes carrying steam and other materials at high temperature and pressure, may cause the significant damage. To prevent such damage, welding, which makes up an important part of the manufacturing process of vessels, etc. is inspected in certain processes on a licensee’s basis. The systems of licensee’s inspections and others are reviewed to ensure the safety of nuclear power reactor facilities.

2) Inspection objects

As specified in Article 35 of the Rules for Commercial Power Reactors, the reactor main body, Vessel belonging to the reactor containment facility, or vessels belonging to the reactor cooling system facility, instrumentation and control system equipment or the radiation management facility to be used as emergency safety devices, the part of pipes installed to vessels, etc. belonging to the reactor main body to a stop valve closest to the vessel, steam turbine, etc. are to be inspected.

3) Acceptance criteria

It is necessary to verify that the welding is in accordance with the technical standards specified in NRA regulations, as specified in Paragraph 2, Article 43-3-13 of the Nuclear Reactor Regulation Act.

(4) Periodical facility inspection (Article 43-3-15 of the Nuclear Reactor Regulation Act)

Specified important nuclear power reactor facilities (other than those specified by the NRA regulations as presenting no specific obstacles to prevent disasters resulting from nuclear fuel material, material contaminated by nuclear fuel material, or nuclear power reactor) must undertake periodical facility inspections by the Nuclear Regulation Authority in accordance with NRA regulations at intervals specified by the NRA regulations.

1) Purpose

After the start of service, nuclear power reactor facilities are checked for aging degradation to verify the maintenance of integrity regularly.

2) Inspection objects

Inspection objects are specified in Article 45 of the Rules for Commercial Power Reactors as follows:

a. The reactor main body, nuclear fuel material handling and storage facilities, the reactor cooling system facility, the instrumentation and control system facility, the radioactive waste disposal facility, the radiation management facility, the reactor containment facility and emergency power supply facility

b. Steam turbine main body and attached equipment

3) Inspection timing

Article 48 of the Rules for Commercial Power Reactors stipulates that establishers of nuclear power plants undergo periodical inspections at the following times:

Specified important nuclear power reactor facilities should undertake periodical facility inspections within 13, 18, or 24 months of the previous inspection in accordance with the determination period stipulated and notified by the NRA. However, the inspection for any special important nuclear power reactor facility without any periodical facility inspection after a nuclear power reactor is installed or the number of units increased should be carried out within 13 months after the date on which it is brought into operation.

4) Inspection methods

A teardown or overhaul inspection and a function test are conducted depending on the importance of the equipment and the status of use.

It is checked that the required functions and performances of the equipment have not been undermined by past use and are in no danger of being undermined by future use.

(5) Periodical safety management inspection (Article 43-3-16 of the Nuclear Reactor Regulation Act)

A periodical safety management inspection, which is specified in Article 43-3-16 of the Nuclear Reactor Regulation Act, is another periodical inspection conducted by the government. During such inspection, the systems of periodical licensee`s inspections are examined.

1) Purpose

The suitability of organizations involved in periodical licensee`s inspections, periodical licensees'inspection methods, process management and training in inspections is examined and the results are evaluated on a scale with these phases. A periodical safety management inspection provides an incentive regulation that adds or reduces inspection items in the next inspection depending on the evaluation.

2) Inspection objects

A periodical safety management inspection is conducted on organizations involved in periodical licensee`s inspections, periodical licensee`s inspection methods, process management, etc.

(6) Inspection of compliance status of operational safety program

1) Operational safety inspection

An inspection of the compliance status of operational safety program (hereinafter referred to as "operational safety inspections") is an inspection that NRA conducts and requires licensees to undergo according to Paragraph 5, Article 43-3-24 of the Nuclear Reactor Regulation Act.

a Purpose

A operational safety inspection is intended to maintain the proper operation of nuclear power plant facilities,(including periodical evaluations of facilities), by requiring licensees to periodically check the compliance status of operational safety program regarding operation management, etc.

b Inspection timing

A operational safety inspection is to be conducted at each nuclear power plant facility on a quarterly basis according to stipulations in ordinances of the NRA. In addition, this inspection is to be carried out for operations related to the start-up or shutdown of a nuclear power reactor. (limited to operations conducted during facility periodical inspection)

c Safety inspection method

A safety inspection is to be conducted by combining the following items appropriately according to NRA regulations:

- On-the-spot inspections of offices and plants or factories
- Inspections of accounts, documents, equipment, components, and other objects
- Questioning workers and other concerned parties
- Submission of nuclear source materials, nuclear fuel material, materials contaminated with nuclear fuel material or other necessary materials (minimum amount required for an inspection).

5. Measures involved in decommissioning of reactors

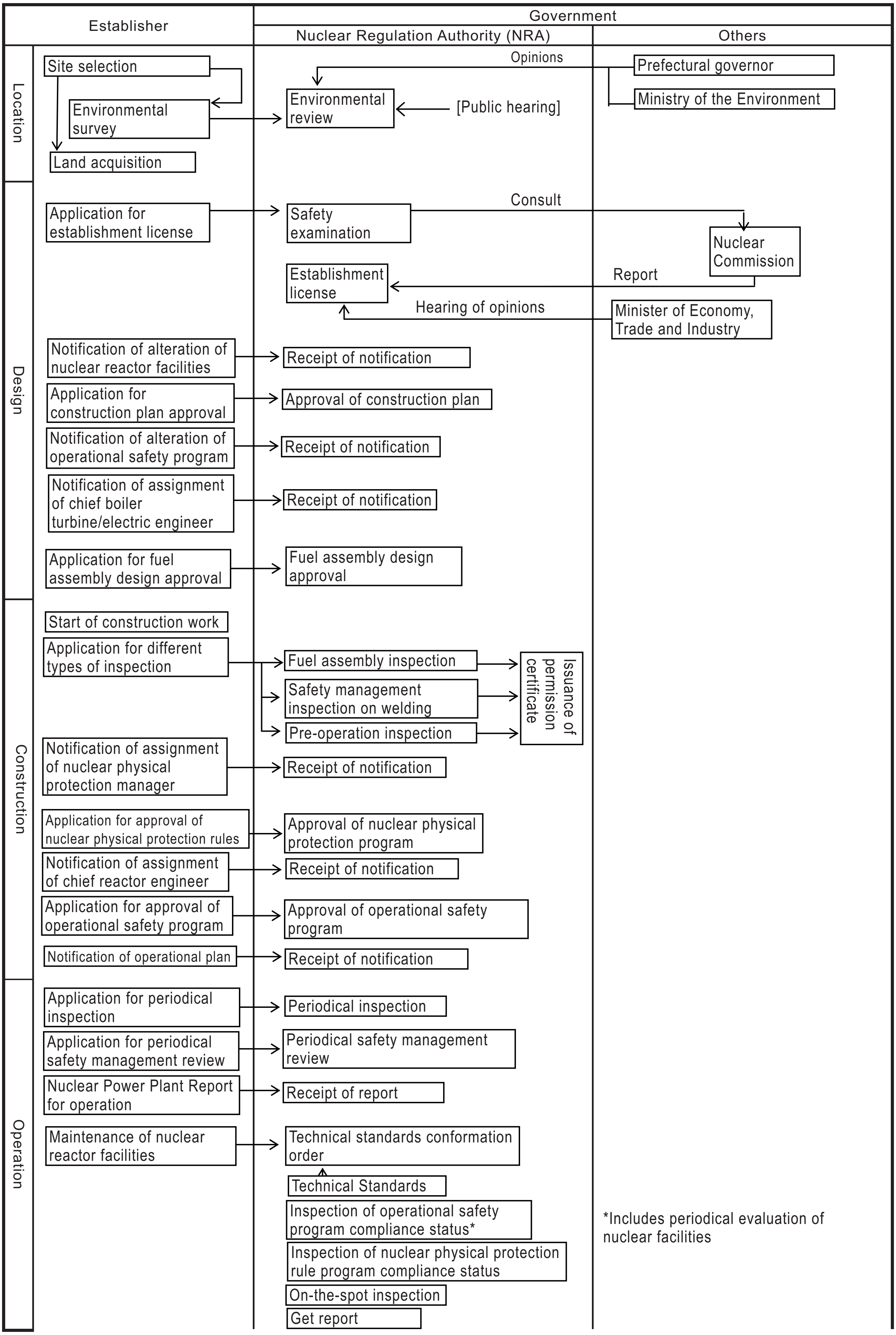
Establishers who have a plan to decommission their nuclear power reactor must dismantle the nuclear reactor facilities, transfer nuclear fuel materials they possess, remove nuclear fuel material contamination, dispose of materials contaminated with nuclear fuel materials, and take other measures stipulated by the NRA (hereinafter called "decommissioning measures") according to Article 43-3-32 of the Nuclear Reactor Regulation Act.

In addition, before taking decommissioning measures, they must establish a plan for the decommissioning measures (hereinafter called a "decommissioning plan") pursuant to the provisions of the NRA and obtain approval for the plan from the NRA.

Even in a decommissioning stage, establishers are still subject to regulations on approval of operational safety program, periodical facility inspections (as long as the reactor facility to be decommissioned contains nuclear fuel materials) and investigations of operational safety program compliance status under the Nuclear Reactor Regulation Act. When extending a facility, they are subject to regulations on approval of design and construction methods and pre-service inspections.

After decommissioning measures are completed, the establishers must have the results of measures approved by the NRA as conforming to standards stipulated in ordinances of the NRA. When completion of decommissioning measures is confirmed, the establishment license given to the establisher for the reactor is invalidated.

Figure XVII-1-2 Legal Procedures from Site Selection to Completion of Decommissioning Measures



Decommissioning	Application for decommissioning plan approval Notification of alteration of nuclear reactor facilities Application for approval for alteration of operational safety program Application for Periodical facility inspection (If the facility to be decommissioned contains nuclear fuel materials） Application for confirmation of completion of decommissioning measures Invalidation of establishment license for that reactor	Approval of decommissioning plan Receipt of notification Approval of alteration of operational safety program Inspection of safety program compliance status Periodical facility inspection Confirmation of completion of decommissioning measures Issuance of permission certificate	Additional equipment to be installed in a stage of decommissioning also requires approval for the installation changes and for the design and construction methods, and must undergo pre-operation inspections under the Nuclear Reactor Regulation Act.

XVII-1-3 Safety Regulations of Refining, Fabrication, Storage and Reprocessing Business

Safety regulations for refining, fabrication, storage and reprocessing facilities are implemented according to the Nuclear Reactor Regulation Law. The main flow of the safety regulations is shown in Figure XVII-1-3.

1. Designation/Approval of Business

Those who are planning to undertake refining, fabrication, storage or reprocessing business must be designated as a licensed business by, or obtain approval from the NRA according to the Nuclear Reactor Regulation Law.

- Refining business (Designation under Article 3 of the Nuclear Reactor Regulation Law)
- Fabrication business (Approval under Article 13 of the Nuclear Reactor Regulation Law)
- Storage business (Approval under Article 43-4 of the Nuclear Reactor Regulation Law)
- Reprocessing business (Designation under Article 44 of the Nuclear Reactor Regulation Law)

Upon receiving an application for designation as a licensed business or an application for permission, the NRA examines whether the basic design of the reactor facility is sufficiently safe or not. If it conforms to the designation or permission standard, the business will be specified or approved.

A business license or permission is granted when the business satisfies the following requirements:

(1) There is no possibility of the spent fuel storage facility or reprocessing facility being used for anything other than peaceful purposes.

(2) The applicant has technical competence and a basic knowledge about accounting required to do the business properly.

(3) The location, structure and equipment of the refining, fabrication, storage or reprocessing facility does not impede the prevention of disasters that may be caused by nuclear source materials or nuclear fuel material.

2. Approval of Design and Construction Methods

A fabrication, storage or reprocessing establisher must obtain approval for the design and construction methods before commencing construction of the facility from the NRA according to relevant government ordinances.

The requirements that such design and construction methods must satisfy to obtain approval are specified in the provisions of the Nuclear Reactor Regulation Law. These requirements are listed below:

1) Fabrication business (Article 16-2 of the Nuclear Reactor Regulation Law.)
    1) The design and construction methods must conform to what is approved in Article 13-1 or Article 12-1 or reported in Article 13-2.
    2) The design and construction methods must conform to technical standards stipulated in NRA regulations.

(2) Storage business (Article 43-8 of the Nuclear Reactor Regulation Law.)
    1) The design and construction methods must conform to what is approved in Paragraph 1, Article 43-4 or Paragraph 1, Article 42 or reported in Paragraph 2, Article 43.
    2) The design and construction methods must conform to technical standards stipulated in ordinances from the Ministry of Economy, Trade and Industry.

(3) • Reprocessing business (Article 45-3 of the Nuclear Reactor Regulation Law)
    1) 1) The design and construction methods must conform to what is specified in Paragraph 1, Article 44, what is approved in Paragraph 3, Article 44 or 43, or what is approved in Paragraph 1 of said article, or reported in Paragraph 2 or 4 of said article.
    2) They must conform to NRA regulations.

3. Inspections of Refining, Fabrication, Storage and Reprocessing Facilities

Inspections are important in ensuring the safety of refining, fabrication, storage and reprocessing facilities, and the Nuclear Reactor Regulation Law contains provisions on pre-service inspections, welding inspections, periodical facility inspections, inspections of safety regulation observance status (safety inspections) and on-the-spot inspections.

(1) Pre-operation inspection

A fabrication, storage or reprocessing establisher must have the construction and performance of their facilities inspected by the NRA according to NRA regulations. The facilities must pass the inspection before they can be put into use.

- Fabrication business (Article 16-3 of the Nuclear Reactor Regulation Law.)
- Storage business (Article 43-9 of the Nuclear Reactor Regulation Law)
- Reprocessing business (Article 46-2 of the Nuclear Reactor Regulation Law)

1) Acceptance criteria

In order to pass, a facility must satisfy the following requirements:

a The construction has been carried out in accordance with the design and methods approved as described in 2.

b They must conform to NRA regulations.

2) Inspection items

Pre-service inspections are conducted for inspection items specified separately for each facility in NRA regulations and are divided into items concerning construction and items concerning performance. Definitive items include:

・Fabrication business (Article 3-6 of the Rules for Fabrication of Nuclear Fuel Materials)

a Items relating to materials or components that must be air-or water-tight

When a nondestructive test, mechanical test, pressure test or leakage test is conducted or when deemed appropriate by the NRA.

b Items relating to the construction of the fabrication equipment itself, a nuclear fuel material storage facility or a radioactive waste disposal facility.

When the dimensions of major components of these facilities can be measured or when a nondestructive test, mechanical test, pressure test or leakage test is conducted.

c When the construction of a building, a radiation management facility or other fabrication facility is completed.

d Items relating to the performance of a fabrication facility

When the fabrication facility is operated on a trial basis at maximum capacity or when deemed appropriate by the NRA.

・Storage business (Article 8 of the Rules for Storage of Spent Fuel)

a Items concerning materials or components related to preventing the criticality of spent fuels, radiation shielding, confinement of spent fuels, etc. and heat removal of spent fuels.

When a chemical analysis, nondestructive test, mechanical test, pressure test or leakage test is conducted or when deemed appropriate by the NRA.

b Items relating to the construction of the spent fuel storage equipment itself, a facility receiving spent fuel or a radioactive waste disposal facility

When the dimensions of major components of these facilities can be measured or when a nondestructive test, mechanical test, pressure test or leakage test is conducted.

c Items relating to the construction of a building, an instrumentation and control system facility, a radiation management facility and other facilities that constitute spent fuel storage equipment

When these facilities are completed.

d Items relating to the performance of the spent fuel storage facility

When the spent fuel storage facility is completed or when deemed appropriated by the NRA.

・Reprocessing business (Article 6 of the Rule for Reprocessing of Spent Fuel)

a Items relating to radiation shielding materials or materials or components that must be air- or corrosion resistant

When a chemical analysis, nondestructive test, mechanical test, pressure test or leakage test is conducted or when deemed appropriate by the NRA.

b Items relating to the construction of a facility receiving or storing spent fuel, the reprocessing equipment itself, a product storage facility or a radioactive waste disposal facility

When the dimensions of major components of these facilities can be measured or when a nondestructive test, mechanical test, pressure test or leakage test is conducted.

c Items relating to the construction of a building, an instrumentation and control system facility, a radiation management facility and other reprocessing facilities

When these facilities are completed.

d Items relating to the performance of the reprocessing facility

When the reprocessing facility is operated on a trial basis at maximum capacity or when deemed appropriate by the NRA.

(2) Welding inspections

Fabrication, storage and reprocessing undertakers must obtain approval for the welding methods of their facility from, and have the welding inspected by the NRA according to the Nuclear Reactor Regulation Law. The facility must pass the inspection before it can be put into use. Facilities to be covered by welding inspections and the acceptance criteria are outlined below:

1) Welding inspection objects

・Fabrication business (Article 16-4 of the Nuclear Reactor Regulation Law.)

Vessels or pipes carrying liquid or gas containing plutonium or a plutonium compound, vessels or pipes carrying liquid or gas containing uranium or a uranium compound, containers that heat uranium hexafluoride and other fabrication facilities as specified in Article 3-8 of the Rules for Fabrication of Nuclear Fuel Materials (Fabrication Facilities that must Undergo a Welding Inspection).

・Storage business (Article 43-10 of the Nuclear Reactor Regulation Law)

Vessels and pipes specified in Article 11 of the Law on Storage of Spent Fuel (Spent Fuel Storage Facilities that must undergo a Welding Inspection).

・Reprocessing business (Article 46-2 of the Nuclear Reactor Regulation Law)

Spent fuel dissolvers, vessels and pipes specified in Article 7-2 of the Rule for Reprocessing of Spent Fuel (Reprocessing Facilities that must Undergo a Welding Inspection)

2) Welding inspection acceptance criteria

In order to pass, welding must satisfy the following requirements:

a The welding must have been carried out in accordance with the method approved by the NRA.

b The welding must conform to the technical standards stipulated in NRA regulations.

(3) Periodical facility inspection

These facilities must undergo periodical performance inspections conducted annually by the NRA as stipulated in NRA regulations (periodical facility inspections stipulated by the NRA and in case of the storage business, less frequently than once a year).

Periodical facility inspections are conducted to verify whether these facilities conform to the technical standards stipulated in NRA regulations.

・Fabrication business (Article 16-5 of the Nuclear Reactor Regulation Law.)

・Storage business (Article 43-11 of the Nuclear Reactor Regulation Law)

・Reprocessing business (Article 46-2-2 of the Nuclear Reactor Regulation Law)

(4) Inspection of safety regulation observance status

See XVII-1-5 below for the approval of safety regulations.

1) Safety inspection

Refining, fabrication, storage and reprocessing licensees must undergo inspections conducted periodically by the NRA to verify safety regulation observance status (hereinafter referred to as "safety inspections").

・Refining business (Article 12-5 of the Nuclear Reactor Regulation Law)

Article 7-2 of the Law on Refining of Nuclear Source Materials and Nuclear Fuel Material (inspection of safety regulation observance status)

・Fabrication business (Article 22-5 of the Nuclear Reactor Regulation Law)

Article 8-2 of the Rules for Fabrication of Nuclear Fuel Materials (Inspection of safety regulation observance status)

・Storage business (Article 43-20-5 of the Nuclear Reactor Regulation Law)

Article 38 of the Rules for Storage of Spent Fuel (Inspection of safety regulation observance status)

・Reprocessing business (Article 50-5 of the Nuclear Reactor Regulation Law)

Article 17-2 of the Rule for Reprocessing of Spent Fuel (Inspection of safety regulation observance status)

a Purpose

A safety inspection is intended to allow operators of these facilities to conduct their respective businesses in an appropriate manner by verifying compliance with safety regulations concerning operational management.

b Inspection timing

Safety inspections are to be conducted by the NRA and inspectors stationed at nuclear regulation offices every quarter for each facility according to the provisions in NRA regulations.

c Safety inspection method

A safety inspection is to be conducted by combining the following items appropriately according to NRA regulations.

- On-the-spot inspections of offices and plants
- Inspections of accounts, documents, equipment, components, and other objects
- Asking workers and other parties concerned questions
- Submission of samples of nuclear source materials, nuclear fuel material, materials contaminated with nuclear fuel material or other materials (minimum amount required for an inspection).

2) Periodical evaluation of facilities

A fabrication, reprocessing, and storage establisher must periodically evaluate the facility.

a Article 7-8-2 (Periodical Evaluation of the Safety of Fabrication Facilities) and Article 8-18 (Safety Regulations) of the Rules for Fabrication of Nuclear Fuel Materials

b Articles 16-2 (Periodical Evaluation of the Safety of Reprocessing Facilities) and 17-22 (Safety Regulations) of the Rule for Reprocessing of Spent Fuel Business

c The Act on Storage of Spent Fuel (Articles 35-2 (Periodical Evaluation of Spent Fuel Storage Facility) and 37-16 (Safety Inspection)

During this evaluation, the facility operator must:

a evaluate the status of safety activity implementation for the facility and

b evaluate how the latest technical expertise has been reflected in safety activities at the facility.

Undertakers are also required to adopt the following measures within 20 years after the commencement of their businesses.

a Technically evaluate age deterioration of the facility.

b Prepare a 10-year plan on measures that must be adopted to ensure the safety of the fabrication facility based on the above technical evaluation.

c Evaluations and plans in the previous paragraph must be re-evaluated at intervals not exceeding a decade.

Figure XVII-1-3 Procedures to be Followed for Nuclear Fuel Facilities According to the Nuclear Reactor Regulation Law

	Refining facility	Fabrication facility	Storage facility	Reprocessing facility
Construction phase	Application for a business license	Application for a business license	Application for a business license	Application for a business license
	Safety examination by the Committee on Nuclear Regulatory Activities	Safety examination by the Committee on Nuclear Regulatory Activities	Safety examination by the Committee on Nuclear Regulatory Activities	Safety examination by the Committee on Nuclear Regulatory Activities
	Designated as a licensed business	Approval of business	Approval of business	Designated as a licensed business
		Approval of design and construction methods	Approval of design and construction methods	Approval of design and construction methods
		Approval of welding methods	Approval of welding methods	Approval of welding methods
		Pre-operation inspection	Pre-operation inspection	Pre-operation inspection
		Welding inspection	Welding inspection	Welding inspection
	Approval of operational safety program	Approval of operational safety program	Approval of operational safety program	Approval of operational safety program
		Notification of assignment of nuclear fuel chief technician	Notification of assignment of nuclear fuel chief technician	Notification of assignment of nuclear fuel chief technician
	Approval of nuclear material protection rules	Approval of nuclear material protection rules	Approval of nuclear material protection rules	Approval of nuclear material protection rules
	Notification of assignment of nuclear material protection manager	Notification of assignment of nuclear material protection manager	Notification of assignment of nuclear material protection manager	Notification of assignment of nuclear material protection manager
Operational phase	Notification of start of business	Notification of start of business	Notification of start of business	Notification of start of business
				Notification of operational plan
		Periodical facility inspection	Periodical facility inspection	Periodical facility inspection
	Keeping of records	Keeping of records	Keeping of records	Keeping of records
		Taking of measures necessary to ensure the safety of facilities	Taking of measures necessary to ensure the safety of facilities	Taking of measures necessary to ensure the safety of facilities
	Report of the status of radiation management	Report of the status of radiation management	Report of the status of radiation management	Report of the status of radiation management
	On-the-spot inspection	On-the-spot inspection	On-the-spot inspection	On-the-spot inspection
	Safety inspection	Safety inspection	Safety inspection	Safety inspection
	Nuclear material protection inspection	Nuclear material protection inspection	Nuclear material protection inspection	Nuclear material protection inspection
		Periodical evaluation of facilitiess		Periodical evaluation of facilities

	Refining facility	Fabrication facility	Storage facility	Reprocessing facility
Decommissioning phase	Approval of decommissioning plan Keeping of records Report of the status of radiation management On-the-spot inspection Safety inspection Confirmation of completion of decommissioning measures Invalidation of license	Approval of decommissioning plan Periodical facility inspection (If the facility to be decommissioned contains nuclear fuel materials) Keeping of records Taking of measures necessary to ensure the safety of facilities Report of the status of radiation management On-the-spot inspection Safety inspection Confirmation of completion of decommissioning measures Invalidation of license	Approval of decommissioning plan Periodical facility inspection (If required by regulations of the Nuclear Regulation Authority) Keeping of records Taking of measures necessary to ensure the safety of facilities Report of the status of radiation management On-the-spot inspection Safety inspection Confirmation of completion of decommissioning measures Invalidation of license	Approval of decommissioning plan Periodical facility inspection (If required by regulations of the Nuclear Regulation Authority) Keeping of records Taking of measures necessary to ensure the safety of facilities Report of the status of radiation management On-the-spot inspection Safety inspection Confirmation of completion of decommissioning measures Invalidation of license

XVII-1-4 Safety Regulations of the Waste Disposal Business

Safety regulations of waste disposal facilities (waste burial facilities and waste management facilities) are implemented according to the Nuclear Reactor Regulation Law. The main flow of the safety regulations is shown in Figure XVII-1-4.

1. Safety Regulations of the Waste Disposal Business

(1) Approval of business

Those who plan to do waste disposal business must obtain approval for the business from NRA under Article 51-2 of NRA regulations.

Upon receiving an application for permission, NRA conducts a safety examination according to the approval requirements stipulated in Article 51-3 of the Nuclear Reactor Regulation Law. The NRA will give permission to the business when the NRA recognizes the permission standard is conformed.

The criteria for permission are as follows (Article 51-3 of the Nuclear Reactor Regulation Law):

1) The applicant has technical competence and a basic knowledge about accounting required to do the business properly.

2) The location, structure and equipment of the waste disposal facility do not present obstacles to the prevention of disasters that may be caused by nuclear fuel material or materials contaminated with nuclear fuel material.

(2) Inspections relating to waste burial facilities

1) Verification relating to waste burial

Waste burial undertakers must have the NRA verify that nuclear fuel material or materials contaminated with nuclear fuel material that are to be buried in their facilities, as well as measures to be taken for the safe burial of these materials conform to the technical standards (see Note 1) stipulated in ordinances from NRA, according to Article 51-6 of the Nuclear Reactor Regulation Law

(Note 1) Articles 6 and 8 of the Rules for Burial of Nuclear Fuel Materials or Materials Contaminated with Nuclear Fuel Materials

2) Inspection of the safety regulation observance status

See XVII-1-5 below for the approval of safety regulations.

An inspection of the observational status of safety regulations (safety inspections) is an inspection that NRA conducts and requires establishers to undergo according to Paragraph 5, Article 51-18 of the Nuclear Reactor Regulation Law.

a Purpose

A safety inspection is intended to maintain the proper operation of nuclear power plant facilities, including periodical evaluations of facilities, by requiring establishers to periodically check the observance status of safety regulations regarding operation management, etc.

b Inspection timing

Safety inspections are to be conducted by the NRA and inspectors stationed at nuclear safety inspection offices every quarter for each facility according to the provisions in NRA regulations.

c Safety inspection method

A safety inspection is to be conducted by combining the following items appropriately according to NRA regulations.

- On-the-spot inspections of offices and plants
- Inspections of accounts, documents, equipment, components, and other objects
- Asking workers and other parties concerned questions
- Submission of nuclear source materials, nuclear fuel material, materials contaminated with nuclear fuel material or other materials (minimum amount required for an inspection).

2. Safety Regulations of a Waste Management Business

(1) Approval of business

Those intending to engage in a waste disposal business must obtain approval for the same from the NRA under Article 51-2 of the Nuclear Reactor Regulation Act.

Upon receiving an application for permission of business, the NRA conducts a safety examination according to the approval requirements stipulated in Article 51-3 of the Nuclear Reactor Regulation Law. The NRA will authorize the business when it deems the permission standard as met.

The criteria for permission are as follows (Article 51-3 of the Nuclear Reactor Regulation Law):

1) The applicant has technical competence and a basic knowledge about accounting required to do the business properly.
2) The location, structure and equipment of the waste management facility do not present obstacles to the prevention of disasters that may be caused by nuclear fuel material or materials contaminated with nuclear fuel material.

(2) Approval of design and construction methods

Waste management undertakers must obtain approval for the design and construction methods related to the facility from the NRA before starting to operate a designated waste management facility in accordance with NRA regulations.

The criteria for approval are as follows: (Article 51-7-3 of the Nuclear Reactor Regulation Law):

- The design and construction methods must conform to what was approved by the NRA.
- They must conform to the technical standards stipulated in NRA regulations.

(3) Inspections of waste management facilities

Inspections are important in ensuring the safety of facilities and the Nuclear Reactor Regulation Law contains provisions on pre-service inspections, welding inspections, periodical facility inspections, inspections of safety regulation observance status (safety inspections) and on-the-spot inspections.

1) Pre-operation inspection

Waste management undertakers must have the construction and performance of their designated waste management facilities inspected by NRA according to Article 51-8 of the Nuclear Reactor Regulation Law. The facilities must pass the inspection before they can be put into use.

The passing criteria are as follows: (Paragraph 2, Article 51-8 of the Nuclear Reactor Regulation Law):

- The construction has been carried out in accordance with the design and methods approved by the NRA.
- The performance must conform to the technical standards stipulated in NRA regulations.

2) Approval of welding methods and welding inspections

Waste management undertakers must obtain approval from the NRA for the welding methods of a tank of liquid nuclear fuel material or liquid materials contaminated with nuclear fuel material and other special waste management facilities, according to Article 51-9 of the Nuclear Reactor Regulation Law. The welding of such special waste management facilities must undergo an inspection by the NRA and they must pass before they can be put into use

The passing criteria are as follows: (Article 51-9 of the Nuclear Reactor Regulation Law):

- The welding must have been carried out in accordance with the method approved by the NRA.
- The welding must conform to technical standards stipulated in NRA regulations.

3) Periodical facility inspection

Waste management undertakers must have the performance of special waste management facilities, or those specified by NRA regulations such as a waste receiving facility, waste management equipment, an instrumentation and control system facility and a radiation management facility, inspected by the NRA once a year according to Article 51-10 of the Nuclear Reactor Regulation Law.

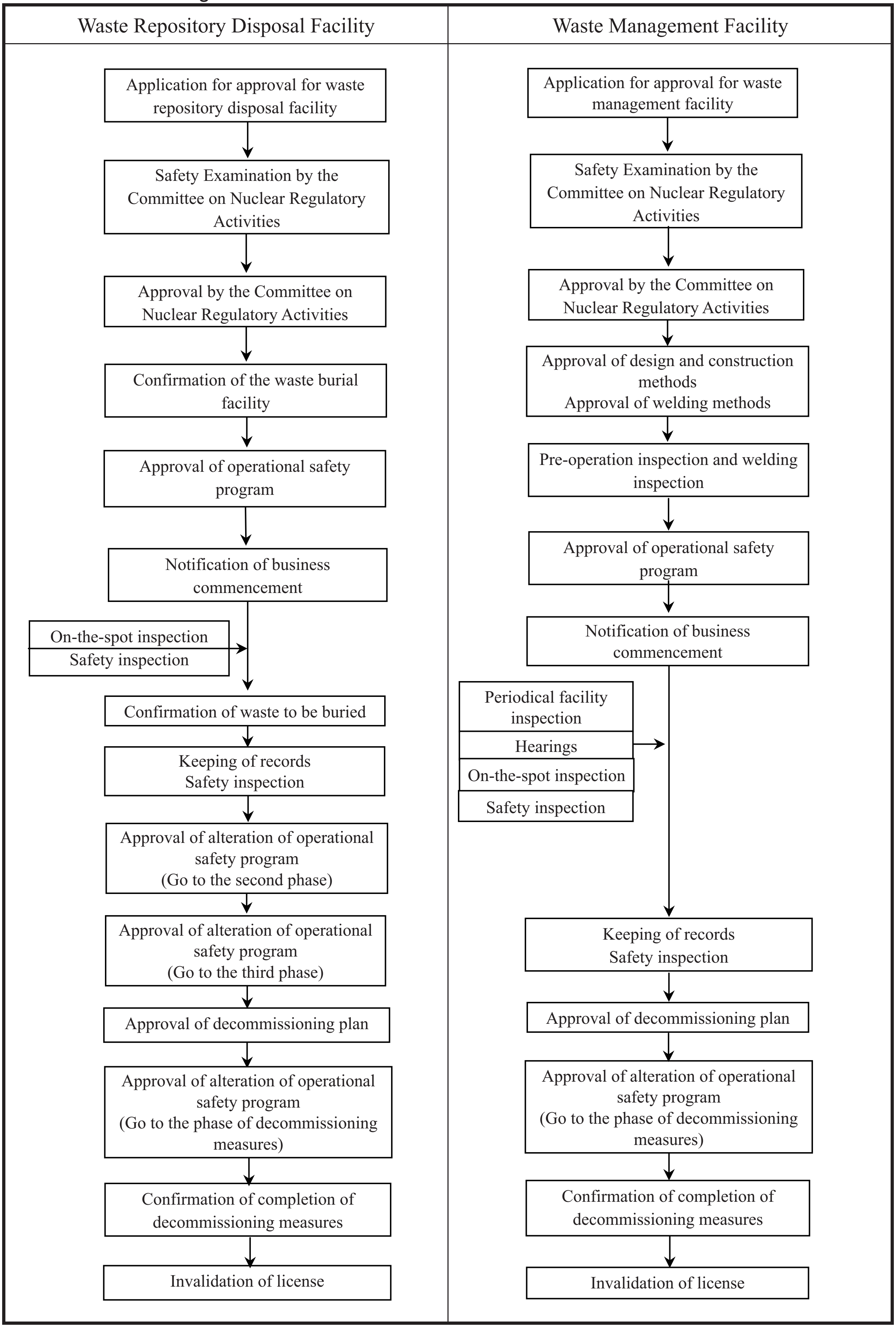
Periodical facility inspections are conducted to verify whether these facilities conform to the technical standards stipulated in NRA regulations.

4) Approval and the observational status of safety regulations

See XVII-1-5 below for the approval of safety regulations.

Inspections of safety regulation observance status (safety inspections) are conducted in the same way as for waste burial undertakers. Please refer to (2)-2) in the previous section.

Figure XVII-1-4 Procedures to be Followed for Waste Disposal Facilities According to the Nuclear Reactor Regulation Law



XVII-1-5 Operational Management and Supervision

1. Safety Programs

Safety measures for nuclear power reactor facilities in Japan consist not only of technical standards, safety examinations and inspections, but also of operational safety program instituted by nuclear power reactor facility establishers upon obtaining approval from the Nuclear Regulation Authority (NRA) under the Nuclear Reactor Regulation Act.

Items required for the operational safety programs are determined by the following rules.

(1) Refining activity (Article 12 of the Nuclear Reactor Regulation Act)
Article 7 of the Rules for Refining of Nuclear Source Materials and Nuclear Fuel Material (Operational Safety Programs)

(2) Fabrication and enrichment activity (Article 22 of the Nuclear Reactor Regulation Act)
Article 8 of the Rules for Fabrication and enrichment activity of Nuclear Fuel Materials (Operational Safety Programs)

(3) Nuclear power reactor facility establisher (Article 43-3-24 of the Nuclear Reactor Regulation Act)
Article 92 of the Rules for Commercial Nuclear Power Reactors concerning the Installation, Operation, etc. (Operational Safety Programs)

(4) Storage activity (Article 43-20 of the Nuclear Reactor Regulation Act)
Article 37 of the rules for Storage activity of Spent Fuel (Operational Safety Programs)

(5) Reprocessing activity (Article 50 of the Nuclear Reactor Regulation Act)
Article 17 of the Rule for Reprocessing activity of Spent Fuel (Operational Safety Programs)

(6) Disposal activity (Article 51-18 of the Nuclear Reactor Regulation Act)
Articles 63 of the Rules for Category 1 Waste Disposal activity of Nuclear Fuel Materials or Materials Contaminated with Nuclear Fuel Materials (Operational Safety Programs)
Articles 20 of the Rules for Category 2 Waste Disposal activity of Nuclear Fuel Materials or Materials Contaminated with Nuclear Fuel Materials (Operational Safety Programs)
Articles 34 of the Rules for Waste Disposal management activity of Nuclear Fuel Materials or Materials Contaminated with Nuclear Fuel Materials (Operational Safety Programs)

Operational Safety programs for nuclear power reactor facilities are prescribed by the following items.

1. Matters relating to the system for compliance with relevant laws and operational safety program (including the involvement of top management).
2. Matters relating to the system for safety culture development (including the involvement of top management).
3. Matters relating to the quality assurance of nuclear power reactor facilities (including the method of root cause analysis, the system to perform its analysis, the positioning of operation manuals, etc. on the operational safety program and periodic assessment of nuclear power reactor facilities).
4. Matters relating to the duties and organization of those who operate, control and manage nuclear power reactor facilities.
5. Matters relating to the scope of duties of the chief engineers of a nuclear power reactor and their details, authorities required for them to supervise the operational safety and their positions in the organization.
6. Matters relating to the scope of duties of the chief electric engineers and their details, authorities required for them to supervise operational safety and their position in the organization.
7. Matters relating to the scope of duties of the boiler and turbine chief engineers and their details, authorities required for them to supervise operational safety and their position in the organization.
8. Matters relating to operational safety education for those who operate, control and manage

nuclear power reactor facilities including followings.

a. Matters relating to the implementation policies of operational safety education (including the preparation of implementation plans.)

b. Matters relating to details about operational safety education including the followings.

(1) Matters relating to compliance with relevant laws and safety regulations.

(2) Matters relating to the structure, performance, and operation of nuclear power reactor facilities.

(3) Matters relating to radiation control.

(4) Matters relating to the handling of nuclear fuel material and materials contaminated with nuclear fuel material.

(5) Matters relating to measures to be taken in case of emergency.

c. Other necessary items related to operational safety education concerning nuclear power reactor facilities.

9. Matters relating to the operations of nuclear power reactor facilities.
10. Matters relating to the operating period of nuclear power reactor facilities.
11. Matters relating to safety review and assessment of the operation of nuclear power reactor facilities.
12. Matters relating to the institution of controlled area, access controlled area and environmental monitoring areas and restrictions on access to these areas.
13. Matters relating to ventilation monitoring equipment, discharge monitoring equipment.
14. Matters relating to dosages, dose equivalents, concentration of radioactive materials, monitoring of the density of radioactive materials on the surface of substances contaminated with radioactive materials, and decontamination.
15. Matters relating to the management of radiation measuring device.
16. Matters relating to tours and inspections of nuclear power reactor facilities and procedures involved with them.
17. Matters relating to receipt and payment, transportation, storage and other handling procedures for nuclear fuel material.
18. Matters relating to the disposal of radioactive waste.
19. Matters relating to measures to be taken in case of emergency.
20. Matters relating to the system adjustment for maintenance activities for nuclear power reactor facilities in the event of fire.
21. Matters relating to the system adjustment for maintenance activities for nuclear power reactor facilities in the event of internal overflow.
22. Matters relating to the system adjustment for maintenance activities for nuclear power reactor facilities in the event of major accident.
23. Matters relating to the system adjustment for maintenance activities for nuclear power reactor facilities in the event of large-scale damage.
24. Matters relating to proper records and reports of safety regulation activities for nuclear power reactor facilities (including the compliance with the operational safety program).
25. Matters relating to the maintenance management of nuclear power reactor facilities.
26. Matters relating to the sharing of technical information on operational safety obtained from a establisher’s maintenance work with other nuclear power reactor establishers.
27. Matters relating to issuing the public announcements on nonconformities in the event.
28. Other necessary items related to operational safety of nuclear power reactor facilities.

In light of the lessons about safety measures learned from the critical accident in uranium processing plant in September 1999, the Nuclear Reactor Regulation Act was partially amended and safety management systems were reviewed in December 1999, in order to further enhance the safety of nuclear facilities. Specifically, the following measures were taken:

1) Introduction of a safety inspection system

The critical accident in the uranium processing plant occurred in September 1999 because the plant systematically ignored work procedures approved by laws and regulations. The Nuclear Reactor Regulation Law was accordingly amended in December 1999, and the duty of establishers of nuclear power reactor facilities to simply comply with their safety regulations that existed prior to the amendment was revised so that periodical inspections of compliance status must also now be conducted. This inspection is conducted every quarter and comprises an appropriate combination of a physical inspection, on-the-spot inspection, the questioning of concerned parties and a submission of samples.

2) Reviews of Operational Safety Programs

In the amendment to the Nuclear Reactor Regulation Act in December 1999, a stipulation that Operational Safety Programs should contain provisions on safety education was added and a safety inspection system to verify compliance with those programs was introduced. This has encouraged the drastic revision and enhancement of the details of these safety programs.

In particular, the amended act now requires establishers to include in their safety regulations, provisions that they establish a safety education plan and educate employees based on that plan, as well as confirming that employees of contractors also receive safety education.

Furthermore, the act also requires operators of commercial power reactors to include provisions on operational conditions. Specifically, and in reference to the technical specifications of the U.S. Nuclear Regulatory Commission (NRC), they are now required to clearly, and in detail, in accordance with (1) operational limit of normal conditions, (2) how frequently these conditions are to be checked, and (3) measures to be taken when these conditions are deviated from and the time required for action.

In August 2002, it was also revealed that Tokyo Electric Power Co., Inc. falsified reports on self-inspections of its nuclear power station. The Subcommittee on Nuclear Safety Regulation Legal Systems of the Nuclear Safety Committee of the Advisory Committee on Natural Resources and Energy, which was established to work on measures to prevent the reoccurrence of such false reports, then proposed specific preventative measures.

Under these circumstances, safety regulation of high quality nuclear power was enhanced from October 2003, and relevant laws were amended to require that nuclear facility operators include provisions on appropriate quality assurance systems and maintenance management activities in their operational safety program, and that the government conduct safety inspections to verify implementation status. Concerning the establishment of these quality assurance systems, the aim should be for nuclear facility operators to verify their own safety activities and to assume accountability for quality assurance in order to obtain the understanding of the public, and these safety activities should be intended to support appropriate safety management at different levels of functioning and significance so that the performance, functions and safety levels that nuclear power generation facilities possess can be maintained.

The technical standards on quality assurance are stipulated in Regulation for the organization Technical standards of quality control method and inspection for design and construction of commercial power reactor by nuclear power reactor establisher (NRA regulation No. 8)

2. Reactor Chief Engineers, Nuclear Fuel Chief Engineers, etc.

Nuclear power reactor facility establishers are required to appoint a chief engineer of reactor or a chief engineer of nuclear fuel from those who have passed the chief engineer examination of reactor conducted or a chief engineer examination of nuclear fuel by the NRA to their reactor facilities according to the Nuclear Reactor Regulation Act, depending on requirements of nuclear facilities. A chief engineer of reactor or a chief engineer of nuclear fuel is expected to supervise the safe control of the operations in nuclear reactor facility. These qualified persons are also expected to have broad knowledge and understanding of nuclear reactor facilities and be able to provide managers and workers with appropriate instructions.

The mandated engineer is as follows depending on the nuclear facility.

(1) Fabrication and enrichment facility : Chief engineer of Nuclear fuel (Article 22-2 of the Nuclear Reactor Regulation Act)
(2) Nuclear power reactor facility : Chief engineer of nuclear fuel (Article 43-3-26 of the Nuclear Reactor Regulation Act)
(3) Storage facility : Spent fuel chief engineer (Appointed from those with a nuclear fuel chief engineer qualification under Article 43-22 of the Nuclear Reactor Regulation Act)
(4) Reprocessing facility : Nuclear fuel chief engineer (Article 50-2 of the Nuclear Reactor Regulation Act)
(5) Disposal facility : Chief engineer of radioactive waste (Appointed from those with a certification for chief engineer of nuclear fuel under Article 51-20 of the Reactor Regulation Act or those with a qualification under other NRA regulations)

3. Others

(1) Safeguards

The Nuclear Reactor Regulation Act requires nuclear facilities to establish a nuclear material accountancy system to confirm that nuclear materials are not used for nuclear weapons or for other unknown purposes. Under the system, they are obliged to keep records of the amounts of nuclear material received from outside in exchange for payment as well as inventory levels in the facility, and to report to the government. The act also stipulates that national inspectors may visit nuclear facilities to check records kept and nuclear material used in the facility in order to verify that records reported to the government accurately reflect fluctuations in nuclear material, and confine them or instruct them to install monitoring instruments or to remove nuclear material as needed.

(2) Physical protection

There are regulations for physical protection in place to prevent the illegal transfer of nuclear materials and sabotage.

1) Nuclear power reactor facility establishers must take measures for physical protection depending on the material and amounts.
2) Nuclear power reactor facility establishers must establish physical protection rules and obtain approval for those rules from the NRA. They must undergo an inspection by the NRA once a year to check the compliance status with the physical protection rules.
3) Nuclear power reactor facility establishers must appoint a nuclear material protection manager who satisfies certain conditions for each site in order to manage duties related to physical protection integrally.

(3) Regulations on disposal of waste outside the facilities

When nuclear power reactor establishers dispose of radioactive waste outside their facilities, they must take measures necessary for safety under provisions by NRA, according to Article 58 of the Nuclear Reactor Regulation Act. (Note) Moreover, to dispose of imported radioactive waste at the disposal facility, they must have the NRA confirm that their safety measures conform to the provisions of NRA regulations, according to Article 58-2 of the Nuclear Reactor Regulation Law.

(Note) Article 2 of the Rules for Disposal of Nuclear Fuel Materials Outside Plants or Site stipulates that nuclear fuel materials should be disposed of in waste disposal facility so that radiation hazards can be prevented. It also stipulates standards for imported waste.

(4) Regulations on the transport of nuclear fuel materials from plants of sites

When reactor establishers transport nuclear fuel materials from their plants or sites, they are subject to the Nuclear Reactor Regulation Act for land transportation and to the Shipping Safety Law for sea transportation. For land transportation, they must take the necessary safety measures according to technical standards specified in NRA regulations (Order of the Ministry of Land, Infrastructure, Transport and Tourism for transportation methods) under Article 59 of the Nuclear Reactor Regulation Act. Specifically, what is transported (transportation containers and contents) and how they are transported (loading methods, load limits, etc.) must conform to the technical standards.

When they transport certain materials that government ordinances specify especially to be needed in order to prevent disaster and protection of a designated nuclear fuel materials, such as uranium fuel and other fissionable materials, spent fuel, and high-level radioactive waste, they must also have the NRA and the Minister of Land, Infrastructure and Transport confirm that what is transported and the transportation methods conform to the technical standards for each transportation under Paragraph 2 of the same article.

They can obtain approval for transportation containers in advance of transportation under Article 59-3 (approval of containers) and for container designs in advance of approval of containers.

For consistency, in cases involving both land and sea transportation, transportation containers and contents deemed to conform to relevant technical standards under the Nuclear Reactor Regulation Act are also deemed to conform to the Shipping Safety Law (Article 87-7 of the Rules for Shipping and Storage of Hazardous Materials).

There are other regulations on the transportation of nuclear fuel material, such as regulations on the notification of transportation routes (prefectural public safety commissions) (Article 59 of the Reactor Regulation Act).

The NRA holds jurisdiction over regulations on containers and contents to be transported as outlined in the following table:

	Item	Licensee or user subject to regulations	Competent government office	Ministerial order or NRA regulations
Land transport	Transported material	Nuclear power reactor facility establishers, fabricating licensees, reprocessing licensees, waste disposal licensees, etc.	Nuclear Regulation Authority	Rules for Transportation of Nuclear Fuel Materials from Plants or Sites
		Users, etc. (Laboratories, experimental reactors, etc.)		
	Transportation methods	All in case of Transportation by vehicle	Ministry of Land, Infrastructure, Transport and Tourism	Rules for Transportation of Nuclear Fuel Materials by Vehicle
Sea transport	Transported material	All Licensee or user	Ministry of Land, Infrastructure, Transport and Tourism	Rules for Shipping and Storage of Hazardous Materials under the Shipping Safety Law
	Transportation methods			

XVII-2 Overview of the Nuclear Regulation Office

1. Nuclear Regulation Office

In the wake of an accident at Three Mile Island (U.S.) Power Plant in March 1979, a senior specialist system for nuclear power plants was established. In light of the lessons learned from Japan's first critical accident in the uranium processing plant of JCO Co., Ltd. in September 1999, the Nuclear Reactor Regulation Act (Act for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors) was partially amended in December 1999 in order to provide substantial additional assurance for the safety of nuclear power stations (effective in July 2000). In April 2000, the senior specialist system for nuclear power plants was replaced by a nuclear safety inspector system.

In addition, in order to drastically strengthen measures to prevent nuclear disasters in Japan, the Act on Special Measures Concerning Nuclear Emergency Preparedness was enacted (effective in June 2000), and a system for Senior Specialist for Nuclear Emergency Preparedness was established under the Act.

In the reorganization of government ministries in January 2001, the Nuclear and Industrial Safety Agency was established in the Ministry of Economy, Trade and Industry. Nuclear safety administration related to the manufacture of fuel for power generation, reprocessing of spent fuel, disposal of radioactive waste and other stage of the nuclear fuel cycle or to power reactors in a research and development stage, which had been undertaken by the Science and Technology Agency, was unified entirely to the NISA.

Under these circumstances, nuclear safety inspectors and Senior Specialist for Nuclear Emergency Preparedness were stationed at nuclear safety inspector offices built in nuclear facilities in order to make strengthen assurance double sure on the safety regulations of nuclear facilities and nuclear emergency preparedness.

The Nuclear Regulation Authority (NRA) and the Secretariat of the NRA (S/NRA) were established as regulatory organizations in September 2012 in response to the accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co. The local organization started activities newly as the nuclear regulation office.

2. System of Nuclear Regulation Office

As of the end of March 2013, nuclear regulation offices are positioned in 22 nuclear facilities and a total of 128 nuclear safety inspectors and Senior Specialist for Nuclear Emergency Preparedness who have received the necessary training are stationed at these offices.

21 of the 124 nuclear safety inspectors supervise these nuclear regulation offices as chief nuclear safety inspectors. (Senior specialists for nuclear emergency preparedness supervise one office.) 20 directors also serve as nuclear safety inspectors, while the other 104 are exclusive Senior Specialist for Nuclear Emergency Preparedness.

38 of the 62 Senior Specialist for Nuclear Emergency Preparedness also serve as nuclear safety inspectors, and the other 24 are exclusive Senior Specialist for Nuclear Emergency Preparedness.

When a nuclear facility is in operation, one inspector from the nuclear regulation office is always on duty even on holidays on a rotation basis.

3. Roles of the Nuclear Regulation Office

(1) Roles of nuclear safety inspectors

1) Inspections of the compliance status of operational safety program and investigations of operational management status

- Operational safety inspections under the Nuclear Reactor Regulation Act (quarterly)
- Inquiries into operational management status and the verification of records
- Walkdowns of nuclear facilities
- Witnessing of periodical self-inspections by licensees

2) Response to accidents

- Upon receiving a report about an accident, inspectors immediately notify the NRA, survey the site, investigate the causes of the accident and verify countermeasures to prevent the reoccurrence of such accidents in collaboration with the NRA.

3) Instructions to licensees on operational management

(2) The Roles of Senior Specialist for Nuclear Emergency Preparedness

1) Roles during normal time

- Provision of instructions or advice on emergency preparedness plans to licensees and confirming the installation, maintenance and inspection status of emergency preparedness materials and equipment
- Provision of advice on regional emergency preparedness plans to local governments
- Maintenance of equipment in offsite centers
- Planning and implementation of nuclear disaster prevention drills
- Promotion of local resident understanding of nuclear emergency preparedness

2) Response to emergencies

- Keeping track of conditions at the disaster site
- Launch the offsite center
- Summarizing information on the response of nuclear licensees and related organizations
- Provision of explanations or advice on the situation to local governments

3) Measures following the disaster and etc.

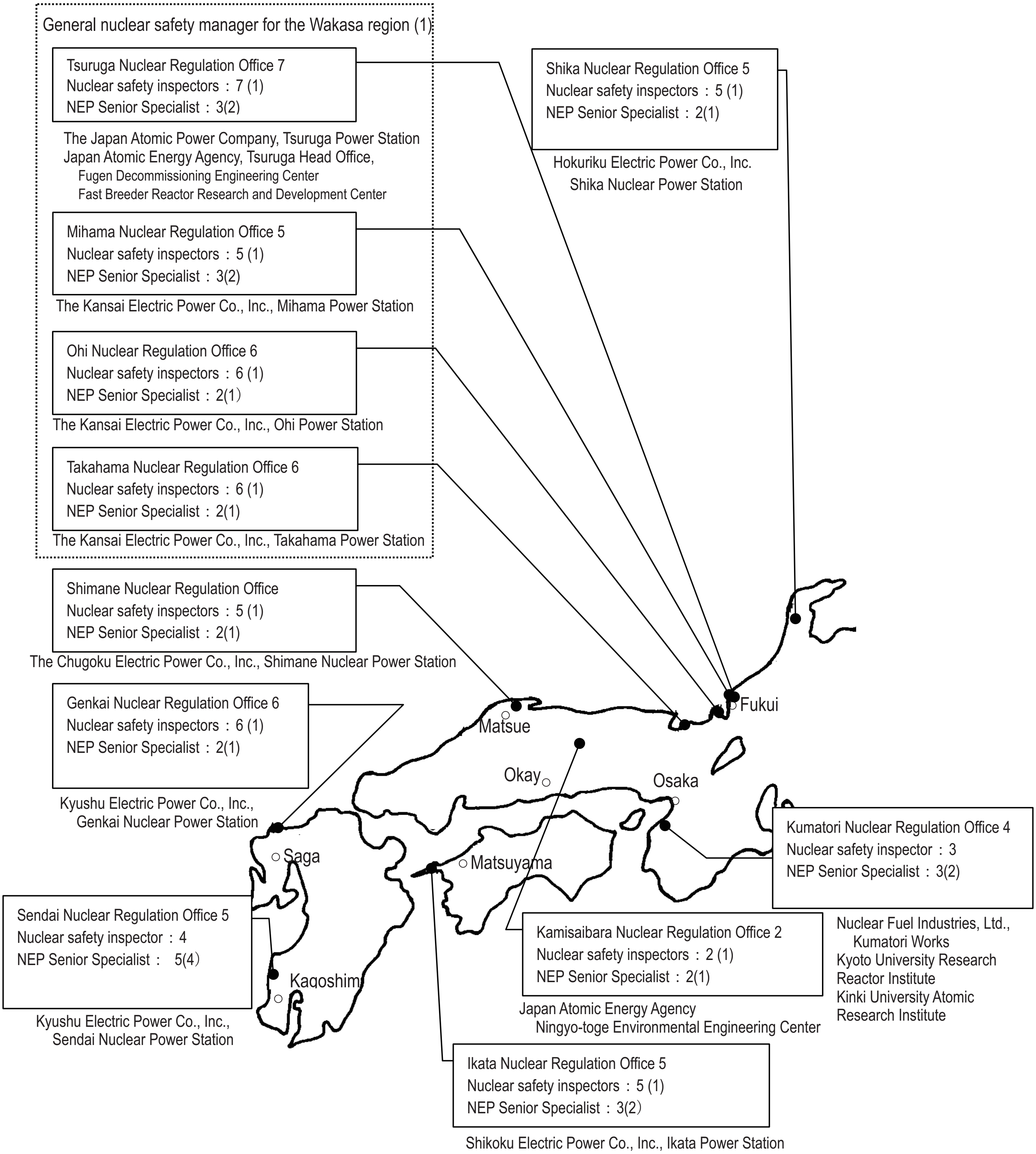
Table XVII-2-1 List of Nuclear Regulation Offices

Office name	Location	Nuclear facilities covered
Tomari Nuclear Regulation Office	Kyowa Town, Hokkaido	Hokkaido Electric Power Co., Inc., Tomari Power Station
Rokkasho Nuclear Regulation Office	Rokkasho Village, Aomori	Japan Nuclear Fuel Limited Enrichment and Disposal Office (Uranium Enrichment Plant), Reprocessing Plant (Reprocessing Facility) , Low-Level Radioactive Waste Disposal Center, High-level Radioactive Waste Storage Facility Nuclear Material Control Center' Rokkasho Safeguard Analysis Center
Higashidori Nuclear Regulation Office	Higashidori Village, Aomori	Tohoku Electric Power Co., Inc., Higashidori Nuclear Power Station Japan Atomic Energy Agency Aomori Research and Development Center, Mutsu Office (Sekine Facility) Recyclable-Fuel Storage Company Ltd. Recyclable Fuel Storage Center
Onagawa Nuclear Regulation Office	Ishinomaki city, Miyagi	Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station
Fukushima Daiichi Nuclear Regulation Office	Hirono-machi, Fukushima	Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station
Fukushima Daini Nuclear Regulation Office	Hirono-machi, Fukushima	Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station
Kashiwazaki-Kariwa Nuclear Regulation Office	Kashiwazaki city, Niigata	Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station
Tokai-Oarai Nuclear Regulation Office	Tokai Village, Ibaraki	The Japan Atomic Power Company Co., Ltd., Tokai No. 2 Power Station The Japan Atomic Power Company Co., Ltd., Tokai Power Station Mitsubishi Nuclear Fuel Co., Ltd. Nuclear Fuel Industries, Ltd., Tokai Works Japan Atomic Energy Agency Tokai Research and Development Center Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility Tokai Research and Development Center Nuclear Science Research Institute, Radioactive Waste Disposal Facility Tokai Research and Development Center, Oarai Research and Development Center, Radioactive Waste Management Facility Graduate school of Engineering, Tokyo University Nuclear Engineering (Reactor YAYOI) Graduate school of Engineering, Tokyo University Nuclear Engineering Tokai Safeguard's Center of the Nuclear Material Control Center Nippon Nuclear Fuel Development Co., Ltd. Nuclear Development Corporation

Office name	Location	Nuclear facilities covered
Kawasaki Nuclear Regulation Office	Kawasaki city, Kanagawa	Toshiba Corporation Nuclear Technology Research Institute Toshiba Corporation Nuclear Research Reactor Management Center Hitachi Ltd. Ozenji Center Goto Ikueikai, Tokyo city University, Atomic Research Laboratory
Yokosuka Nuclear Regulation Office	Yokosuka city, Kanagawa	Global Nuclear Fuel-Japan Co., Ltd. Rikkyo University Nuclear Research Institute
Hamaoka Nuclear Regulation Office	Omaezaki city, Shizuoka	Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station
Shika Nuclear Regulation Office	Shika Town, Ishikawa	Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station
Tsuruga Nuclear Regulation Office	Tsuruga city, Fukui	The The Japan Atomic Power Company, Tsuruga Power Station Japan Atomic Energy Agency, Tsuruga Head Office Fugen Decommissioning Engineering Center Fast Breeder Reactor Research and Development Center
Mihama Nuclear Regulation Office	Mihama Town, Fukui	The Kansai Electric Power Co., Inc., Mihama Power Station
Ohi Nuclear Regulation Office	Ohi Town, Fukui	The Kansai Electric Power Co., Inc., Ohi Power Station
Takahama Nuclear Regulation Office	Takahama Town, Fukui	The Kansai Electric Power Co., Inc., Takahama Power Station
Kumatori Nuclear Regulation Office	Kumatori Town, Osaka and / Higashi Osaka city, Osaka	Nuclear Fuel Industries, Ltd., Kumatori Works Kyoto University Research Reactor Institute Kinki University Atomic Energy Research Institute
Kamisaibara Nuclear Regulation Office	Kagamino Town, Okayama	Japan Atomic Energy Agency Ningyo-toge Environmental Engineering Center, Uranium Enrichment Demonstration Plant
Shimane Nuclear Regulation Office	Matsue city, Shimane	The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station
Ikata Nuclear Regulation Office	Ikata Town, Ehime	Shikoku Electric Power Co., Inc., Ikata Power Station
Genkai Nuclear Regulation Office	Karatsu city, Saga	Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station
Sendai Nuclear Regulation Office	Satsumasendai city, Kagoshima	Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station

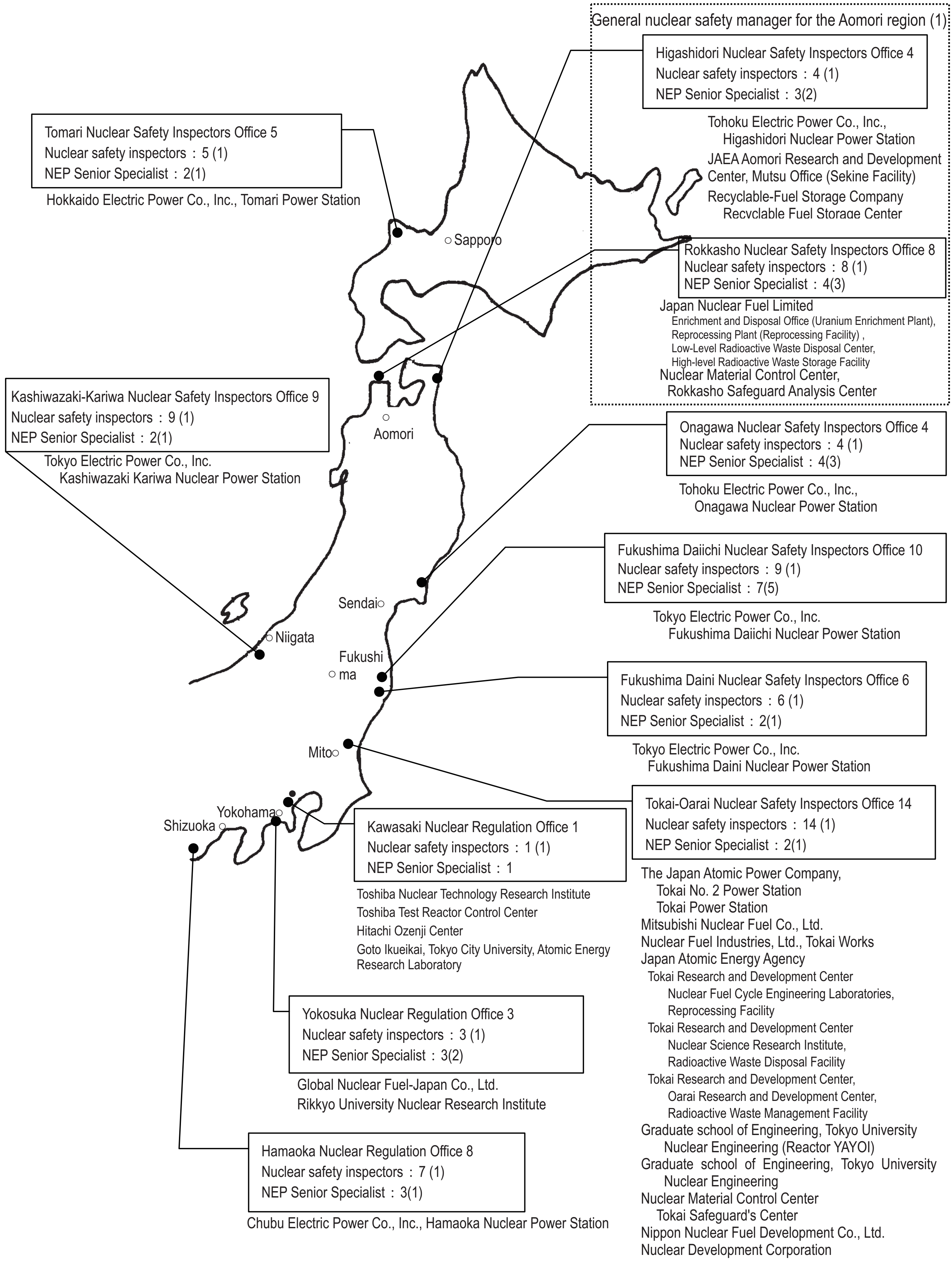
Figure XVII-2-1 Nuclear Safety Inspectors and Senior Specialist for Nuclear Emergency Preparedness at Nuclear Regulation Offices

Number of nuclear safety inspectors and Senior Specialist for Nuclear Emergency Preparedness : 128
Number of nuclear safety inspectors : 124 (21 chief nuclear safety inspectors and 20 Senior Specialist also serve as nuclear safety inspectors)
Number of Senior Specialist for Nuclear Emergency Preparedness : 62 (including 25 directors who also serve as nuclear safety inspector)
Number of Nuclear Regulation Offices : 21



Note: Figures in parentheses are the numbers of nuclear safety inspectors and Senior Specialist for Nuclear Emergency Preparedness who also serve as nuclear safety inspectors.

As of End of March 2013



XVII

XVII-3 Nuclear Emergency Preparedness

XVII-3-1 Overview of the Nuclear Emergency Preparedness System

The accidents at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. occurred in connection with the Tohoku District-off the Pacific Ocean Earthquake on March 11, 2011. Many problems of nuclear emergency preparedness were revealed, including in terms of preparation and implementation of conventional protective measures for residents. Lessons learned from the accidents included a lack of measures from residents' perspective, a lack of education/training, including measures against complex disasters and severe accidents, deficiencies in the emergency information provision system, insufficient advance preparations, including evacuation plans, materials and equipment, and unclear decision-making on measures, all of which must be reviewed.

Previously, the act on nuclear emergency preparedness was prepared including nuclear power stations according to the “Act on Special Measures Concerning Nuclear Emergency Preparedness” (hereinafter “ASMCNE,”) which was triggered by the criticality accident at the uranium fuel facility in Tokai village, Ibaraki prefecture on September 30, 1999. However, in light of the lessons learned from Fukushima Daiichi Nuclear Power Station, “ASMCNE” and other laws were reviewed to smoothly implement nuclear emergency measures.

The nuclear regulation system was also reviewed as the other important improvement. On September 19, 2012, the Nuclear Regulation Authority (NRA), which centrally develops and implements measures required to ensure security for the use of nuclear energy, and the Secretariat of NRA (S/NRA), its secretariat, were inaugurated. NRA provided “the Nuclear Emergency Response Guidelines” (hereinafter the Emergency Response Guidelines) on October 31, 2012, based on the revised “ASMCNE.” The purposes of the guideline include to minimize the radiation influence on neighboring nuclear facilities and ensure protective measures in the event of an emergency. To achieve these objectives, specialized and technical items are provided and scientific and objective judgments must be formed when the latest global knowledge is actively gained and a licensee of nuclear energy-related activity, national and local governments perform nuclear emergency measures, or when a related plan is developed in advance. (See Figure XVII-3-1 System of Acts Related to Nuclear Emergency Preparedness.)

XVII-3-2 Act on Special Measures Concerning Nuclear Emergency Preparedness

“The purpose of this Act is to strengthen nuclear disaster control measures, in cooperation with the “Act on Regulation of Nuclear Source Materials, Nuclear Fuel Materials and Reactors” (hereinafter referred to as the "Nuclear Reactor Regulation Act"), the Basic Act on Disaster Control Measures (hereinafter the “Basic Act on DCM”) and other Acts concerning nuclear disaster prevention, by providing special measures for the obligations, etc. of nuclear operators concerning nuclear disaster prevention, the issuance of a declaration of a nuclear emergency situation, and the establishment, etc. of nuclear emergency response headquarters, the implementation of emergency response measures and other matters relating to a nuclear disaster, taking into consideration the particularity of a nuclear disaster, thereby protecting the lives, bodies and properties of citizens from a nuclear disaster.” (Quoted from Article 1.)

“ASMCNE”, which covers not only nuclear power stations but also fabrication facilities, storage and other facilities, clarified the duties of nuclear licensees such as reporting when certain incidents occurred, and enhanced cooperation between the central government and local governments. The Act also stipulates that a disaster countermeasure headquarters be established in an emergency and provides a foundation of nuclear emergency preparedness.

Reference: Attachment 3 shows List of Abbreviations related to Nuclear Emergency Preparedness.

Based on lessons learned from Fukushima Daiichi Nuclear Power Station accidents, the following and others have been revised that "the national government has the duty to assume responsibility in the event of a large-scale natural disaster, Terrorism may also trigger nuclear disaster, to which full-scale measures should taken, the Nuclear Emergency Response Guidelines should be provided and improvements or other necessary measures ordered in response to a disaster prevention drill report from a licensee of nuclear energy-related activity, and the joint council for nuclear emergency response should survive after the Declaration of Cancel of Nuclear Emergency to cooperate with each other." (See Attachment 1, References 1 and 2.)

XVII-3-3 Emergency Response Guidelines

The "Emergency Response Guidelines" established based on "ASMCNE" are the replacement to "About Emergency Measures for Nuclear Facilities, etc.," an old guideline established before the occurrence of the Fukushima Daiichi Nuclear Power Station accidents. They reflect many lessons from the accidents as well as the latest global knowledge.

In comparison with the old guidelines, the "Emergency Response Guidelines" enable a decision-maker to decide to implement protective measures based on common understanding agreed by concerned parties in the preparatory phase according to the time axis of event progress in consideration of a long-lasting disaster and the distance axis where the area where protective measures are taken may be wide. In the initial response to the emergency situation, it is admitted to issue an evacuation order to neighbors of nuclear facilities before the release of radioactive materials according to the plant status reported from a license holder. After the release of radioactive materials is detected, it should be ensured that protective measures to minimize the impact of radiation on neighboring nuclear facilities are taken by implementing protective measures from short to long range according to the measured radiation dose. In addition, the national government shall prepare and oversee a system including an emergency monitoring center so that national and local governments and licensees of nuclear energy-related activity can conduct joint emergency monitoring. Stable iodine can be distributed in advance for preventive purposes.

In other words, the old regulatory guideline shows uncertain measures that the level of exposure should be estimated based on ERSS and SPEEDI and protection measures such as the evacuation zone and the administration of stable iodine should be discussed in the event of an accident. Based on the idea that measures should be gradually taken from a higher-risk neighborhood of the nuclear facility, the method was drastically reviewed and the risk of radiation exposure was surely reduced by improving advance planning and programs and implementing the measures determined.

(See Attachment 2)

XVII-3-4 Measures in Event of Emergency

If an emergency arises at a nuclear power plant, licensees must report it to national and local governments and strive to prevent damage from spreading in accordance with "ASMCNE." In addition, the licensees should notify the competent minister of certain incidents in phases before the emergency situation. The act also requires competent ministers who receive reports of an emergency to immediately inform the prime minister, who must then declare a state of nuclear emergency and establish a nuclear disaster countermeasure headquarters headed by the prime minister.

The "Emergency Response Guidelines" provide that the status of measures in the event of an emergency should be classified into preparatory, the initial response, the medium-term response, and the restoration phases, the actual actions of which are respectively reviewed. During the initial phase, where information is limited, protective measures should be immediately implemented. For this action, in the preparatory phase, the emergency action level (hereinafter “EAL”), the standard of which is the observable status of the plant, and the operation intervention level (hereinafter “OIL”), which determines the preventive measures to be implemented in comparison with emergency monitoring results, should be predetermined. The focused scope of the area where protective measures are applied should be also set. In setting the focused area, the distance from the facility should be used as a guideline depending on the types of nuclear facilities involved. A precautionary action zone (hereinafter “PAZ”) and urgent protective action planning zone (hereinafter “UPZ”) should also be established to determine the measures to be taken in advance. (See Figure XVII-3-2 Standard Framework for Implementation Criteria of Protective Measures)

Emergencies are classified into three categories which are alerts, site area emergencies and general emergencies. In the event of an accident, the licensees notify which emergency has occurred based on “EAL.” Based on predetermined roles, national and local governments then take preventive protective measures according to PAZ and UPZ evacuations as required before the release of radioactive materials commences. The NRA directs the emergency monitoring center in preparation for the release of radioactive materials. In the event of a release, it determines the necessary measures, comparing the results of emergency monitoring with “OIL.” (See Figure XVII-3-3 Example Implementation of Protective Measures in General Emergency) The national and local governments and licensees fulfill their predetermined roles.

Furthermore, the Act also requires that a joint council for nuclear disaster countermeasures be established in an appropriate emergency response facility (offsite center), which is supposed to cover certain nuclear power plants so that the government, local governments and licensees can gather to share information and devise emergency countermeasures. The national government is supposed to establish the Local Nuclear Emergency Response Headquarters in the offsite center and provide a video conference system. (See Figure XVII-3-4 Organization and Collaboration after the Declaration of a Nuclear Emergency Situation)

Figure XVII-3-1 System of Acts Related to Nuclear Emergency Preparedness

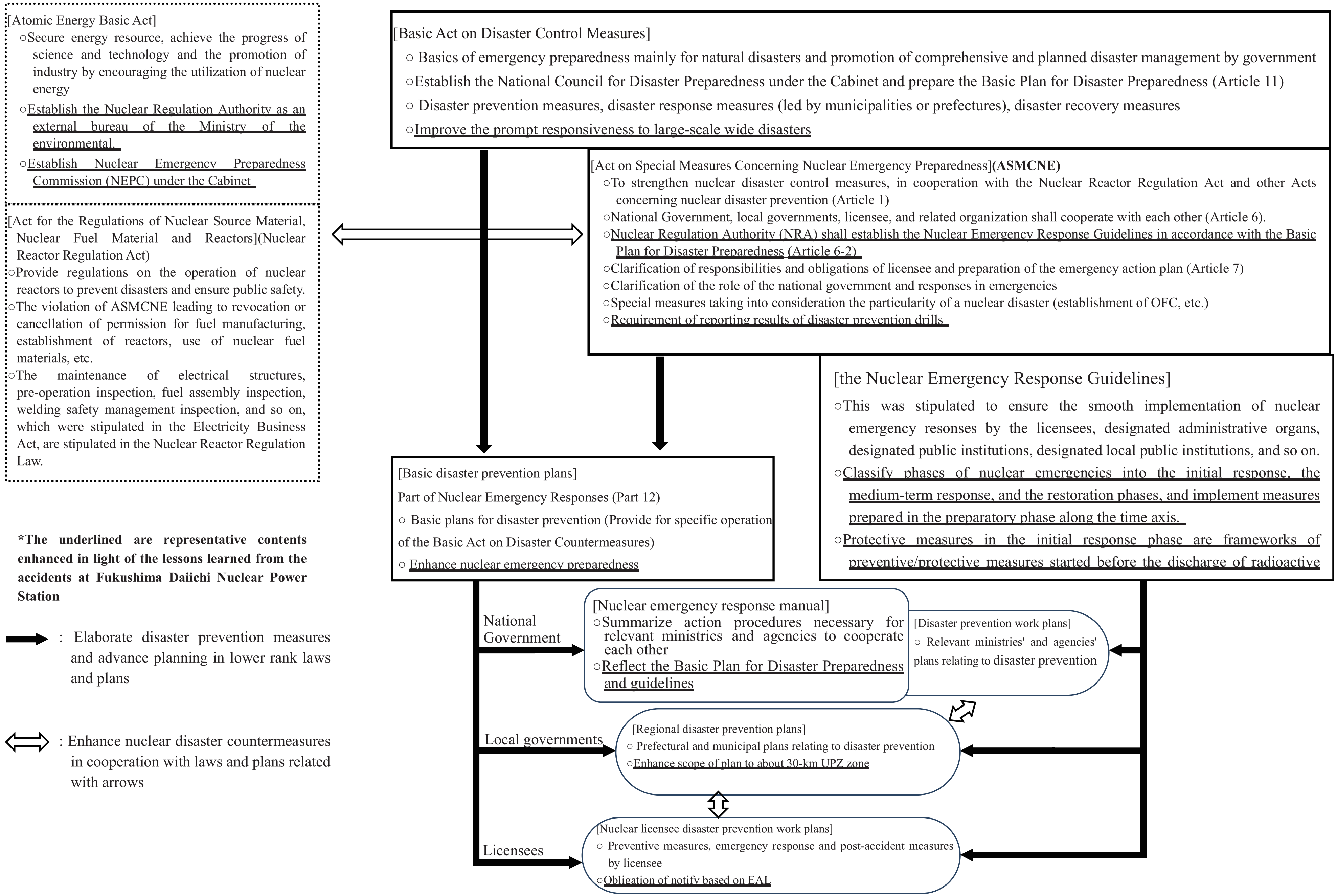


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Figure XVII-3-2 Standard Framework for Implementation Criteria of Protective Measures

Emergencies should be classified into the preparatory phase, the initial response, the medium-term response, and the restoration phases, and responses were developed in response to each phase.

1. During the preparatory phase, the standard required to implement protective measures for residents (the scope of evacuation, implementation standards, and so on) should be determined. Roles should be predetermined for licensees and national and local governments to fulfill as part of advance planning.
2. The framework in the initial response phase enables immediate implementation without any extra consultation in accordance with a predetermined standard to minimize the risk of radiation exposure. In the PAZ, protective measures including preventive evacuation should be implemented in accordance with EAL before the release of radioactive materials. In addition, after residents in PAZ have been evacuated, the evacuation zone should be gradually enlarged within the UPZ near the nuclear facility as and when the accident condition deteriorates, such as accidents involving several units at sites with multiple units.
3. The framework in the medium-term response phase enables proper management of the influence of radioactive materials or radiation, change/cancellation of protective measures implemented during the initial response phase, and a review of long-term protective measures. After fully understanding the actual measurement results of environmental radiation monitoring, measures should be taken based on OIL indicators. At the time, protective measures based on OIL should also be implemented based on monitoring beyond the zone determined as PAZ or UPZ.
4. During the restoration phase, based on long-term restoration measures for the disaster region developed in a transition to restoration, the framework shows residents attempt to return to socioeconomic activities.

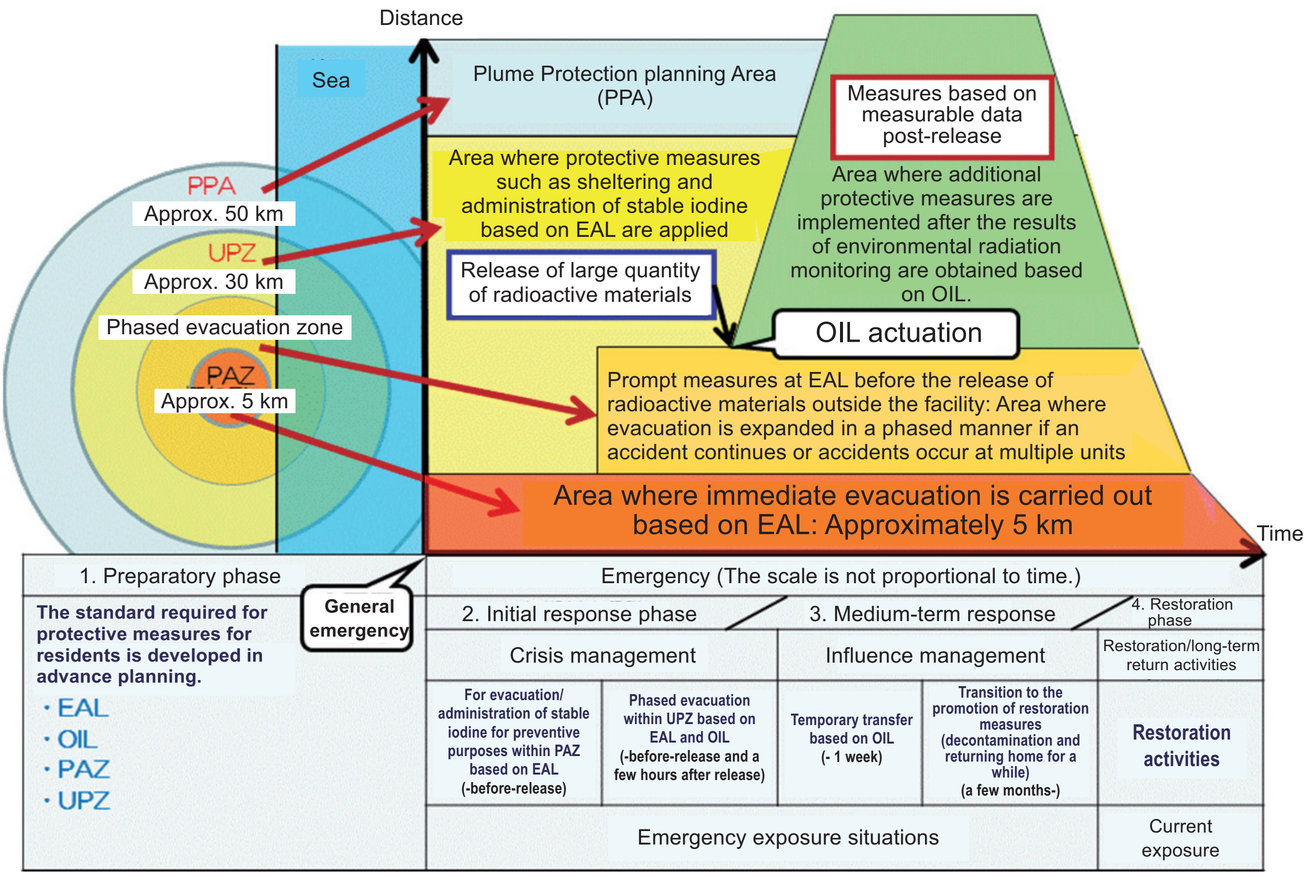


Figure XVII-3-3 Example Implementation of Protective Measures in General Emergency

From the initial to medium-term response phases, the licensees and national and local governments must respectively fulfill their roles to play based on the standards (the scope of evacuation, implementation standards, and so on) required to implement predetermined protective measures for residents. The example of the implementation flow according to the time axis is shown below.

1. Emergencies are classified into three categories, alerts, site area emergencies, and general emergencies according to the status of nuclear facilities. The national government confirms reports (EAL) from the licensees according to emergency classification and instructs the local governments on evacuations and the administration of stable iodine for preventive purposes, etc. The local governments implement protective measures for residents. In addition, after the evacuation of residents in PAZ, the evacuation zone should be enlarged in a phased manner within the UPZ near the nuclear facility according to the deterioration of accident condition, such as accidents involving several units at the site with multiple units.
2. The emergency monitoring starts according to the emergency classifications. Since the release of radioactive material is detected, the necessary measures are taken within a few hours in light of actual radiation monitoring results and the standard to implement protective measures (OIL) in compliance with directions from the national government. The purpose of the emergency monitoring is to provide a basis to decide the implementation of protection measures and evaluate the impact of radiation on residents and the environment. In compliance with OIL purposes, whether objects are fixed or mobile, (aircraft, monitoring cars, vessels, portable installations, etc.), measurements should be made promptly. If the OIL1 value may be measured in an area, protective measures should be taken at EAL before the release. In addition, if the emergency monitoring result shows a value exceeding OIL2 outside the evacuation area according to EAL, a temporary transfer should be carried out within one week. Decontamination should be promptly carried out in accordance with OIL4, the decontamination standard, and OIL6, which restricts ingestion of food and drink, as well as identifying the areas where radioactive materials are measured within a few days to determine which restrictions on the ingestion of food and drink should be made.

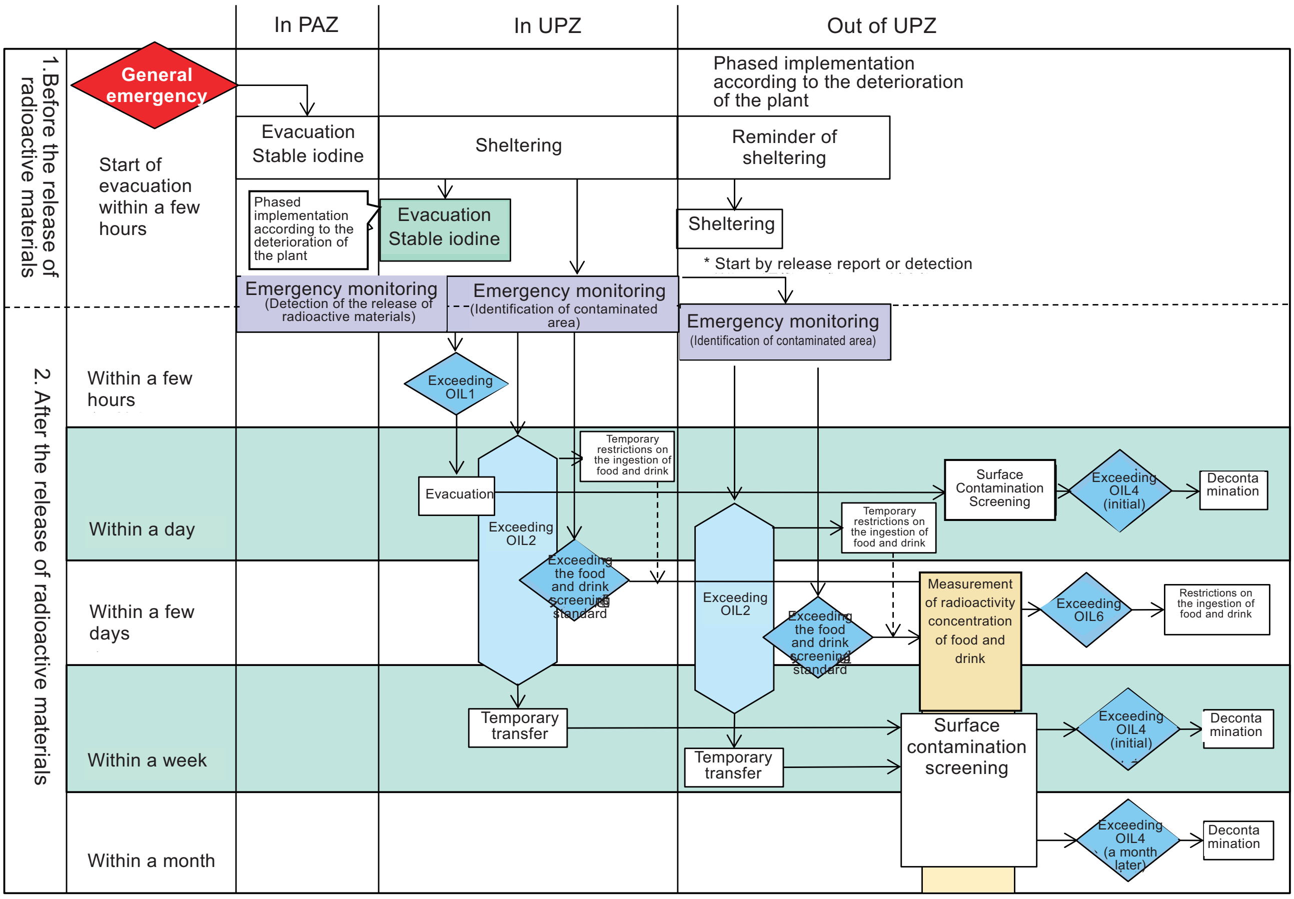
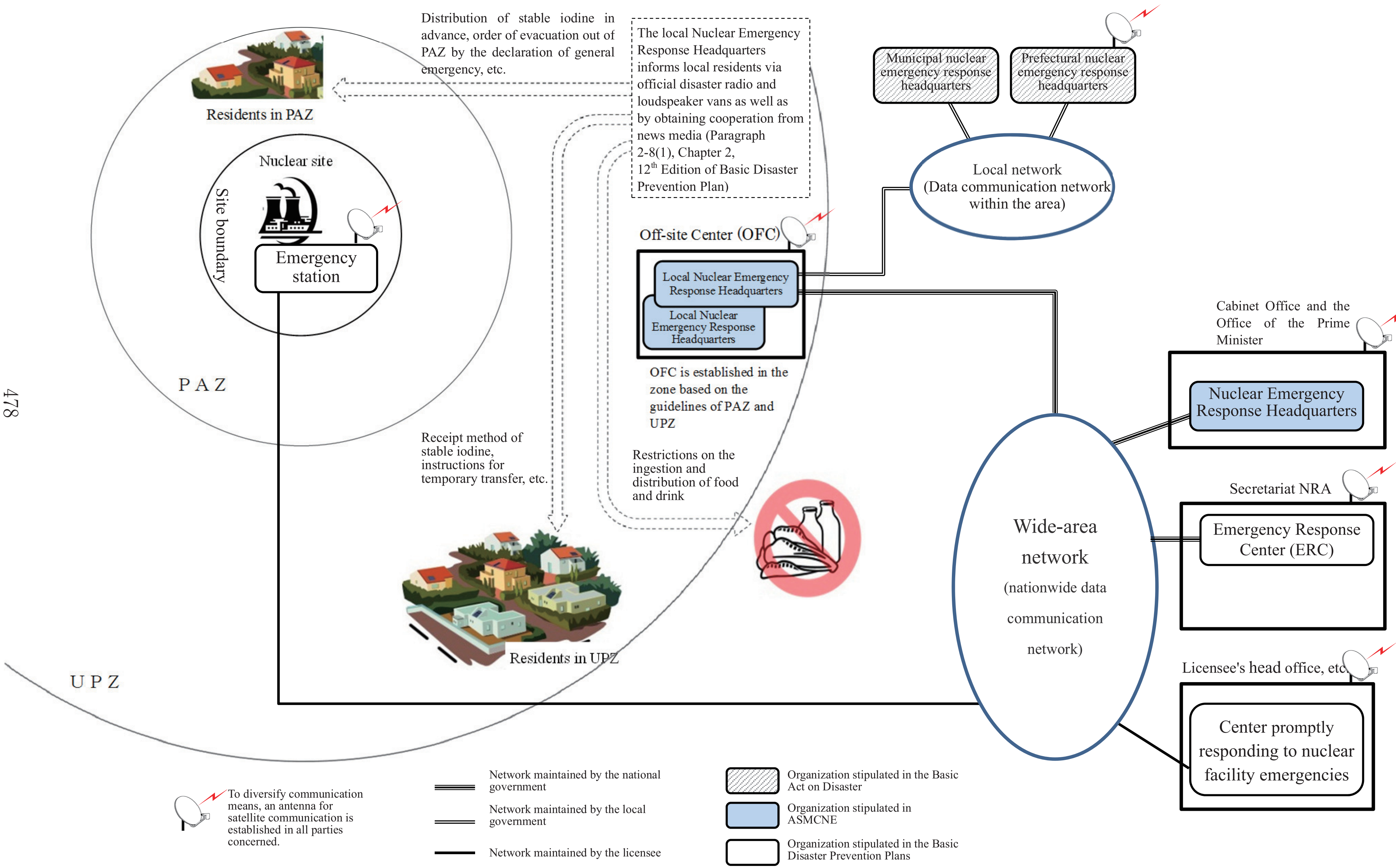


Figure XVII-3-4 Organization and Collaboration after Declaration of Nuclear Emergency Situation

(Based on laws and regulations/plans related to nuclear power)



(Attachment 1)

About ASMCNE (Overview)

This Act was amended in June 2012 in light of the lessons learned from accidents at the Tokyo Electric Power Co. (TEPCO) Fukushima Daiichi Nuclear Power Station in March 2011. The main amendments are the following 4 items.

(1) The national government shall have the duty to assume the occurrence of any complex disaster consisting of a large-scale natural disaster, terrorism, etc. involving a nuclear disaster and be responsible for taking full-scale measures to prevent the occurrence of a nuclear disaster.
(2) NRA stipulates the “Nuclear Emergency Response Guidelines” to facilitate the implementation of measures to prevent a nuclear emergency, emergency response measures, and measures for restoration from a nuclear emergency.
(3) The prime minister designates the Nuclear Emergency Response Operations Center, which will be a facility that serves as a center for emergency response measures and measures for restoration from a nuclear emergency.
(4) The licensees shall report on the performance results of disaster prevention drills to NRA and publicize the summary.

It was necessary to develop laws for nuclear disasters in light of lessons learned from a critical accident in a uranium processing plant of JCO Co., Ltd. in September 1999. This act was enacted as a special act of the “Basic Act on Disaster Countermeasures” in December 1999 and enforced on June 16, 2000.

The following 4 points are the original key components of this act at the time of its enactment:

1) Prompt initial response
- The Act requires licensees to report abnormal situations
- The Act requires that a nuclear disaster countermeasure headquarters headed by the prime minister be immediately established in a nuclear emergency, and that the Minister of Economy, Trade and Industry serve as the vice chief.

2) Systematic collaboration between the central and local governments
- The Act requires that an on-the-spot disaster countermeasure headquarters be established
- The Act requires that a joint council for nuclear disaster countermeasures be organized in an emergency response facility (off-site center) to enhance collaboration on countermeasures to be taken at the site between the central and local governments.
- The Act requires that nuclear disaster countermeasure drills be implemented at sites.

3) Strengthening of emergency communication and response systems
- Legally qualified Senior Specialist for Nuclear Emergency Preparedness are stationed at nuclear facilities.
- Off-site centers are designated by the Minister of Economy, Trade and Industry.
- Different types of response functions are promptly cast onto the site in a nuclear emergency

4) Clarification of nuclear licensee responsibility
- Nuclear licensees are required to prepare and report plans of disaster countermeasures
- Nuclear disaster prevention managers must be stationed at each plant

About the Off-site Center

By October 22, 2004, 20 emergency response facilities (off-site) had been designated as nuclear sites respectively.

When this act was revised, the prime minister designated the 22 off-site centers as facilities to serve as a center for emergency response measures in total 20 off-site centers shown above and 2 off-site centers designated by the Ministry of Education, Culture, Sports, Science and Technology. (See References 1 and 2.)

(Reference 1)

Nuclear Emergency Response Operation Center (Off-Site Center)

Prefecture	Name	Location	Covered by licensees
Hokkaido	Hokkaido Off-site Center	261-1, Miyaoka, Kyowa Town, Iwanai County, Hokkaido *The relocation to the site 10 km away from the power station in Kyowa Town is decided.	Hokkaido Electric Power Co., Inc., Tomari Power Station
Aomori	Rokkasho Off-site Center	1-67, Aza-Nozuki, Oaza-Obuchi, Rokkasho Village, Kamikita County, Aomori 1-67	Japan Nuclear Fuel Limited Enrichment and Disposal Office (Uranium Enrichment Plant), Reprocessing Plant (Reprocessing Facility) , Low-Level Radioactive Waste Disposal Center, High-level Radioactive Waste Storage Facility
			Nuclear Material Control Center' Rokkasho Safeguard Analysis Center
	Higasidori Off-site Center	Aza-Sawauchi, Oaza-Sunagomata, Higashidori Village, Shimokita County, Aomori 5-35	Tohoku-Electric Power Co., Inc., Higashidori Nuclear Power Station
			Japan Atomic Energy Agency Aomori Research and Development Center, Mutsu Office (Sekine Facility)
			Recyclable-Fuel Storage Company Ltd. Recyclable Fuel Storage Center
Miyagi	Miyagi Prefecture Disaster Prevention Center	12-1, Aza-Ise, Onagawa-hama, Onagawa Town, Oshika County, Miyagi *2 At present, the temporary off-site center is established in Miyagino Ward, Sendai City.	Tohoku Electric Power Co., Inc., Onagawa Nuclear Power Station
Fukushima	Fukushima Prefecture Nuclear Energy Off-site Center	476-3, Aza-Ono, Oaza-Shimonogami, Okuma Town, Futaba County, Fukushima 476-3 *2 At present, the temporary off-site center is established in Fukushima Municipal Hall	Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station
			Tokyo Electric Power Co., Inc., Fukushima Daini Nuclear Power Station
Niigata	Niigata Prefecture Kashiwazaki Kariwa Off-site Center	5-48, Sanwa-cho, Kashiwazaki City, Niigata	Tokyo Electric Power Co., Inc., Kashiwazaki-Kariwa Nuclear Power Station
Ibaraki	Ibaraki Prefecture Nuclear Energy Off-site Center	11601-12, Nishijusanbugyo, Hitachinaka City, Ibaraki 11601-12	The Japan Atomic Power Company Co., Ltd., Tokai Power Station
			The Japan Atomic Power Company Co., Ltd., Tokai No. 2 Power Station
			Japan Atomic Energy Agency Tokai Research and Development Center Nuclear Fuel Cycle Engineering Laboratories, Reprocessing Facility Tokai Research and Development Center Nuclear Science Research Institute, Radioactive Waste Disposal Facility Tokai Research and Development Center, Oarai Research and Development Center, Radioactive Waste Management Facility
			Mitsubishi Nuclear Fuel Co., Ltd.
			Nuclear Development Corporation
			Graduate school of Engineering, Tokyo University Nuclear Engineering (Reactor YAYOI) Graduate school of Engineering, Tokyo University Nuclear Engineering
			Tokai Safeguard's Center of the Nuclear Material Control Center
			Nuclear Fuel Industries, Ltd., Tokai Works
			Nippon Nuclear Fuel Development Co., Ltd..

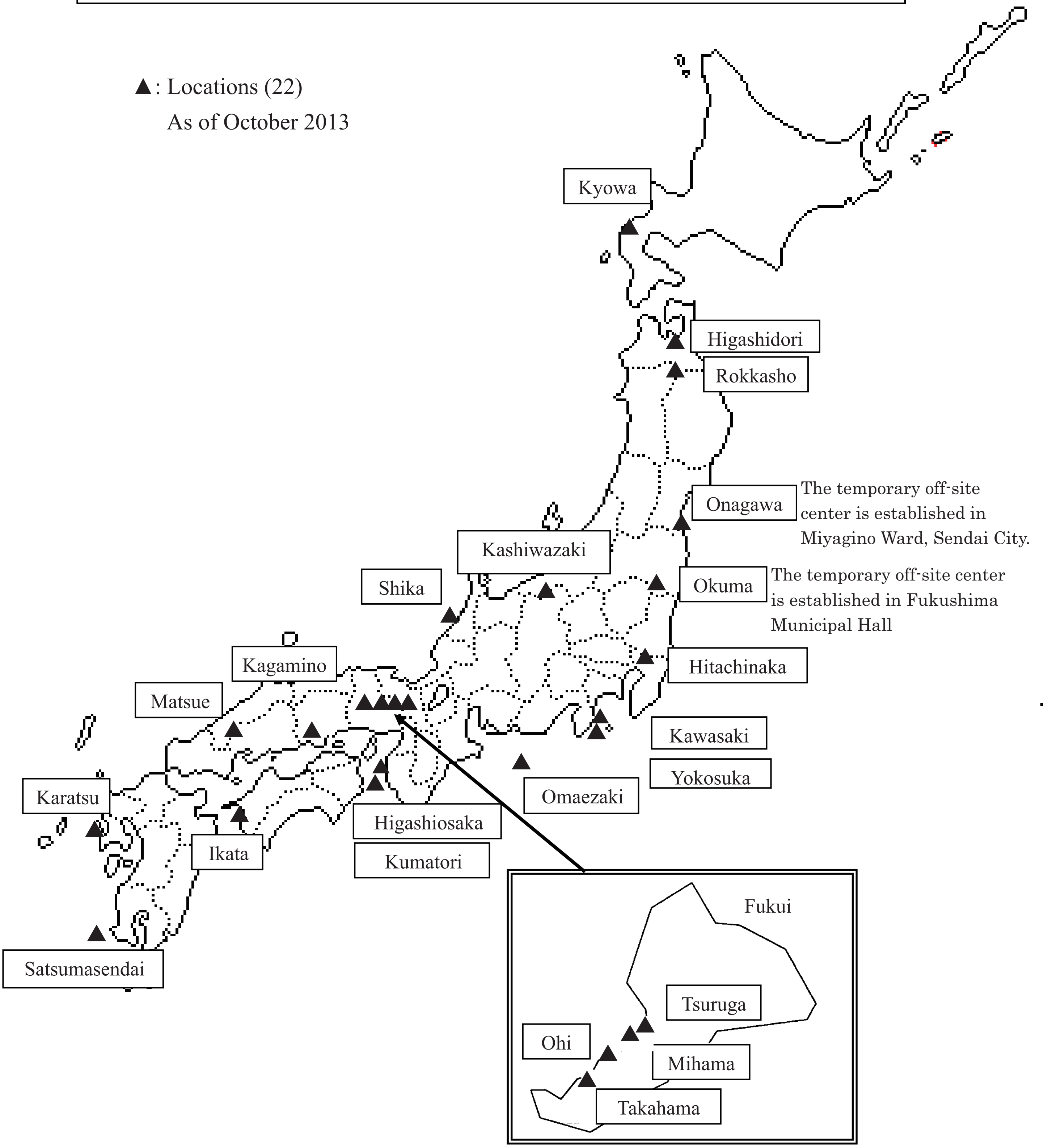
Kanagawa	kanagawa Prefecture Kawasaki Off-site Center	1-1-6, Hinode-cho, Kawasaki-ku, Kawasaki City, Kanagawa	Toshiba Corporation Nuclear Technology Research Institute
			Toshiba Corporation Nuclear Research Reactor
			Hitachi Ltd. Ozenji Center
			Goto Ikueikai, Tokyo city University, Atomic Research Laboratory
	Kanagawa Prefecture Yokosuka Off-site Center	1-4-7, Hinode-cho, Yokosuka City, Kanagawa	Global Nuclear Fuel-Japan Co., Ltd.
			Rikkyo University Nuclear Research Institute
Shizuoka	Sizuoka Prefecture Hamaoka Off-site Center	5215-1, Ikeshinden, Omaezaki City, Shizuoka *[1] The decision to relocate the site 20 km from the power station in Makinohara city has been taken.	Chubu Electric Power Co., Inc., Hamaoka Nuclear Power Station
Ishikawa	Ishikawa Prefecture Shika Off-site Center	34-1, Gai, Abuya, Shika Town, Hakui County, Ishikawa *[1] The decision to relocate the site 9 km away from the power station in Shika town has been taken.	Hokuriku Electric Power Co., Inc., Shika Nuclear Power Station
Fukui	Fukui Prefecture Tsuruga Off-site Center	99-11-47, Kanayama, Tsturuga City, Fukui	The Japan Atomic Power Company, Tsuruga Power Station
			Japan Atomic Energy Agency Fast Breeder Reactor Research and Development Center
			Japan Atomic Energy Agency Fugen Decommissioning Engineering Center
	Fukui Prefecture Mihama Off-site Center	Kenohana 1-6, 64, Sada, Mihama Town, Mikata County, Fukui	The Kansai Electric Power Co., Inc., Mihama Power Station
	Fukui Prefecture Ohi Off-site Center	1-1-1, Seiwa, Ohi Town, Ohi County, Fukui	The Kansai Electric Power Co., Inc., Ohi Power Station
	Fukui Prefecture Takahama Off-site Center	35-14, Sonobe, Takahama-cho, Ohi County, Fukui	The Kansai Electric Power Co., Inc., Takahama Power Station
Osaka	Osaka Prefecture Higashi Osaka Off-site Center	1-3, Shinkamikosaka, Higashi-Osaka City, Osaka	Kinki University Atomic Energy Research Institute
	Osaka Prefecture Kumatori Off-site Center	2-1010-1, Asashironishi, Kumatori Town, Sennan County, Osaka	Kyoto University Research Reactor Institute
			Nuclear Fuel Industries., Ltd., Kumatori Works
Okayama	Okayama Prefecture Kamisaibara Off-site Center	514-1, Kamisaibara, Kagamino Town, Tomata County, Okayama	Japan Atomic Energy Agency Ningyo-toge Environmental Engineering Center
Shimane	Shimane Prefecture Off-site Center	52, Nakabara-cho, Matsue City, Shimane	The Chugoku Electric Power Co., Inc., Shimane Nuclear Power Station
Ehime	Ehime Prefecture Off-site Center	1993-1, Minatoura, Ikata Town, Nishiuwa County, Ehime *The relocation to the site 24 km away from the power station in Seiyo City is decided.	Shikoku Electric Power Co., Inc., Ikata Power Station
Saga	Saga Prefecture Off-site Center	2-5, Nishinohama-machi, Karatsu City, Saga	Kyushu Electric Power Co., Inc., Genkai Nuclear Power Station
Kagoshima	Kagoshima Off-site Center	1-3, Kanda-cho, Satsumasendai City, Kagoshima	Kyushu Electric Power Co., Inc., Sendai Nuclear Power Station

*[1]: This is currently being planned based on the details shown in "2. Primary Measures against Nuclear Disasters (9) Off-Site Center in the Nuclear Emergency Response Guidelines"

*[2]: A temporary off-site center was established in place of the off-site center, which could not be used due to tsunami damage or radioactive contamination in the Tohoku District - off the Pacific Ocean Earthquake.

(Reference 2)

Locations of Nuclear Emergency Response Operation Center (Off-Site Center)



(Attachment 2)

About the Nuclear Emergency Response Guidelines (Overview)

The Nuclear Safety Commission used to put together specialized/technical matters to foster smoother emergency preparedness activities around nuclear power stations in the "Guideline for Emergency Measures for Nuclear Installations" (hereinafter "old guidelines"). However, the accidents at Fukushima Daiichi Nuclear Power Station revealed a lack of measures from residents' perspective, a lack of education/training, including measures against complex disasters and severe accidents, a deficiency in the emergency information provision system, insufficient advance preparations, including evacuation plans, materials and equipment, and unclear decision-making on measures to take.

The Nuclear Regulation Authority (NRA), which was inaugurated in place of the Nuclear Safety Commission, reviewed the old guidelines and established this Regulatory Guide in consideration of reports from accident investigation committees.

This guideline aims to ensure protective measures to minimize the influence of radiation on neighboring nuclear facilities in the event of an emergency. To support scientific and objective judgments of licensees, national and local governments in developing and implementing plans related to nuclear disaster measures, specialized and technical items are determined based on the following basic concepts.

- Developing disaster prevention plans from residents' perspective.
- Building a system to provide information without interruption in consideration of long-lasting disasters.
- Reviewing criteria used in developing plans to always optimize them, including actively gaining the latest global knowledge.

<Main items in the guideline>

1. Nuclear disasters
    - Nuclear disasters and the responsibility of licensees
    - Basic concepts of protective measures against radiation exposure
2. Primary measures against nuclear disasters
    - Basic concepts of primary measures against nuclear disasters
    - Basic concepts of implementation of protective measures in emergencies
    - Focused area of nuclear disaster measures
    - Primary measures against nuclear disasters to be taken by licensees
    - Improvement of the system to provide information to residents in emergencies
    - Improvement of the emergency monitoring system
    - Provision of information to residents under normal circumstances
    - Improvement of off-site centers
    - Education and training for those interested in emergency actions
3. Emergency response measures
    - Basic concepts of emergency response measures
    - Recognizing abnormalities and emergency response measures
    - Provision of information to residents in emergency
4. Mid-and-long term measures against nuclear disasters
    - Basic concepts of mid-and-long term measures against nuclear disasters
    - Environmental radiation monitoring for restoration after the disaster
5. Accidents at Tokyo Electric Power Co., Inc., Fukushima Daiichi Nuclear Power Station
    - Points to consider in primary measures against nuclear disasters and measures to prevent nuclear emergencies
    - About mid-and-long term measures
    - About the future agenda

(See Attachment 3)

List of Abbreviations related to Nuclear Emergency Preparedness

Abbreviations	Original (Translation)	Meaning
EAL	Emergency Action Level	A standard to enable licensees to judge whether the nuclear facility falls under the emergency classifications based on the status of nuclear facilities
ERC	Emergency Response Center	The organization, which is established in the Secretariat of NRA (S/NRA), supports the office of the prime minister as a back office by activities such as analyzing the accident progress and liaison and coordination with local governments.
OFC	Off-site Center	The center for the national government's nuclear emergency response headquarters and local government's emergency preparedness headquarters to organize the joint council for nuclear emergency response on site, and sharing information, taking cooperative nuclear emergency measures.
OIL	Operational Intervention Level	The standard judges whether protective measures such as evacuation, temporary transfer, and restrictions on the ingestion of food and drink should be implemented after the release of radioactive materials. As a rule, the standard is expressed with measurable values in principle such as air dose rates, and the concentration of radioactive materials in environmental specimens.
PAZ	Precautionary Action Zone	The PAZ is a zone in which protective prevention measures are prepared since the phase before the release of radioactive materials into the environment such as the implementation of immediate evacuation according to the previously noted EAL to avoid deterministic effects of radiation exposure, even in a rapidly developed accident. The specific area is within a “radius of about 5 km of a nuclear facility.” The IAEA international standard provides that the maximum PAZ radius should be 3-5 km from a nuclear facility (5 km is recommended).
PPA	Plume Protection Planning Area	Additional protective measures may be required such as sheltering and administering stable iodine as a protective measure when the plume passes. It is difficult to recognize the plume by measuring air dose rates alone except when it passes. It is difficult to take protective measures before it arrives. It may be necessary to prepare to implement protective measures out of UPZ according to the status of nuclear facilities before the release of radioactive materials. In future, the Nuclear Regulation Authority will study the specific area of PPA and the concept of implementing the necessary protective measures, evalutatily the global discussions.
UPZ	Urgent Protective action planning Zone	Emergency protective measures for the area are prepared based on the previously noted EAL/OIL to minimize the risks of stochastic effects. The specific area is that within a “radius of about 30 km from a nuclear facility.” The IAEA international standard provides that the maximum UPZ radius should be 5-30 km from a nuclear facility.

Outline of the Nuclear Regulation Authority Establishment Act

1. Objectives

In order to eliminate the negative effects caused by a rigid vertical administrative system on policies related to the study, development, and use of nuclear power (hereinafter referred to as the “use of nuclear power”) which became evident in the wake of the accident at the nuclear power station that occurred during the Tohoku District – off the Pacific Ocean Earthquake on March 11, 2011, and also to resolve the problems resulting from having a single administrative organization handle both promotion and regulation of the use of nuclear power, this Act shall establish a Nuclear Regulation Authority to centrally manage administrative affairs related to the securing of safety in the use of nuclear power (including nuclear-related refining, fabrication, storage, reprocessing, and disposal businesses as well as regulation of nuclear power facilities) in order to define and implement any measures required to secure safety in the use of nuclear power based on established international standards, while always remaining wary of the possibility of accidents caused by the use of nuclear power and recognizing that best and maximal efforts must be made to prevent such accidents, that allows its chairman and members to independently exercise their authority from a neutral and fair position based on their specialist knowledge and which contributes to protection of the lives, health, and property of the people, the conservation of the environment, and the securing of safety in Japan.

2. Establishment

Based on the stipulations in Article 3-2 of the National Government Organization Act, the Nuclear Regulation Authority is established as an external agency of the Ministry of the Environment.

3. Duty

The Nuclear Regulation Authority shall have the duty of securing safety in the use of nuclear power (including nuclear-related refining, fabrication, storage, reprocessing, and disposal businesses as well as regulation of nuclear power facilities) in order to contribute to protection of the lives, health, and property of the people, the conservation of the environment, and the securing of safety in Japan.

4. Responsibilities

(1) The Nuclear Regulation Authority shall take charge of the matters listed below in order to fulfill the duty described in 3 above.

1 Matters related to the securing of safety in the use of nuclear power;

2 Matters related to nuclear-related refining, fabrication, storage, reprocessing, and disposal businesses, the regulation of nuclear power facilities, and the securing of the safety of those businesses and facilities;

3 Matters related to the regulation of use of nuclear source materials and nuclear fuel materials as well as the securing of the safety of those materials;

4 Matters related to promotion of uniform technical standards for the prevention of radiation hazards;

5 Matters related to the definition and promotion of basic policies regarding monitoring and measurement of radioactive materials and radiation levels, as well as cost distribution plans for the relevant administrative organs;

6 Matters related to the training of researchers and technicians related to the securing of safety in the use of nuclear power (excluding matters related to education and research at universities);

7 Matters related to the arrangement of administrative affairs conducted by relevant administrative organs regarding protection against nuclear fuel materials and other radioactive materials;

8 Matters related to investigations into the causes of the accidents that were caused by operation of the reactors (hereinafter called the “nuclear accidents”) and of the damage caused by said nuclear accidents; and

9 Matters related to international cooperation regarding these responsibilities.

- Investigations and research as needed to accomplish the responsibilities listed in 1 through 9 above.
- In addition to the matters listed in 1 through 9, the responsibilities of the Nuclear Regulation Authority stipulated in the relevant acts (including orders based on such acts).

(2) The Nuclear Regulation Authority shall be able to advise the heads of relevant administrative organs about matters related to the securing of safety in the use of nuclear power and ask them to report on measures taken based on that advice, if the Commission recognizes that such actions must be taken to perform its responsibilities.

5. Exercise of Authority

The chairman and members of the Nuclear Regulation Authority shall exercise their respective authorities independently.

6. Organization

(1) The Nuclear Regulation Authority shall be comprised of a chairman and four members.

(2) The chairman shall represent the Nuclear Regulation Authority and preside over its operations.

(3) In the case of an accident incapacitating the chairman or if the chairman is otherwise unable to attend the Commission, the member designated in advance shall execute the chairman’s duties on his or her behalf.

7. Appointment of the Chairman and Members

(1) With the approval of both Houses, the prime minister shall appoint the chairman and members from among highly principled persons with expert knowledge, significant experience and broad perspective regarding the securing of safety in the use of nuclear power.

(2) The appointment and dismissal of the chairman shall be certified by the emperor.

(3) When a state of nuclear emergency as stipulated in Article 15-2 of the Act on Special Measures concerning Nuclear Emergency Preparedness is declared or any special emergency situation occurs during a Diet session and also when both the chairman and the member designated to conduct duties on his or her behalf described in Section 6-(3) are unable to attend the Commission (hereinafter called a “case that requires an emergency appointment”), the prime minister shall have the authority to appoint a chairman from among the people with the qualifications described in (1), regardless of the stipulation in (1), if a resolution on an agreement regarding the chairman who should be appointed in accordance with (1) is not made (excluding the case when the other House reaches a decision not to agree) within 10 days (excluding recesses of the Diet or each House) after the day when both or either House requests the agreement above along with a document stating that an emergency appointment is required (or if a case that requires an emergency appointment occurs after the agreement regarding the chairman was requested in accordance with (1) above, on the day when such notification is received).

(4) When a cancellation of a nuclear emergency is declared as stipulated in Article 15-4 of the Act on Special Measures concerning Nuclear Emergency Preparedness during a case in which the emergency situation described in Section (3) above or other special emergency situation is resolved, approval shall be sought from both Houses immediately. If approval is not received from the Diet after approval has been requested from both Houses, the prime minister must dismiss said chairman immediately.

(5) When the chairman or member reaches the end of his or her term of service or if there is a vacancy and approval from both Houses is not possible due to the closing of the Diet or a dissolution of the House of Representatives, the prime minister shall have the right to appoint a chairman or member from those people with the qualifications described in (1), regardless of the provision in (1).

(6) In the case of (5), approval for the appointment must be sought from both Houses in the first Diet session following the appointment. If approval is not received from both Houses, the prime minister must dismiss said chairman or member immediately.

(7) No person who meets any of the following criteria shall be permitted to serve as chairman or a member.

1 Persons who have received a decision on the commencement of bankruptcy proceedings and have yet to have their rights restored;

2 Persons who are serving sentences of imprisonment or are subject to a heavier punishment;

3 Of those entities that handle nuclear-related refining, fabrication, storage, reprocessing, or disposal businesses, those that have established reactors, those that allow foreign nuclear ships to enter Japanese water areas, and those that use nuclear source materials or nuclear fuel materials, any board member of such an entity if said entity is a legal entity (including persons with equivalent or higher authority or ascendancy, regardless of job title), or any employee or person engaged with such an entity.

4 Board member of an entity fitting the criteria in 3 above (including person with equivalent or higher authority or ascendancy, regardless of job title) or any employee or person engaged with such an entity.

8. Term of Service of the Chairman and Members

(1) The terms of service of the chairman and members shall be 5 years. However, the term of service of a substitute chairman or member shall be the remaining term of his or her immediate predecessor.

(2) The chairman and members may be reappointed.

(3) When a chairman or member reaches the end of his or her term of service, said chairman or member shall continue to fulfill his or her duties until a successor is appointed.

9. Dismissal of the Chairman or Members

(1) Whenever a chairman or member meets any of the criteria listed in Section 7-(7), the prime minister must dismiss said chairman or member.

(2) When it is recognized that the chairman or a member is unable to fulfill his or her duties due to physical or mental problems or if the chairman or a member has committed a violation of obligation in the course of his or her duties or other misconduct unbecoming of such the chairman or a member, the prime minister shall have the right to dismiss said chairman or member upon the agreement of both Houses after hearing from the Nuclear Regulation Authority.

10. Meetings

(1) Meetings of the Nuclear Regulation Authority shall be convened by the chairman.

(2) Meetings of the Nuclear Regulation Authority shall not be called nor resolutions made without the attendance of the chairman and at least two members.

(3) Decisions of the Nuclear Regulation Authority shall be made by a majority of the attendees. In the case of a tied vote, the decision shall be made by the chairman.

(4) In the cases listed below, regardless of (2) and (3) above, when the chairman agrees that there is insufficient time to call the Commission due to a special emergency situation or when the quorum of the Committee meeting is not satisfied, the chairman shall be able to represent the Committee on a temporary basis with respect to the matters listed below.
  1 When the criteria stipulated in Article 15-1 of the Act on Special Measures concerning Nuclear Emergency Preparedness are satisfied: approval of a state of nuclear emergency as stipulated in said article, reporting to the prime minister, public announcement in accordance with the stipulations in paragraph 2 of said article, and submission of draft instructions in accordance with the stipulations in paragraph 3 of said article
  2 During the period between a declaration of a state of nuclear emergency as stipulated in Article 15-2 of the Act on Special Measures concerning Nuclear Emergency Preparedness and the cancellation of said nuclear emergency as stipulated in Article 15-4 of the same act: matters related to emergency responses as stipulated in Article 2-5 of the act
  3 When information is received as stipulated in the first clause of Article 105-1 of the Act Concerning Measures to Protect Japanese Citizens During Armed Attacks and Others (hereinafter called the Civil Protection Act): reporting to the chief of the disaster countermeasure headquarters and notification to designated relevant public institutions in accordance with the stipulations in Article 105-2 of the act
  4 When an event as stipulated in Article 105-1 of the Civil Protection Act occurs: acknowledgment of the occurrence of said event in accordance with the stipulations in Article 105-4 of the act
  5 When information is received as stipulated in Article 105-1 of the Civil Protection Act: reporting to the chief of the disaster countermeasure headquarters and notification to designated relevant public institutions in accordance with the stipulations in Article 105-2 of the act, which is applied in accordance with the stipulations in Article 105-4, and notification to the local prefectural governor in accordance with the stipulations in the final clause of Article 105-4 of the act
  6 When a state of armed attack, etc. (armed attacks as defined in Article 2-1 of the Civil Protection Act) has occurred: ordering that the necessary measures be taken in accordance with the stipulations in Article 106 of the Civil Protection Act

(5) When the chairman is representing the Commission on a temporary basis because of a situation as defined in (4) above, he or she must report that fact and any responsibilities that he or she exercised as a representative at the next meeting in accordance with the regulations of the Nuclear Regulation Authority.

(6) If an accident incapacitates the chairman or if the chairman is otherwise unable to attend to the Commission, the member who has been designated to execute the chairman's duties on his or her behalf in accordance with Section 6-(3) shall be considered to be the chairman for the purposes of Sections (2), (4), and (5).

11. Duties of the Chairman and Members

(1) The chairman and members shall not leak any secret which they come to learn in the course of executing their duties. The same shall apply after retirement.

(2) During their terms of service, neither the chairman nor members shall serve as officers of a political party or any other political body nor shall they actively engage in any political movements.

(3) The chairman and members shall not engage in any other duty for which they receive financial compensation or operate a profit-making business or provide other services for financial gain while holding office except in the case that permission has been received from the prime minister.

(4) In order to prevent any activities that may invite public suspicion or mistrust of the neutrality and fairness of the actions of the chairman and members, the Nuclear Regulation Authority shall disclose any information regarding research endowments from nuclear licensees, etc. related to the chairman or members, place restrictions on such acts of endowment from nuclear licensees while the chairman and members serve in their positions, and define and announce other internal rules to be complied with by the chairman and members. The same shall continue to apply if these rules are modified.

(5) In order to quickly take appropriate action in the event of a nuclear accident, the Nuclear Regulation Authority shall anticipate various situations and define internal rules that stipulate action guidelines to be complied with by the chairman and members, such as how to call a meeting and how to make a decision, and ensure such rules are administered properly.

12. Compensation of the Chairman and Members

The compensation of the chairman and members shall be defined in a separate act.

13. Committees, etc.

(1) The Nuclear Regulation Authority shall establish the Committee on Examination of Reactor Safety and the Committee on Examination of Nuclear Fuel Safety.

(2) Besides the committees defined in (1), other committees, etc. established by the Nuclear Regulation Authority, which are to be defined in separate acts, shall include the Committee on Review of Radioactive Effects and the Evaluation Committee for Incorporated Administrative Agencies.

14. Committee for Emergency Responses and Measures

Upon issuing an instruction, the Nuclear Regulation Authority shall establish the Committee for Emergency Responses and Measures to investigate and review the matters related to nuclear emergency responses and measures, which are stipulated in Article 2-2 of the Act on Special Measures concerning Nuclear Emergency Preparedness. The committee shall be established such that it is constituted of no more than the number of members defined by government orders.

15. Investigations of Nuclear Accidents

(1) The Nuclear Regulation Authority shall have the right to perform the following actions when it is recognized that such actions are required to fulfill the responsibilities listed in Section 4-(1)-8.

1 Requesting a report from a nuclear licensee or a person who took measures to prevent damage caused by a nuclear accident from spreading, or another relevant party to such a nuclear accident (hereinafter called collectively the related parties).

2 Visiting a nuclear facility or other type of site where a nuclear accident has occurred, the offices of nuclear licensee, or other sites as necessary to inspect the accounts, documents, and other materials related to such a nuclear accident (hereinafter called the related materials), ask questions to related parties, or collect nuclear source materials, nuclear fuel materials, and other materials as necessary so long as said amounts are the minimum required for testing.

3 Asking related parties to attend a meeting of the Commission and asking them questions.

4 Asking the owners, possessors, or custodians of the related materials to submit such materials, or keeping said submitted materials.

5 Ordering the owners, possessors, or custodians of the related materials to keep said materials, or prohibiting them from moving such materials.

6 Prohibiting people from entering a nuclear facility or other site where a nuclear accident has occurred, except those entering for official duties and who have been approved by the Nuclear Regulation Authority.

(2) The Nuclear Regulation Authority shall have the authority to permit the chairman, members, or officers of the Secretariat of Nuclear Regulation Authority to perform the actions listed in (1)-1 through 6.

16. Reports to the Diet

The Nuclear Regulation Authority shall report to the Diet on the state of implementation of its responsibilities via the prime minister and officially announce an outline of the same every year.

17. Disclosure of Information

The Nuclear Regulation Authority shall ensure the transparency of its operations by issuing thorough official announcements on the information the Commission has in order to contribute to fulfilling the public's right to know.

18. Development of Regulations

In order to implement responses to acts or government orders or based on the special designations stipulated in acts or government orders, the Nuclear Regulation Authority shall have the authority to develop its own regulations regarding its responsibilities.

19. Secretariat of Nuclear Regulation Authority (NRA)

(1) The Nuclear Regulation Authority shall establish an office to handle its affairs.
(2) The office described in (1) shall be named the Secretariat of NRA.
(3) A director general and other officers shall be stationed at the Secretariat of NRA.
(4) The director general described in (3) shall have the title of Secretary-General of the Secretariat of NRA.
(5) The Secretary-General of the Secretariat of NRA shall take charge of its affairs under the orders of the chairman.
(6) The internal organization of the Secretariat of NRA shall comply with the stipulations in Article 7-3, 7-4, 7-6, 21-1, and 21-5 of the National Government Organization Act, regardless of the stipulations in Article 7-7 of said act.

20. Operation of the Nuclear Regulation Authority

In addition to the matters defined in this act, the Nuclear Regulation Authority shall define matters required for its operation.

21. Penal Provisions

(1) Anyone who violates the rules in Section 11-(1) shall be punished by imprisonment with work for not more than one year or a fine of not more than five hundred thousand yen.
(2) Anyone who meet any of the following criteria shall be punished by a fine of no more than three hundred thousand yen.
    1 Anyone who reports incorrect information in response to a request for a report as defined in Section 15-(1)-1 or 2;
    2 Anyone who rejects, hinders, or refuses himself or herself from an investigation or submission of materials as defined in Section 15-(1)-2 or 15-(2) or who has made a false statement in response to the questions enumerated in the above clauses
    3 Anyone who has made a false statement in response to the questions enumerated in Section 15-(1)-3 or 15-(2)
    4 Anyone who failed to submit the materials in violation of the responsibilities enumerated in Section 15-(1)-4 or 15-(2)
    5 Anyone who failed to keep the materials or moved them in violation of the responsibilities enumerated in Sections 15-(1)-5 or 15-(2)
(3) When a representative of a legal entity, a legal entity, or a representative person, servant, or other employee performs an action that violates (2) in a manner related to the affairs of that legal entity or person, the person who performs such an action shall be punished and the legal entity or person shall also be punished by a penalty as defined in (2).

22. Enforcement Date

This act shall be enforced from the date defined by a government order issued within three months from the date of its publication. However, the following parts shall come into force from the date defined by the following criteria:

1 The part of Section 7-(1) which is related to gaining agreement from both Houses: On the date of publication
2 Section 28: On April 1, 2013
3 Section 29: On the date defined by a government order issued within ten months from the date of enforcement of this act
4 Section 30: On the date defined by a government order issued within one year and three months from the date of enforcement of this act

23. Appointment of the First Chairman and Members
(1) The term of service of the members to be appointed for the first time after this act is enforced shall be two years for two of the members, and three years for the other two regardless of Section 8-(1).
(2) The term of service of each member as defined in Section (1) shall be specified by the prime minister.
(3) For the first appointment of the chairman and members after this act comes into force, Sections 7-(3) and (4) shall be applied if approval from both Houses is not possible due to a closed Diet or dissolution of the House of Representatives.

24. Considerations on Administrative Organizations with Administrative Responsibility for Matters Relating to the Securing of Safety in the Use of Nuclear Power

Additional consideration shall be given within three years of the enforcement of this act to administrative organizations with responsibility for matters related to the securing of safety in the use of nuclear power, and the government shall take necessary actions based on the result such as the establishment of an independent regulatory commission at the Cabinet Office so that said organizations further conform to the international standards, while considering the implementation status of this act, the contents of the reports submitted by the Tokyo Electric Co., Inc.'s Fukushima Nuclear Power Station Accident Investigation Commission, the latest international standards regarding the securing of safety in the use of nuclear power, etc., and also considering the responsibility relating to the nuclear safety such as protecting nuclear material has an important impact on Japan's national security.

25. Governmental Actions, etc.
(1) The issue of regulations related to the securing of safety in the use of nuclear power has been a matter of great urgency since the accident occurred at the nuclear power station during the Tohoku District – off the Pacific Ocean Earthquake, and to continuously assure excellent and highly-motivated human resources who know international trends regarding this matter well, the government shall immediately take appropriate actions to support the employees of the Secretariat of NRA, including the matters listed below and other required matters.
1 Setting up a compensation system and enriching other compensation packages for duties and responsibilities that require expertise and experience, while considering the qualifications of each employee, etc.
2 In addition to securing a sufficient number of regular new employees, the government shall actively hire individuals with expertise or experience from universities, institutions, and private businesses in Japan. In addition, the government shall actively hire individuals with expertise or experience from universities, institutions, and private businesses outside of Japan as third-party advisors on Japan's use of nuclear power, due to the importance of actively considering various viewpoints and insights from foreign countries regarding the securing of safety in the use of nuclear power.
3 Securing opportunities to study abroad, dispatching representatives to international institutions and foreign government organizations, etc., working at overseas diplomatic facilities, etc., and conducting personnel exchanges with domestic and overseas universities and institutions.

4 Establishing training facilities and setting up other training systems, for the improvement of functional skills.

5 Assuring financial resources to enrich policies regarding the assurance and training of human resources, including the hiring of employees, other human and physical systems of the Nuclear Regulation Authority, and introducing accounts.

(2) In order to assure the independency of the regulation of nuclear safety, reassignment of the employees of the Secretariat of NRA, not only the senior officials but also any other employees, to a government organization that has administrative responsibility for matters related to promotion of the use of nuclear power shall be strictly prohibited. However, the above shall not apply if an unavoidable reason is recognized within five years of this act coming into force, considering the employee's motivation and adequacy, etc.

(3) In order to ensure the independency of the regulation of nuclear safety, re-employment of the employees of the Secretariat of NRA that may invite public suspicion or mistrust of the neutrality and fairness of the agency shall be restricted.

(4) In order to transfer the affairs conducted by the Japan Nuclear Energy Safety Organization (JNES) to the Nuclear Regulation Authority, the government shall dissolve the JNES as quickly as possible and immediately take legislative actions required for that purpose, including reassignment of the employees working at the JNES to relevant jobs at the Secretariat of NRA.

(5) In addition to Section (4), in order to implement efficient and effective regulations for the securing of nuclear safety, the government shall consider the future of the independent administrative agencies and other external organizations and their duties, and take necessary actions based on the result.

(6) The government shall review the policies so that the application system stipulated in Article 66-2-1 of the Nuclear Reactor Regulation Act becomes more effective, and take necessary actions based on the result.

(7) Considering the enormous damage caused by the Tohoku District – off the Pacific Ocean Earthquake, the government shall conduct fundamental reviews on the future of the government organizations that deal with wide-scale disasters so that agile and effective responses to wide-scale disasters including nuclear disasters become possible, and take necessary actions based on the result.

(8) Considering the accident that occurred at the nuclear power station during the Tohoku District – off the Pacific Ocean Earthquake, the government shall promptly review methods of disclosure of information related to nuclear facilities and the disasters caused by a nuclear accident to local governments, and take necessary actions based on the result. Also, considering the importance of setting up close cooperation among the relevant parties, the government shall take actions to share information among the national government, local governments, citizens, nuclear licensees, and so forth, as well as among the relevant administrative organizations, and other necessary actions.

(9) The nuclear licensees shall be deeply aware of their primary responsibilities for securing the safety of the nuclear facilities and stopping any accidents which may occur, and take not only the actions that are stipulated in the Nuclear Reactor Regulation Act, and other acts, but also more voluntary actions, which are appropriate for each nuclear facility, to set up a system for perfect crisis management, in order to prevent any disaster caused by an accident at the said nuclear facility from spreading.

26. Partial Revision of the Atomic Energy Basic Act
    (1) The Cabinet shall establish the Nuclear Emergency Preparedness Council (hereinafter called the Council).
    (2) The Council shall govern the affairs listed below.
        1 Promoting the implementation of measures based on the nuclear disaster response guidelines and other measures to secure comprehensive efforts made by the government in the event of a nuclear accident
        2 Promoting the implementation of measures requiring the various related parties to make long-term comprehensive efforts in the event of a nuclear accident
    (3) Organization of the Council
        1 The Council shall be comprised of a chairman, vice-chairman, and members.
        2 The prime minister shall serve as the chairman.
        3 The vice-chairman shall be appointed from among the Chief Cabinet Secretary, the Minister of the Environment, and other ministers of state, who is designated by the prime minister, and the chairman of the Nuclear Regulation Authority shall also serve as the vice-chairman.
        4 The members shall be appointed from among the persons listed below.
            i. All the ministers of state excepting the chairman and vice-chairman, as well as the Deputy Chief Cabinet Secretary for Crisis Management
            ii. The person appointed by the prime minister among from the Deputy Chief Cabinet Secretary, the Deputy Minister of the Environment or state secretaries of relevant ministries and agencies, parliamentary secretaries of the Minister of the Environment or parliamentary secretaries of the minister of relevant ministries and agencies, or heads of the relevant administrative organizations except the ministers of state
    (4) Office
        1 The Council shall establish an office to conduct its affairs.
        2 A director general and other officers shall be stationed at the office.
        3 The Minister of the Environment shall serve as the director general.
        4 Under the orders of the chairman, the director general shall take charge of the duties of the office with the help of the Assistant Chief Cabinet Secretary under commission and the prime minister, who should take charge of the matters stipulated in Article 4-3 of the Act for Establishment of the Cabinet Office.

27. Partial Revision of the Nuclear Reactor Regulation Act
    (1) Part of the stipulated purposes of the act, that is, “to assure planned implementation of the use of nuclear source materials, nuclear fuel materials, and reactors,” shall be deleted. As a result of this, the statements related to the planned implementation of the use of nuclear power, etc. shall also be deleted from the standards for approval of establishment of reactors, and other standards.
    (2) The stipulated purposes of the act shall include two additional statements: “implement necessary regulations while remaining wary of the possibility of large-scale natural disasters, terrorism, or other criminal acts” and “contribute to the protection of the lives, health, and property of the people of Japan, the conservation of the environment, and the securing of safety.”
    (3) The regulations to secure safety in the use of nuclear power shall be implemented by the Nuclear Regulation Authority.
    (4) A nuclear facility where a disaster has occurred shall be managed in an appropriate way according to the specific status of that facility, and the regulations to secure safety in the use of nuclear power shall be implemented.

28. Partial Revision of the Nuclear Reactor Regulation Act

The regulations for safeguards based on international agreements and other regulations to secure the peaceful use of nuclear power shall be implemented by the Nuclear Regulation Authority.

29. Partial Revision of the Nuclear Reactor Regulation Act

(1) A quality control system for power reactor establishers, etc. shall be added to the standards for the approval of the construction plan for power reactor establishment.
(2) Measures to be taken in the case of serious accidents shall be reinforced by, for example, clarifying that such measures are included in the measures that power reactor establishers are required to take to ensure safety.
(3) In the case when it is recognized, based on the latest knowledge available, that the position, structure, or equipment of an approved power reactor facility does not meet the approval standards, or in other similar cases, orders to stop the use of, remodel, repair, or take other related actions for the said power reactor facility may be issued to the power reactor establishers.
(4) The operable period of a power reactor shall be forty years from the date when the reactor passed the pre-service inspection for the first time. However, at the end of said period, if it is recognized based on the deterioration status of the reactor, etc. caused by long-term operation, that the reactor still meets the standards for safety assurance defined by the regulations of the Nuclear Regulation Authority, an extension of the period for not more than twenty years shall be approved only once, and the period shall be defined by a government order.
(5) To improve the safety of power reactor facilities, etc., a notification system and a model approval system shall be introduced for changing the equipment at the power reactor facilities in a way that clearly does not hinder disaster prevention.
(6) A nuclear safety regulation system for power reactor facilities shall be organized.
(7) The responsibilities of the nuclear licensees, etc. for taking necessary actions for disaster prevention shall be clarified.
(8) The Nuclear Regulation Authority may conduct on-the-spot inspections of the facilities of the entities that manufacture the equipment of the nuclear facilities, as required.

30. Partial Revision of the Nuclear Reactor Regulation Act

(1) In the case when it is recognized, based on the latest knowledge available, that the position, structure, or equipment of an approved fabrication facility does not meet the approval standards, or in other similar cases, orders to stop the use of, remodel, repair, or take other related actions for the said fabrication facility, etc., may be issued to the fabrication licensees.
(2) Measures to be taken in the case of serious accidents shall be reinforced by, for example, clarifying that such measures are included in the measures that fabrication licensees, etc. are required to take to ensure safety.
(3) A system that requires the power reactor establishers, etc. to evaluate the safety of their power reactor facilities by themselves, report the results to the Nuclear Regulation Authority, and publish the details of the evaluation shall be introduced.

31. Partial Revision of the Environmental Basic Act

The Environmental Basic Act shall apply to the measures for preventing air pollution caused by radioactive materials, etc.

32. Partial Revision of the Act on Special Measures concerning Nuclear Emergency Preparedness

(1) The statement "The national government has an obligation to take comprehensive measures for increasing security measures, conduct thorough defense in depth at the nuclear facilities, set up countermeasures according to the status of damage, and prevent nuclear disasters, while remaining wary of the possibility of large-scale natural disasters, terrorism, and other criminal acts in order to minimize the damage caused by such disasters" shall be added as the obligations of the national government.

(2) The Nuclear Regulation Authority shall define the guidelines (nuclear emergency preparedness guidelines) to ensure the smooth implementation of nuclear disaster preventive measures, emergency measures, and measures for restoration from nuclear emergency to be taken by the nuclear licensees, the heads of the designated administrative organs, the heads of the designated local administrative organs, the local governments, the designated public agencies, the designated local public agencies, and other parties, in accordance with the disaster prevention basic plan stipulated in Article 2-8 of the Disaster Control Measures Basic Act.

(3) The nuclear disaster preventive measures shall be enhanced by expanding the number prefectural governors who should attend the discussions and other meetings about the nuclear licensee disaster prevention plan, and by obliging the nuclear licensees to report the results of their nuclear disaster prevention drills, and so forth.

(4) The Chief Cabinet Secretary, the Minister of the Environment, and the chairman of the Nuclear Regulation Authority shall serve as the vice chief of the nuclear emergency response headquarters, and the nuclear emergency response headquarters shall be enhanced by increasing the number of its members.

(5) The matters relating to judgments on the administrative responsibilities of the Nuclear Regulation Authority that are to be made solely based on technical and professional knowledge shall be removed from the matters relating to implementation of emergency responses, which are to be based on the instructions of the chief of the nuclear emergency response headquarters.

(6) Even after the cancellation of a nuclear emergency has been declared, the nuclear emergency response headquarters shall remain active, and each mayor may issue instructions to evacuate or take other measures as appropriate, aiming for smooth implementation of the measures for restoration from nuclear emergency.

33. Partial Revision of the Act on Special Accounts

The Account of "nuclear safety regulation measures" shall be established as a separate accounting of the special account for energy measures.

34. Partial Revision of the Act for Establishment of the Cabinet Office

The matters listed below shall be added as administrative responsibilities of the Cabinet Office.

(1) Matters related to the prevention of disasters caused by nuclear accidents

(2) Matters related to the cooperation of the director general of the Nuclear Emergency Preparedness Council, which are stipulated in Article 3-3 of the Atomic Energy Basic Act

35. Partial Revision of the National Government Organization Act

Appropriate revision shall be made, such as modifying the quota of the Deputy Ministers and parliamentary secretaries of the Environment.

36. External Independent Administrative Agencies

In order safety in the study and development of the use of nuclear power, the Nuclear Regulation Authority shall be added as a competent government agency in the list of independent administrative agencies, the National Institute of Radiological Sciences and the Japan Atomic Energy Agency.

37. Review

After the revisions stipulated in Sections 29 and 30 are made, the stipulations in the Nuclear Reactor Regulation Act shall be reviewed immediately, considering the implementation status. If necessary, appropriate actions shall be taken based on the result.

40. Others

Appropriate regulations shall be set up for related acts.

REFERENCE

Trends in World Nuclear Electric Power Generation

1．World Nuclear Electric Power Generation

Table 1　World Nuclear Electric Power Generation Plants (As of Jan. 1, 2013)

2．Trends in Capacity Factors of Nuclear Power Plants in the World

Table 2 Trends in Capacity Factors of Nuclear Power Plants in the World

Fig.1 Trends in Capacity Factors of Nuclear Power Plants in the World
for the Past 10 Years

Fig.2 Capacity Factors of Nuclear Power Plants in the World in 2012

Ref.

Trends in World Nuclear Electric Power Generation

Table 1 World Nuclear Electric Power Generation Plants

Breakdowns / Country or region name	Stage of progress							
	Operating		Under construction		Being planned		Total	
	Output	Number of units	Output	Number of units	Output	Number of units	Output	Number of units
U.S.A.	10,658.2	104	120.0	1	1,066.0	9	11,844.2	114
France	6,588.0	58	163.0	1	0.0	0	6,751.0	59
Japan	4,614.8	50	442.1	4	1,240.7	9	6,297.6	63
Russia	2,519.4	29	1,026.0	11	1,815.0	17	5,360.4	57
Germany	1,269.6	9	0.0	0	0.0	0	1,269.6	9
Korea	2,071.6	23	520.0	4	700.0	5	3,291.6	32
U.K.	1,092.7	16	0.0	0	326.0	2	1,418.7	18
Ukraine	1,381.8	15	200.0	2	0.0	0	1,581.8	17
Canada	1,424.0	19	0.0	0	0.0	0	1,424.0	19
Sweden	942.8	10	0.0	0	0.0	0	942.8	10
Spain	738.3	7	0.0	0	0.0	0	738.3	7
Belgium	619.4	7	0.0	0	0.0	0	619.4	7
Taiwan	522.4	6	270.0	2	0.0	0	792.4	8
Bulgaria	200.0	2	0.0	0	0.0	0	200.0	2
Switzerland	340.5	5	0.0	0	0.0	0	340.5	5
Finland	286.0	4	172.0	1	–	0	458.0	5
India	478.0	20	530.0	7	530.0	4	1,538.0	31
Slovakia	195.0	4	94.2	2	0.0	0	289.2	6
China	1,259.8	15	3,499.6	32	2,582.8	23	7,342.2	70
Brazil	199.2	2	140.5	1	0.0	0	339.7	3
South Africa	194.0	2	0.0	0	0.0	0	194.0	2
Hungary	200.0	4	0.0	0	0.0	0	200.0	4
Czech Republic	406.6	6	0.0	0	200.0	2	606.6	8
Mexico	136.4	2	0.0	0	0.0	0	136.4	2
Argentina	100.5	2	74.5	1	0.0	0	175.0	3
Slovenia	72.7	1	0.0	0	0.0	0	72.7	1
Romania	141.0	2	211.8	3	0.0	0	352.8	5
Netherlands	51.2	1	0.0	0	0.0	0	51.2	1
Pakistan	78.7	3	68.0	2	0.0	0	146.7	5
Armenia	40.8	1	0.0	0	0.0	0	40.8	1
Others	0	0	240.0	2	2370.5	24	2,610.5	26
Total	38,823.4	429	7,771.7	76	10,831.0	95	57,426.1	600

Notes：
1. This table was compiled based on the "2013 Report on the Trends in World Nuclear Electric Power Generation Development" (Japan Atomic Industrial Forum, Inc.).
2. This table is only for nuclear power plants with gross capacity of more than 30,000kW.
3. "Monju" a prototype fast breeder reactor of 280,000 kW under construction, is included in the Japan data.
4. Others are Iran, Indonesia, Egypt, Israel, Turkey, Kazakhstan, Vietnam, United Arab Emirates, Lithuania, Jordan, Belarus

(As of Jan. 1, 2013)

(Unit: 10,000 kW)

By reactor type (including the reactors in operation, under construction and being planned)					
Light water-moderated reactor			Graphite moderated reactor	Heavy water-moderated reactor	Fast breeder reactor
Pressurized water reactor (PWR)	Boiling water reactor (BWR)	Total			
8,008.0	3,836.2	11,844.2	0.0	0.0	0.0
6,751.0	0.0	6,751.0	0.0	0.0	0.0
2,494.4	3,775.2	6,269.6	0.0	0.0	28.0
3,992.0	0.0	3,992.0	1,100.0	0.0	268.4
1,000.8	268.8	1,269.6	0.0	0.0	0.0
3,013.7	0.0	3,013.7	0.0	277.9	0.0
451.0	0.0	451.0	0.0	0.0	0.0
1,581.8	0.0	1,581.8	0.0	0.0	0.0
0.0	0.0	0.0	0.0	1,424.0	0.0
293.4	649.4	942.8	0.0	0.0	0.0
629.1	109.2	738.3	0.0	0.0	0.0
619.4	0.0	619.4	0.0	0.0	0.0
192.0	600.4	792.4	0.0	0.0	0.0
200.0	0.0	200.0	0.0	0.0	0.0
179.5	161.0	340.5	0.0	0.0	0.0
276.0	182.0	458.0	0.0	0.0	0.0
730.0	32.0	762.0	0.0	726.0	50.0
289.2	0.0	289.2	0.0	0.0	0.0
7,018.2	0.0	7,018.2	0.0	144.0	160.0
339.7	0.0	339.7	0.0	0.0	0.0
194.0	0.0	194.0	0.0	0.0	0.0
200.0	0.0	200.0	0.0	0.0	0.0
606.6	0.0	606.6	0.0	0.0	0.0
0.0	136.4	136.4	0.0	0.0	0.0
0.0	0.0	0.0	0.0	175.0	0.0
72.7	0.0	72.7	0.0	0.0	0.0
0.0	0.0	0.0	0.0	352.8	0.0
51.2	0.0	51.2	0.0	0.0	0.0
133.0	0.0	133.0	0.0	13.7	0.0
40.8	0.0	40.8	0.0	0.0	0.0
2,472.1	138.4	2,610.5	0.0	0.0	0.0
41,829.6	9,889.0	51,718.6	1,100.0	3,113.4	506.4

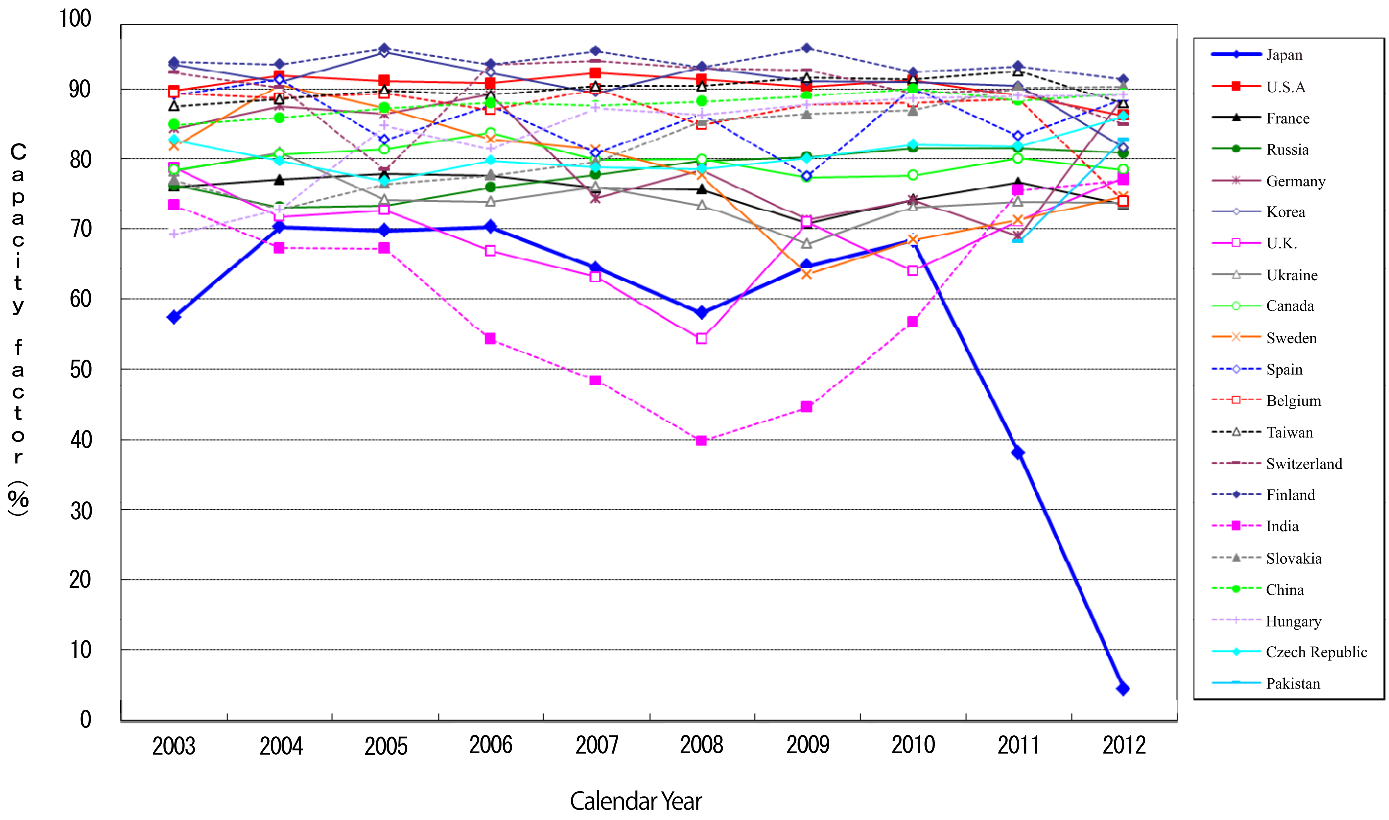
Table 2 Trends in Capacity Factors of Nuclear Power Plants in the World

(Unit: %)

Calendar year / Country or region name	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Japan	57.4 (52)	70.2 (52)	69.7 (54)	70.2 (55)	64.4 (55)	58.0 (55)	64.7 (56)	68.3 (54)	38.0 (54)	4.4 (50)
BWR	35.4 (29)	63.2 (29)	62.2 (31)	64.4 (32)	53.8 (32)	51.0 (32)	51.3 (32)	60.5 (30)	26.1 (30)	1.0 (26)
PWR	87.4 (23)	79.7 (23)	80.5 (23)	79.2 (23)	80.8 (23)	69.0 (23)	84.5 (24)	79.4 (24)	54.8 (24)	3.4 (24)
U.S.A.	89.7 (103)	91.8 (103)	91.1 (103)	90.8 (103)	92.2 (104)	91.4 (104)	90.3 (104)	91.2 (104)	89.0 (104)	86.1 (104)
France	76.0 (59)	77.0 (59)	77.8 (59)	77.6 (59)	75.8 (59)	75.6 (59)	70.7 (59)	74.1 (59)	76.6 (58)	73.5 (58)
Russia	76.2 (30)	73.1 (30)	73.4 (31)	75.9 (31)	77.7 (31)	79.6 (31)	80.2 (31)	81.5 (32)	81.5 (32)	80.8 (32)
Germany	84.3 (19)	87.4 (18)	86.3 (18)	89.1 (17)	74.4 (17)	78.4 (17)	71.2 (17)	74.1 (17)	68.9 (17)	88.8 (9)
Korea	93.4 (18)	90.9 (19)	95.1 (20)	92.3 (20)	89.4 (20)	93.1 (20)	91.1 (20)	90.9 (20)	90.4 (21)	81.6 (23)
U.K.	78.7 (31)	71.7 (27)	72.6 (23)	66.9 (23)	63.1 (19)	54.2 (19)	70.9 (19)	64.0 (19)	71.1 (19)	77.3 (18)
Ukraine	78.2 (13)	80.9 (13)	74.2 (14)	73.9 (15)	76.0 (15)	73.4 (15)	67.9 (15)	73.1 (15)	73.9 (15)	73.7 (15)
Canada	78.4 (16)	80.6 (17)	81.3 (18)	83.7 (18)	79.8 (18)	79.9 (18)	77.3 (18)	77.6 (18)	80.0 (18)	78.4 (20)
Sweden	81.8 (11)	90.6 (11)	87.1 (11)	82.8 (10)	81.3 (10)	77.6 (10)	63.5 (10)	68.4 (10)	71.2 (10)	74.6 (10)
Spain	89.1 (9)	91.3 (9)	82.7 (9)	87.5 (9)	80.8 (8)	86.3 (8)	77.5 (8)	90.1 (8)	83.2 (8)	88.4 (8)
Belgium	89.3 (7)	88.6 (7)	89.2 (7)	86.9 (7)	89.9 (7)	84.8 (7)	87.6 (7)	88.0 (7)	88.5 (7)	73.9 (7)
Taiwan	87.4 (6)	88.4 (6)	89.8 (6)	89.1 (6)	90.4 (6)	90.4 (6)	91.6 (6)	91.4 (6)	92.5 (6)	87.8 (6)
Bulgaria	67.5 (4)	65.3 (4)	72.9 (4)	76.1 (4)	82.0 (2)	88.1 (2)	85.2 (2)	85.3 (2)	91.4 (2)	88.8 (2)
Switzerland	92.3 (5)	90.2 (5)	78.4 (5)	93.5 (5)	93.9 (5)	92.9 (5)	92.6 (5)	89.4 (5)	89.9 (5)	84.9 (5)
Lithuania	68.6 (2)	66.9 (2)	91.9 (1)	76.5 (1)	87.4 (1)	87.8 (1)	96.6 (1)	– (–)	– (–)	– (–)
Finland	93.8 (4)	93.5 (4)	95.7 (4)	93.5 (4)	95.3 (4)	93.1 (4)	95.7 (4)	92.3 (4)	93.2 (4)	91.3 (4)
India	73.4 (14)	67.3 (14)	67.2 (15)	54.2 (16)	48.4 (17)	39.7 (17)	44.5 (17)	56.7 (19)	75.5 (20)	76.9 (20)
Slovakia	76.9 (6)	72.8 (6)	76.4 (6)	77.6 (6)	79.5 (5)	85.3 (5)	86.3 (4)	86.8 (4)	90.2 (4)	90.3 (4)
China	84.8 (8)	85.8 (9)	87.2 (9)	87.9 (9)	87.5 (11)	88.1 (11)	88.9 (11)	90.4 (13)	88.2 (14)	89.3 (15)
Brazil	75.4 (2)	64.7 (2)	55.2 (2)	78.0 (2)	74.1 (2)	85.2 (2)	74.5 (2)	83.5 (2)	89.6 (2)	91.7 (2)
South Africa	80.4 (2)	90.4 (2)	77.6 (2)	63.9 (2)	79.9 (2)	80.6 (2)	73.4 (2)	81.8 (2)	80.9 (2)	77.0 (2)
Hungary	69.2 (4)	72.7 (4)	84.7 (4)	81.4 (4)	87.2 (4)	86.2 (4)	87.6 (4)	88.6 (4)	88.9 (4)	89.0 (4)
Czech Republic	82.7 (6)	79.6 (6)	76.8 (6)	79.7 (6)	78.7 (6)	78.5 (6)	80.0 (6)	82.1 (6)	81.9 (6)	86.0 (6)
Mexico	84.1 (2)	73.2 (2)	86.6 (2)	87.3 (2)	83.5 (2)	82.0 (2)	88.8 (2)	49.1 (2)	81.8 (2)	63.0 (2)
Argentina	85.8 (2)	89.1 (2)	77.8 (2)	87.3 (2)	82.1 (2)	83.4 (2)	92.7 (2)	81.7 (2)	72.0 (2)	71.9 (2)
Slovenia	83.8 (1)	87.8 (1)	97.7 (1)	91.3 (1)	93.0 (1)	102.1 (1)	93.6 (1)	92.2 (1)	97.9 (1)	86.8 (1)
Romania	79.2 (1)	89.4 (1)	89.1 (1)	90.2 (1)	95.8 (2)	90.5 (2)	95.0 (2)	94.0 (2)	94.9 (2)	92.5 (2)
Netherlands	96.1 (1)	91.2 (1)	95.7 (1)	82.5 (1)	94.6 (1)	92.9 (1)	95.5 (1)	88.9 (1)	92.8 (1)	87.6 (1)
Pakistan	48.6 (2)	51.8 (2)	64.7 (2)	68.4 (2)	62.0 (2)	46.6 (2)	70.8 (2)	68.8 (2)	68.1 (3)	82.8 (3)
Armenia	60.7 (1)	66.5 (1)	76.0 (1)	73.5 (1)	71.3 (1)	68.6 (1)	69.7 (1)	69.6 (1)	71.8 (1)	64.5 (1)

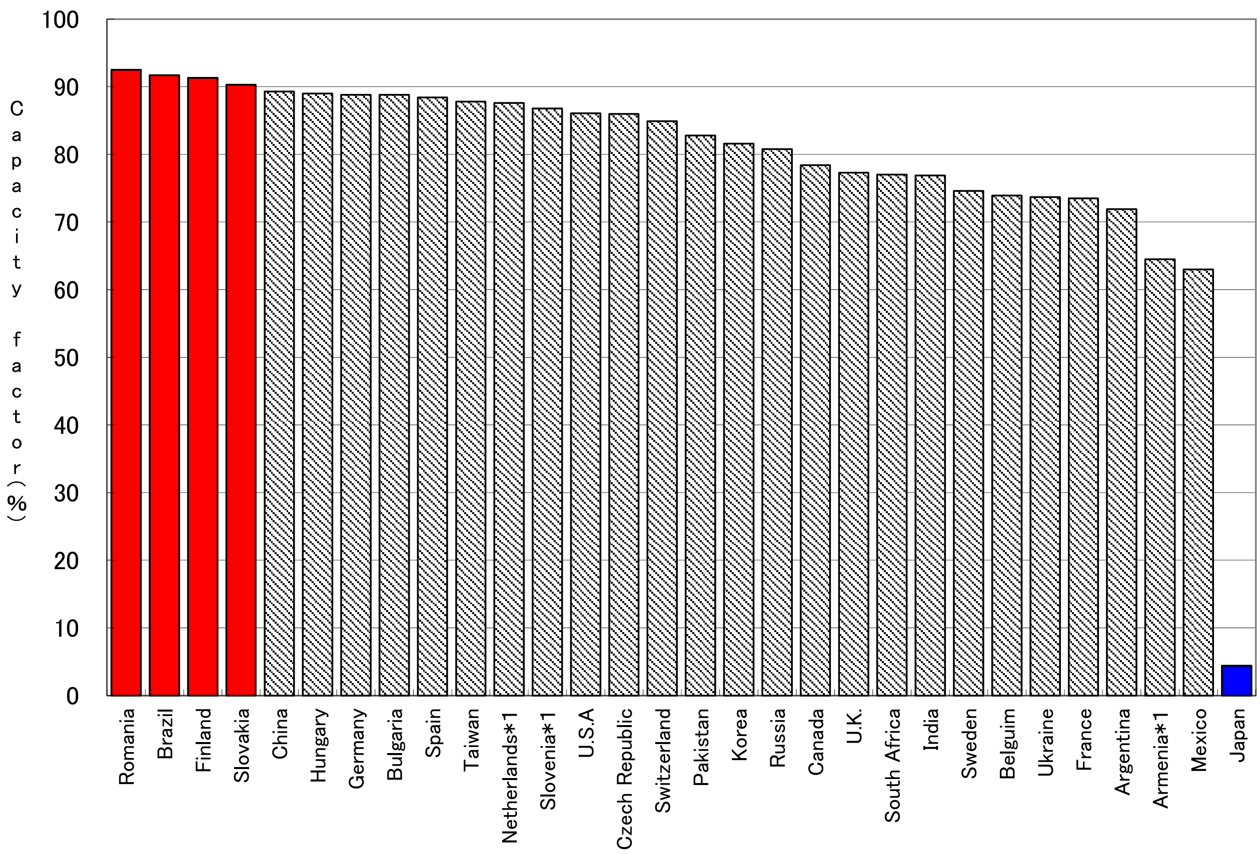
(Notes)
1. The capacity factors of Japan are licensee supplied data edited by JNES.
2. The capacity factors of other countries except Japan are based on the IAEA-PRIS (Power Reactor Information System)data. (As of Aug. 30, 2013)

Fig.1 Trends in Capacity Factors of Nuclear Power Plants in the World for the Past 10 Years



Note: Countries that have less than two operating plants are excluded.

Fig.2 Capacity Factors of Nuclear Power Plants in the World in 2012



Note: Capacity factor of over 90% is shown in red. *1: For only one nuclear power plant

Ref.

APPENDIX

Chronology: Major Trends in Nuclear Power Generation

Major Trends in Nuclear Power Generation	
1955	
December 19	Promulgation of the three basic nuclear power laws (Atomic Energy Basic Law, Law Establishing the Atomic Energy Commission, Law Establishing the Prime Minister's Office (partial amendment))
1956	
June 15	The Japan Atomic Energy Research Institute is inaugurated.
1957	
June 10	Promulgation of the Law for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors
August 27	JRR-1 of Japan Atomic Energy Research Institute reaches criticality. The first "nuclear light" in Japan
1963	
October 26	Japan Atomic Energy Research Institute succeeds in a JPDR electric power generation experiment (October 26 subsequently becomes "Nuclear Power Day")
1964	
July 11	Promulgation of the Electricity Utilities Industry Law
1966	
July 25	Commissioning of Japan Atomic Power Company Co., Ltd.'s Tokai Power Station
1970	
March 14	Commissioning of Japan Atomic Power Company Co., Ltd.'s Tsuruga Power Station (First BWR in Japan)
November 28	Commissioning of Kansai Electric Power Co., Inc.'s Mihama Power Station Unit 1 (First PWR in Japan)
1971	
March 26	Commissioning of Tokyo Electric Power Co., Inc.'s Fukushima Daiichi Nuclear Power Station Unit 1

1979	
January 22	The Ministry International Trade and Industry institutionalizes "public hearings" in locations convenient to nuclear power plants for the listening of resident opinions.
January 26	The Nuclear Safety Commission determines the general principles of the safety inspection double checking system.
February 27	A proposed amendment to part of the Nuclear Reactor Regulation Law is passed in a House of Representatives plenary session, paving the way for private reprocessing business.
March 28	A large-scale reactor accident occurs in Unit 2 (PWR made by B&W) at the Three Mile Island (TMI) nuclear power plant (U.S.A.).
March 30	The state governor declares a state of emergency and residents in surrounding areas are evacuated.
June 6	Based on the results of comprehensive inspections of nuclear power plants, the Ministry of International Trade and Industry instructs each electric power company to make eight specific improvements.
July 12	The Central Disaster Prevention Council determines measures that should be implemented for the present time to prevent possible disasters at nuclear power plants.
July 16	A fire occurs at a reprocessing plant Windscale, U.K.
September 13	The TMI Special Committee of the Nuclear Safety Commission releases its second report, indicating 52 lessons to be learned (items to be reflected in safety preservation measures).
October 23	The US Nuclear Regulatory Commission (NRC) releases its final report (NUREG-0585) on the TMI accident.

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1980	
January 17	The Nuclear Safety Commission conducts the first public hearing on the construction of a new reactor (Unit 3) at the Kansai Electric Power Co., Inc.'s Takahama Power Station.
May 6	The Nuclear Safety Commission decides to incorporate "14 items relating to the TMI accident to be reflected in safety preservation measures" into safety inspections.
June 30	The Nuclear Safety Commission determines the guidelines for nuclear disaster countermeasures.
August 4	For the first time, the Ministry of International Trade and Industry approves the additional installation of Units 3 and 4 at the Takahama Power Station and Units 3 and 4 at the Fukushima Daini Nuclear Power Station conditional upon the double checking system.
December 4	The first public hearing on the installation of reactors is conducted (concerning the installation of Units 2 and 5 at the Tokyo Electric Power Co., Inc.'s Kashiwazaki-Kariwa Nuclear Power Station).

1981	
January 17	The Power Reactor and Nuclear Fuel Development Corporation's Tokai Reprocessing Plant begins full-scale operation as negotiations on reprocessing between Japan and the U.S. are settled.
March 26	Tokyo Electric Power Co., Inc.'s Fukushima Daiichi Nuclear Power Station achieves an accumulated electric power record of 100 billion kWh, the highest for a BWR anywhere in the world.
April 18	A radiation leak occurs at the Japan Atomic Power Company Co., Ltd.'s Tsuruga Power Station.
May 12	The national government designates Sekinehama, Aomori Prefecture, as the new home port for the nuclear ship "Mutsu."
May 18	The Ministry of International Trade and Industry and the Science and Technology Agency release a report on the problems of the Tsuruga Nuclear Power Station.
June 17	The Ministry of International Trade and Industry orders the Japan Atomic Power Company Co.'s Tsuruga Power Station where the accident occurred to suspend operations for 6 months.
July 27	The Ministry of International Trade and Industry begins work on the third improvement and standardization program (toward the completion of the "Japanese-type light water reactor").
October 20	The Nuclear Safety Commission compiles the first white paper on nuclear safety.

1982	
March 26	The Power Reactor and Nuclear Fuel Development Corporation begins full-scale operation of the uranium enrichment pilot plant (centrifuge) at the Ningyo-toge.
	The Advisory Committee for Energy of the Ministry of International Trade and Industry announces prospects for long-term energy supply and demand.
April 21	The prospects of August 1979, are downwardly revised and the goal for nuclear power output for FY1985 is set at 46 million kW.
May 14	The Atomic Energy Commission formulates a new long-term nuclear power utilization plan.
June 30	The policy that private companies should play the central role in uranium enrichment and reprocessing operations is laid out.

1983	
April 28	Unit 1 at the Fukushima Daini Nuclear Power Station, which began operation in April of the previous year, achieves a record of 384 days of continuous operation.
May 13	Concerning the installation of Unit 2 at the Chugoku Electric Power Co., Inc.'s Shimane Nuclear Power Station, a second public hearing was held with those against the installation in attendance for the first time.
October 26	The US Senate rejects the budget for the Clinch River Breeder Reactor (CRBR) and the construction plans are canceled.
November 6	The Nuclear Power Subcommittee of the Advisory Committee for Energy at the Ministry of International Trade and Industry, downwardly revise long-term energy demand prospects and set the goal for nuclear power output for FY1990 at 34 million kW. It also forecasts that the construction of a demonstration unit of a fast breeder reactor will begin in the first half of the 1990s.
December 22	The second public hearing on the installation of Units 1 and 2 at the Tomari Power Station is held with those against the installation not present.

1984	
January 10	Five European nations enter into long-term cooperation agreements on the joint construction of commercial fast breeder reactors.
January17	The Scientific Technology Subcommittee of the Liberal Democratic Party decides to take the nuclear ship “Mutsu” out of service.
January 24	The Atomic Energy Commission stresses the importance of “Mutsu” and prepares the “Guidelines for Research and Development of Nuclear Ships.” It is decided to continue with the experiment.
April 20	The Federation of Electric Power Companies officially requests Mr. Kitamura, governor of Aomori Prefecture, to agree on a proposal to construct three nuclear fuel cycle facilities in Aomori Prefecture.
July 2	The Nuclear Power Subcommittee of the Advisory Committee for Energy releases a report entitled “Toward the Establishment of an Independent Nuclear Fuel Cycle.”
August 7	The Atomic Energy Commission releases an interim report on the disposal of radioactive waste.
August 23	The Nuclear Power Subcommittee of the Advisory Committee for Energy releases an interim report on the enhancement of light-water reactor technology (increasing the operating rates of nuclear power stations to more than 80%, etc.).

1985	
April 8	The Japan Atomic Energy Research Institute successfully produces plasma for the first time using the JT-60 plasma experimentation unit.
April 18	Concerned parties reach an agreement to cooperate on the selection of sites for three nuclear fuel cycle facilities.
May 29	The US Nuclear Regulatory Commission (NRC) approves the restarting of Unit 1 at TMI.
July 31	The Japan-China nuclear power agreement is signed.
September 7	“Super Phoenix”, a fast breeder demonstration reactor in France, reaches critical level.
January 14	The French “Super Phoenix” demonstration FBR begins transmission of electric power.
February 5	A radiation leak occurs at a reprocessing plant in Sellafield, U.K.

1986	
April 26	The worst nuclear accident in history occurs in Unit 4 at the Chernobyl nuclear power plant (former USSR).
May 21	The radioactive waste disposal business is newly legislated and a proposed amendment to part of the Nuclear Reactor Regulation Law is passed in the House of Councilors.
August 25	The IAEA holds a meeting of experts to discuss the nuclear reactor accident that occurred in Russia (until August 25 in Vienna).
December 4	The Japan Atomic Energy Research Institute requests the Nuclear Regulatory Commission to start dismantling the JPDR.

1987	
April 30	The Japan Nuclear Fuel Service Company signs a contract with French company SGN concerning reprocessing technology.
May 26	Japan Nuclear Fuel Ltd. applies for a license to operate the Rokkasho uranium enrichment plant.
May 28	The Special Committee for Investigation of the Accident in Russia, which was established within the Nuclear Safety Commission, reports that there are no immediate improvements to be made.
June 22	The Atomic Energy Commission formulates a long-term nuclear power development and utilization plan.
	The established policy to promote the reprocessing of spent fuel and to shift from light water source.
November 4	The national government signs the new Japan-U.S. Nuclear Cooperation Treaty into which the “comprehensive prior agreement system” is incorporated.
February 12	The output adjustment operation of Unit 2 at the Shikoku Electric Power Co., Inc.’s Ikata Power Station is carried out as planned.

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1988	
July 7	Negotiations to amend the Japan-France Nuclear Treaty begin.
August 10	The national government approves the construction of Japan Nuclear Fuel Ltd.'s commercial uranium enrichment facility (construction to begin on October 14).
October 18	The national and US governments sign the amended version of the new Japan-U.S. Nuclear Treaty.
	Sea transportation of plutonium is incorporated into the comprehensive prior agreement system.
October 21	The IAEA and OSART (Operational Safety Review Team) report that the level of safety at the Kansai Electric Power Co., Inc.'s Takahama Nuclear Power Station is the highest in the world.
October 28	Japan becomes an official member of the Convention on the Physical Protection of Nuclear Material.
November 16	Hokkaido's first nuclear power plant, Tomari Power Station Unit 1, reaches critical level.
December 1	With the construction of the Shika Nuclear Power Station, there are no regions in Japan without a nuclear power plant.
January 7	Unit 3 at the Fukushima Daini Nuclear Power Station is shut down due to the malfunction of the recirculation pump.
February 10	The Japan Atomic Energy Research Institute applies for approval for the installation of a high-temperature engineering test reactor (HTTR) with a thermal output of 30,000 kW.
March 30	Japan Nuclear Fuel Service Company Limited applies for the licensing of its Rokkasho reprocessing plant.

1989	
April 7	The US Nuclear Regulatory Commission (NRC) approves a new regulation for unifying the licensing of the standardization, construction and operation of nuclear power plants.
May 15	The World Association of Nuclear Operators (WANO) is officially established in an inaugural meeting held in Moscow.
July 10	The Ministry of International Trade and Industry initiates a system for the ranking accidents and breakdowns of nuclear power plants and for making the information available to the public.
July 16	The important role that nuclear power generation plays in reducing greenhouse gas emissions is clearly stated at a Summit Meeting in Paris.
July 18	The Science and Technology Agency initiates a system for the ranking accidents and breakdowns of nuclear fuel cycle facilities and research reactors and for making the information available to the public.
September 17	The increasing importance of the role of nuclear power generation in protecting the global environment is emphasized at the 14th World Energy Conference held in Montreal.

1990	
June 5	The Advisory Committee for Energy compiles new prospects for long-term energy supply and demand; the output of nuclear power generation for 2010 was downwardly revised to 72.5 million kW, and the importance of the location of nuclear facilities was highlighted.
July 5	The Ministry of International Trade and Industry announces the assessment result, stating that there are no problems with the restarting of Unit 3 at the Fukushima Daini Nuclear Power Station.
July 19	The Japan-France Nuclear Cooperation Treaty, a major premise for the construction of reprocessing facilities, goes into effect.
August 2	Iraq invades Kuwait, and an economic blockade against Iraq is adopted by the United Nations Security Council - "the Gulf Crisis"
September 13	Japan Nuclear Fuel Ltd. completes the delivery of commercial uranium enrichment equipment
October 18	Revision application from Japan Nuclear Fuel Service Company for reprocessing facilities
November 15	The national government approves the construction of Japan Nuclear Fuel Ltd.'s industrial low-level radioactive waste burial facilities. Construction to begin on December 6
February 9	Unit 2 at the Mihama Power Station is shut down due to the fracturing of heat transfer pipes in the steam generator (ECCS functioned for the first time).

1991	
May 15	The Ministry of International Trade and Industry approves the installation of Units 6 and 7 (the first improved BWRs) at the Kashiwazaki-Kariwa Nuclear Power Station.
May 18	"Monju", a prototype fast breeder reactor, is installed and comprehensive functional testing begins.
June 6	The Special Investigative Committee for the Mihama Accident established within the Ministry of International Trade and Industry, releases its interim report that the cause of the accident was an error made when inserting the side anchor.
October 30	The Nuclear Safety Commission conducts a public hearing on reprocessing facilities and facilities for handling high-level radioactive returned waste.
November 22	The Special Committee for Investigating the Mihama Accident releases its final report.
	It concludes that the cause of the fracture was an error made when inserting the side anchor, and instructed the company to strengthen countermeasures.
December 18	With the commencement of operation of Unit 3 at the Ohi Power Station, the number of commercial nuclear power plants in Japan is 42 and their overall generation capacity is 3,340 kW.
January 20	The Japan Atomic Energy Research Institute announces the "Mutsu" dismantling plan.
March 27	Japan Nuclear Fuel Ltd. begins operation of its uranium enrichment plant (initial output unit: 150 tons SWU/year).

1992	
May 6	Japan Nuclear Fuel Service Company beings the first-term construction of its high-level radioactive returned waste facility (storage of 1,440 vitrified containers of waste).
July 6	An economic declaration is announced at the Munich Summit Meeting. Measures to support the former USSR and eastern European nations in securing the safety of their nuclear power plants are incorporated into the declaration.
July 28	The Atomic Energy Commission establishes a long-term planning division to review the long-term nuclear power development and utilization plan. The Special Group for Radioactive Waste Countermeasures estimates that radioactive waste disposal operations for the disposal of high-level radioactive waste will commence in the mid-2030s or mid-2040s.
	The Ministry of International Trade and Industry, the Science and Technology Agency and the Ministry of Transport, decide to adopt the "International Nuclear Event Scale (INES)" for nuclear power plants, related facilities and transportation.
August, 1	The Ministry of International Trade and Industry instructs the Tokyo Electric Power Co. to take countermeasures in order to prevent the reoccurrence of the same accident as that which occurred in Unit 2 at the Fukushima Daiichi Nuclear Power Station.
October 29	It also requests that the presence of ECCS functioning be reported first.
December 8	Japan Nuclear Fuel Ltd. begins operation of the low-level radioactive waste storage center.
December 24	Licensing of Rokkasho Reprocessing Plant is granted to Japan Nuclear Fuel Ltd.
January 5	"Akatsukimaru," a plutonium transport ship, enters Tokai Port.
January 13	In the U.S., ABWR is selected as a progressive reactor and AP600 as a passive reactor based on detailed engineering designs.
February 17	The Clinton government of the U.S. cuts the budget for new reactor development to a quarter of the budget of the previous year.
March 23	The Japan Atomic Energy Research Institute achieves the world's highest fusion product through the operation of the JT-60.

1993	
April 28	Japan Nuclear Fuel Limited begins construction of its Rokkasho reprocessing plant.
May 28	A preparatory committee for organizing operators responsible for the disposal of high-level radioactive waste is established.

1994	
April 5	The prototype fast breeder reactor, “Monju”, reaches critical level.
June 24	The Atomic Energy Commission adopts the “Long-term Plan for Nuclear Power Research, Development and Utilization.” It is stated in this plan that policies to promote nuclear fuel recycling should be maintained and that the plan should be implemented with due consideration to transparency and information disclosure.
October 13	Unit 2 at the Mihama Power Station begins commercial operation. The 10th reactor unit in Korea reaches critical level.
January 17	The Great Hanshin-Awaji Earthquake occurs. Nuclear power plants in surrounding regions are not affected.

1995	
May 15	In the supplementary budget of FY1995, emphasis is on science and technology. The Japan Atomic Energy Research Institute’s high-temperature engineering test and research reactor is completed one year ahead of schedule and reaches critical level in FY1997.
July 11	The Federation of Electric Power Companies requests the Science and Technology Agency and concerned parties to review the Oma advanced thermal demonstration reactor plan.
September 29	Following the Great Hanshin-Awaji Earthquake, the Examination Committee on Seismic Safety of the Nuclear Safety Commission reviews the Examination Guide for Seismic Design of Nuclear Power Reactor Facilities, and concludes that the current Guide is appropriate.
December 8	Sodium leakage occurs at the “Monju” prototype fast breeder reactor.
January 23	The governors of Fukushima, Niigata and Fukui Prefectures call on the Director-General of the Science and Technology Agency and the Minister of International Trade and Industry, to request that best efforts be made to build a national consensus.
March 15	The Atomic Energy Commission decides that a round-table meeting is to be established to discuss nuclear policies.

1996	
April 16	In the U.S., a plan to construct an intermediate storage facility for spent fuel on the Mescalero Indian reservation stalls.
June 28	It is decided to terminate the commercial operation of the Japan Atomic Power Company’s Tokai Power Station (GCR) at the end of March 1998 and for the plant to be into decommissioning stage.
February 14	The Director-General of the Science and Technology Agency and the Minister of International Trade and Industry hold a meeting with the three governors of Fukui, Fukushima and Niigata Prefectures to request their cooperation in implementing the nuclear fuel cycle policy. (1) The thermal use of plutonium is to begin using 3 to 4 units by 2000, with full-scale thermal use operation to start by around 2010. (2) The viability of storing spent fuel outside the premises of power plants is to be investigated. (3) Measures to dispose of high-level radioactive waste are to be investigated. (4) The safety of the “Monju” reactor is to be verified by performing comprehensive inspections, and the appropriateness of maintaining its operation is to be clarified.
March 6	Tokyo Electric Power Co. explains the details of its plutonium-thermal project in Niigata and Fukushima Prefectures.
March 11	A fire and explosion occur at the asphalt solidification facility in the Power Reactor & Nuclear Fuel Development Corporation’s Tokai Plant.

1997	
April 15	The Science and Technology Agency establishes the Investigative Committee for Power Reactor & Nuclear Fuel Reform.
July 2	Unit 7 at Tokyo Electric Co., Inc.'s Kashiwazaki-Kariwa Nuclear Power Station commences operation, making the facility the world's largest nuclear power plant.
August 1	The Investigative Committee for Power Reactor & Nuclear Fuel Reform submits a plan to the Director-General of the Science and Technology Agency on restructuring and the inauguration of a new corporate body. A working group is established for this new entity.
December 1	The third session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) is held in Kyoto (until December 11). Nations participating in this session reach an agreement on the numerical reduction targets of greenhouse gas emissions.
December 23	The Science and Technology Agency announces that the new name of the Power Reactor & Nuclear Fuel Development Corporation is the "Japan Nuclear Cycle Development Institute."
February 2	The French government decides to shut down the "Super Phoenix" fast breeder reactor.
February 23	Kansai Electric Power Co. submits to Fukui and other prefectures a request for prior understanding on the plutonium-thermal project.
March 31	The unit at the Japan Atomic Power Company's Tokai Power Station, which was the first commercial reactor established in Japan, is shut down and put into the decommissioning stage.

1998	
April 29	The COP3 protocol is signed.
May 28	Following an underground nuclear test by India, Pakistan also conducts an underground nuclear test.
June 5	In the U.K., BNFL announces the shutdown of its MOX fuel reprocessing plant in Dounreay.
October 1	The Japan Nuclear Cycle Development Institute (formerly the Power Reactor & Nuclear Fuel Development Corporation) is established.
October 6	A special investigative committee is established at the Science and Technology Agency to investigate the falsification of data on neutron shielding material of a spent fuel transportation container.
November 2	Fukushima Prefecture announces that it will give prior understanding on the plutonium-thermal project as requested by the Tokyo Electric Power Co.
February 8	The Ministry of International Trade and Industry releases the report "Evaluation of Measures Taken by Electric Power Companies Concerning Nuclear Plant Aging, and Practical Measures to Implement to Deal with Aging."

1999	
June 28	The Nuclear Safety Commission determines that the current Safety Examination Guideline can be applied to the safety of ABWR using global MOX fuel.
July 12	Leakage occurs from the heat exchanger of the chemical volume control system in Unit 2 at Japan Atomic Power Company Co., Ltd.'s Tsuruga Power Station.
September 14	Kansai Electric Power Co. announces that it was notified by BNFL, which supplies Unit 3 at Takahama with MOX fuel, of doubts over a part of the quality control data.
September 30	A criticality accident occurs at the JCO Tokai Plant (fuel processing facility) in Tokai Village.
December 3	Japan Nuclear Fuel Limited commences operation of its Rokkasho reprocessing plant.
December 9	In order to engender a culture of safety in the nuclear industry, 35 companies and organizations, including electric power companies, fuel fabricating companies, plant manufacturers, research institutions, etc. found the Nuclear Safety Network (NS Network).
December 13	The Special Law on Nuclear Disaster Countermeasures and the amended Nuclear Reactor Regulation Law specifying tightened safety regulations are passed in a House of Councilors plenary session and go into effect.
December 21	Mr. Hisashi Ouchi, a JCO employee who was exposed to excessive radiation during the JCO criticality accident, dies at the age of 35. He is the first victim at nuclear facilities in Japan.
March 28	The Science and Technology Agency revoke the fabrication business license of JCO on the grounds that the company modified equipment without the permission of the regulatory authority and committed other violations against the Nuclear Reactor Regulation Law.

App

2000	
May 24	The Science and Technology Agency assesses the JCO criticality accident as a "level 4" accident according to the International Nuclear Event Scale (INES).
May 31	The "Law on Final Disposal of Special Radioactive Waste," which specifies the framework for the disposal of high-level radioactive waste generated by reprocessing, is adopted in a House of Councilors plenary session and goes into effect.
June 2	The Conference on Long-Term Planning encountered the JCO accident and had a considerable influence on the course of discussions about the accident. It submits a draft of the final report to the Atomic Energy Commission.
June 14	The "Special Law on Nuclear Disaster Countermeasures," which specifies the establishment of off-site centers in 21 locations throughout the country, goes into effect.
October 18	The Nuclear Waste Management Organization of Japan is established as an organization in charge of controlling the disposal of high-level radioactive waste.
November 16	The Japan Nuclear Cycle Development Institute concludes agreements with the governments of Hokkaido and Horonobe Town concerning the study of deep geological strata.
November 20	The Japan Nuclear Cycle Development Institute's Tokai Reprocessing Facility resumes operation after a suspension period of 3 years and 8 months.
December 19	Japan Nuclear Fuel Limited starts bringing in spent fuel to its Rokkasho reprocessing plant.
January 6	The Nuclear and Industrial Safety Agency is in charge of dealing with matters related to commercial power reactors. After the reorganization of government ministries and agencies, the responsibilities of the Agency were expanded and it was made responsible for not only matters facilities, reprocessing facilities, disposal facilities and power reactors in a research and development stage.

2001	
July 16	The Nuclear Safety Commission determines the clearance levels for nuclear facilities, heavywater reactors, fast breeder reactors, etc.
November 7	Pipes fracture in the residual heat removal system of Unit 1 at the Chubu Electric Power Co., Inc.'s Hamaoka Nuclear Power Station.

2002	
August 29	Falsification of self-inspection records and other issued involving Tokyo Electric Power Co. are revealed.
October 25	Falsification in the reactor containment leakage rate test of Unit 1 at the Tokyo Electric Power Co.'s Fukushima Daiichi Nuclear Power Station is revealed.
October 31	The Subcommittee for Investigation of Nuclear Safety Regulation Laws, established within the Nuclear Safety Commission, investigates the falsification of self-inspection records involving licensees, studies preventive measures and releases an interim report.
November 1	Japan Nuclear Fuel Limited commences chemical testing at its Rokkasho reprocessing plant.

2003	
October 1	The Nuclear Reactor Regulation Law, the Electricity Utilities Industry Law and other related laws are amended, and based on these amended laws a new nuclear safety administration system begins.
November 21	Construction begins on Hokkaido Electric Power Co., Inc.'s Tomari Power Station Unit 3 following the granting of approval of the first work plan.
November 26	The FY2003 nuclear disaster drills are carried out in Unit 2 at the Genkai Nuclear Power Station.
December 12	The Nuclear and Industrial Safety Agency orders inspections in relation to the damage to outlet piping in the regenerative heat exchanger at Tomari Power Station Unit 2.
December 22	The Nuclear and Industrial Safety Agency requests the periodical evaluation of processing and reprocessing facilities, as well as reporting on aging management.
March 31	The Nuclear and Industrial Safety Agency establishes a Nuclear Safety Public Relations and Training Division.

2004	
April 22	The Nuclear and Industrial Safety Agency instructs measures to be taken in relation to the damage to the main rod of the charging pump in Unit 3 at Shikoku Electric Power Co., Inc.'s Ikata Power Station.
May 29	Kyushu Electric Power Co., Inc. applies for approval for the use of MOX fuel at Genkai Nuclear Power Station Unit 3.
June 29	The Nuclear and Industrial Safety Agency orders the collection of reports on the ECCS strainer and clogging of the recirculator sump screen of the containment vessel.
August 9	The secondary piping rupture accident occurs in Unit 3 at Kansai Electric Power Co., Inc.'s Mihama Power Station during preparation for a periodical inspection; five workers are killed and six are injured.
September 22	Promulgation and enforcement of the Ordinance for the Amendment of the Enforcement Regulations of the Electricity Utilities Industry Law, which is related to integrity evaluations of piping that uses austenite low carbon stainless steel for nuclear power generation.
October 1	The Nuclear and Industrial Safety Agency publishes the safety management evaluation results of licensee periodical inspections for Hokkaido Electric Power Co., Inc.'s Tomari Power Station Unit 2, Kansai Electric Power Co., Inc.'s Takahama Power Station Unit 1, Shikoku Electric Power Co., Inc.'s Ikata Power Station Unit 2 and Kyushu Electric Power Co., Inc.'s Genkai Nuclear Power Station Units 2 and 3.
November 16	"Town hall meetings" between local residents in the vicinity of nuclear power facilities and the Nuclear and Industrial Safety Agency begin.
December 16	The first meeting of the Nuclear Power Plant Aging Review Committee is held in Fukui City.
	Prior to the meeting, the Nuclear Power Plant Aging Management Office is established at the inspection division of nuclear power in the Nuclear and Industrial Safety Agency on December 13.
December 21	Japan Nuclear Fuel Limited commences uranium testing at its Rokkasho reprocessing plant.
January 18	Commissioning of Chubu Electric Power Co., Inc.'s Hamaoka Nuclear Power Station Unit 5 (ABWR electrical output 1,380,000 kW) - the largest generated output in Japan
	A workshop on the effectiveness of safety management and inspection activities conducted by electric power companies is given under the joint auspices of NEA and IAEA.
March 30	The Nuclear and Industrial Safety Agency compiles the final report on the fracture of secondary system piping that occurred at the Mihama Power Station Unit 3.

2005	
April 13	The Japan Nuclear Technology Institute is established to improve the technological infrastructure and to promote self-controlled safety preservation activities.
April 22	Pipe fracturing occurs and a solution leaks at a reprocessing plant in Sellafield, U.K.
May 30	The national government wins a case involving the fast breeder reactor "Monju" at the Supreme Court's decision.
June 9	Results of the OSART evaluation of Kashiwazaki-Kariwa Units 4 and 5 are made public.
August 12	The Nuclear and Industrial Safety Agency issues a guideline regarding how to identify nonradioactive wastes generated by nuclear power plants.
August 16	Units 1, 2 and 3 at the Onagawa Nuclear Power Station are automatically shut down as the Miyagi Prefecture Offshore Earthquake occurs and the tremor exceeds a specified safety limit.
August 29	As the hurricane Katrina approaches the United States, the Waterford Nuclear Power Station was and shut down.
October 1	The Japan Atomic Energy Research Institute and Japan and the Nuclear Fuel Cycle Development Institute are consolidated to establish the Japan Atomic Energy Agency.
October 14	The "Nuclear Energy Policy Outline" compiled by the Atomic Energy Commission is approved at a Cabinet meeting.
November 9	A comprehensive nuclear disaster preparedness drill is given at the Kashiwazaki-Kariwa Nuclear Power Station.
December 5	IAEA makes a TranSas evaluation in Japan.
December 6	The Federation of Electric Power Companies announces a plutonium utilization plan.
December 6	Commissioning of Tohoku Electric Power Co., Inc.'s Higashidori Nuclear Power Station Unit 1 - a new nuclear power station constructed for the first time in 12 years.
December 10	IAEA and its Director-General El Baradei, are awarded Nobel Peace Prize.
March 15	Shika Nuclear Power Station Unit No. 2 (ABWR) began operation; it is the 55th unit put into operation in Japan.
March 31	Active tests began at the Rokkasho Reprocessing Plant.

2006	
June 15	At Hamaoka Nuclear Power Station, Unit No. 5 stopped operation due to excessive turbine vibration. It was discovered that the low-pressure turbine blades had fallen off.
June 30	The Nuclear and Industrial Safety Agency approved the decommissioning plan for Tokai Power Station of the Japan Atomic Power Company, Ltd.
July 1	Mr. Dale Klein replaced Mr. Nils Diaz as chairman of the U.S. NRC.
July 25	At Forsmark Nuclear Power Station in Sweden, the emergency DG of Unit No. 1 (BWR, 1008 MWe) failed to start due to problems related to opening of the disconnector at the switchyard.
August 8	The Ministry of Economy, Trade and Industry officially adopted The New National Energy Strategies
September 14	The national government designated Higashidoori Nuclear Power Station of Tokyo Electric Power Co., Inc. as an important point of electric power development.
September 19	The Nuclear Safety Commission revised Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities
October 25	Under the direction of the national government, nuclear disaster countermeasure drills were conducted at Ikata Power Station of Shikoku Electric Power Co., Inc.
November 13	ASN (Nuclear Safety Regulatory Bureau) was established in France, and Mr. Lacoste became the new chairman.
November 14	The experimental fast reactor Joyo received a historic landmark award of American Nuclear Society (News)
December 6	At the Rokkasho Reprocessing Plant, the 2nd step of the active test in the commissioning process was completed.
February 27	Exelon Nuclear of the United States, Lassale Unit 1 marked a world record for continuous operation of 739 days.
March 12	A hidden critical accident at the periodical inspection in 1999 was revealed at Hokuriku Electric Power Company, Shika Nuclear Power Station, Unit 1.

2007	
April 24	The Japan-U.S. joint nuclear energy action plan was announced.
April 26	Active test “third step” finished at Japan Nuclear Fuel Limited, Rokkasho Reprocessing Plant.
July 16	Damage occurred to Kashiwazaki-Kariwa Nuclear Power Station due to the Niigata Chuetsu-Oki earthquake.
July 29	Fifty-year anniversary of the establishment of the IAEA.
August 6	The IAEA team started to investigate the state of damage to the Kashiwazaki-Kariwa Nuclear Power Station due to the earthquake.
October 24	The “ITER agreement” came into effect and the ITER institution was established formally.
December 4	The construction of Flamanville Unit 3, the first EPR in France, started.
December 27	The Nuclear Safety Commission of Japan revised part of the Examination guide for fire protection of light water nuclear power reactor facilities.
January 23	The Borssele nuclear power plant in the Netherlands achieved a new record power generation of 3,994 TWh in 2007.
March 14	The Basic Policy on Specified Radioactive Waste Final Disposal, and the Specified Radioactive Waste Final Disposal Plan were revised (Cabinet approval).

2008	
May 5	Kazakhstan and Japan signed a memorandum for strengthening their strategic partnership in the field of the peaceful uses of nuclear energy.
July 29	The Action Plan for Establishing a Low Carbon Society was approved in the Cabinet.
October 3	The International Atomic Energy Agency (IAEA) inaugurated the International Seismic Safety Centre (ISSC).
December 22	The Chubu Electric Power Co., lnc.'s Hamaoka Nuclear Power Station replacement plan (decommissioning of Units 1 and 2, and building of Unit 6 and a spent fuel dry-storage facility) was announced.
February 3	India signs a safeguard treaty with the IAEA at a commercial nuclear reactor.

2009	
May 20	Tokyo Electric Power Co., Inc.'s Kashiwazaki-Kariwa Nuclear Power Station Unit 7 resumes power generation for the first time in 1 year and 10 months since its shutdown due to the Chuetsu-Oki Earthquake.
June 3	Sweden determines Forsmark to be the final disposal site of spent fuel.
August 11	Chubu Electric Power Co.'s Hamaoka Nuclear Power Station Units 4 and 5 automatically shut down due to the earthquake centered off the coast of Suruga Bay.
October 26	A (center-right) coalition government comprising three parties which promote nuclear power generation is established in Germany.
November 9	Kyushu Electric Power Co., Inc.'s Genkai Nuclear Power Station Unit 3 starts plutonium thermal operation for the first time in Japan.
December 1	Yukiya Amano, the former ambassador of nuclear nonproliferation, officially assumes the office of IAEA Director General.
December 22	Hokkaido Electric Co., Inc.'s Tomari Power Station Unit 3 starts commercial operation.

2010	
April 26	In India, the scrap plant manager died of radiation source exposure by Co-60 of gamma ray irradiation equipment. INES rating "Level 4".
May 6	Fast breeder Reactor Monju restarted its System Start-up Test following 14 year 5 Month suspension after the sodium leak event occurred in 1995.
November 30	Japan Atomic Energy commission started examination aiming at the new Framework for Nuclear Energy Policy.
December 1	Russia was placed of a guaranteed reserve of Low enriched uranium under the control of the IAEA, the world's first.
March 11	The Tohoku District – off the Pacific Ocean Earthquake occurred, resulting in an accident at Fukushima Daiichi Nuclear Power Station (INES classification: Level 7 (provisional)).
March 25	The European Council decided to implement stress tests

2011	
May 24 to June 2	The IAEA International Fact-Finding Mission visited Japan to investigate matters related to the accident at Fukushima Daiichi Nuclear Power Station that occurred after the Tohoku District – off the Pacific Ocean Earthquake and Tsunami.
June 1	EU countries started stress tests.
July 11	It was decided to conduct safety evaluations of the units that are being shutdown in Japan by using the stress tests conducted in the EU as a reference.
July 12	The US NRC released its final report on the short-term task force (NTTF) for the accident in Japan.
October 28	Kansai Electric Power Co., Inc. submitted to the NISA a report on the comprehensive evaluation (primary evaluation) of the safety of Ohi Power Station Unit 3 (following this, a total of 17 reports on nuclear power plants were submitted from respective electric power companies by the end of March, 2012).
October 31	The licensees in EU countries completed reports of stress tests.
November 25	The NISA issued instructions on the comprehensive evaluation of the safety of nuclear fuel cycle facilities in Japan.
December 16	It was confirmed that a cold shutdown status of Tokyo Electric Co., Inc.'s Fukushima Daiichi Nuclear Power Station had been achieved (Step 2 for recovery from the accident was completed).
December 31	The regulating authorities in EU countries completed final reports on the stress tests.
January 23 to 31	The IAEA Review Mission visited Japan to investigate matters related to the adequacy of the evaluation methods used in the stress tests in Japan.
March 12	The NRC released high-priority orders (additional requests on top of the usual approval conditions) and requests for information regarding three NTTF advisories on the response to the Fukushima accident.

2012	
April 19	The decommissioning of Fukushima Daiichi Nuclear Power Station Units 1-4 was decided.
May 5	The shutdown of Tomari Power Station Unit 3 led to a zero capacity factor after the internal of 42 years.
June 16	The restart of Ohi Power Station Units 3 and 4 was determined based on the stress test results.
June 27	Promulgation of the Nuclear Regulation Authority Establishment Act (Establishment on September 19)
July 5	Zero capacity factor ended in about 2-months when Ohi Power Station Unit 3 restarted.
September 18	Abolition of the Nuclear and Industrial Safety Agency, which was newly established when the central government ministries and agencies were reorganized on January 6, 2001.
September 19	The Nuclear Regulation Authority was established.
November 7	Nuclear facilities at the Fukushima Daiichi Nuclear Power Station, Tokyo Electric Power Co., Inc. were specified as specific nuclear facilities.
February 6	The Nuclear Regulation authority announced a draft of framework of a new safety standard for regulation of light water nuclear power reactor facilities.
February 15	The Diet approved 5 committee members of the Nuclear Regulation Authority.

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