

Nuclear Reactor-Re-Starts-Japan
Draft Status Report
6 January 2014

Is 2014 the Year of Nuclear Re-starts in Japan?

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Commentary - January 2014 (May 2013 Commentary at back of this report)

Eight Japanese Electric Power Companies (EPCs) have submitted applications to Japan's Nuclear Regulatory Authority (NRA) to re-start [17 reactors](#) as of [31 December 2013](#).

The list is as follows:--

[Hokkaido EPC](#): All 3 Tomari Reactors) Hokkaido = 3

[Kansai EPC](#) : Units # 3 & # 4 Ohi Reactors

[Kansai EPC](#) : Units # 3 & #4 Takahama Reactors) Kansai = 4

[Shikoku EPC](#) : Unit # 3 Ikata Reactor) Shikoku= 1

[Kyushu EPC](#) : Units #1 & # 2 Sendai Reactors

[Kyushu EPC](#) : Units # 3 & # 4 Genkai Reactors) Kyushu = 4

[TEPCO](#) : Units # 6 & #7 Kashiwazaki-Kariwa Reactors) TEPCO = 2

[Chugoku EPC](#) : Unit #2 Shimane Reactor) Chugoku = 1

[Tohoku EPC](#) : Unit #4 at Onagawa Reactors) Tohoku = 1

[Chubu EPC](#) : Unit #4 at Hamaoka Reactors) Chubu = 1

The cumulative generation capacity of these reactors is 15.4GW equivalent to the entire power generation capacity of [Vietnam](#) or [Greece](#) and may be capable of generating over [100TWh](#) of power or over 10% of Japanese power requirements.

Hokuriku EPC is the only one of the nine Japanese "Nuclear" EPCs that has so far not applied for a reactor re-start.

The reprocessing plant at [Rokkasho](#), in Aomori Prefecture in Northern Honshu is also expected to recommence operations in Q4 2014.

The status of the New-Build reactors at [Ohma](#) (J-Power) and [Shimane](#) (Chugoku EPC) also needs to be re-assessed.

EPC-Nuclear & Financial Dependency January 2014

EPC	Total Generataion Capacity GW	Nuclear Generation Capacaity GW	Nuclear % of total	FY 2012 Earnings		Expected Reactor Re-start Date						
				Ybillions	\$millions	Never	On-Line	Q2 2014	Q3 2014	Q4 2014	FY 2015	2016 +
#s of Reactors												
Hokkaido	7.4	2.4	32%	(133)	(1,330)				3			3
Tohoku	17.2	3.28	19%	(104)	(1,040)	2			1		1	4
Tokyo	65	12.1	19%	(685)	(6,850)	4			2		5	11
Chubu	32.8	3.52	11%	(32)	(320)	0			1		2	3
Hokuriku	8.1	1.74	21%	0	1						2	2
Kansai	34.9	9.79	28%	(243)	(2,430)	7			4			11
Chugoku	12	1.28	11%	(22)	(220)	1					1	2
Shikoku	7.2	2.03	28%	(43)	(430)	2			1			3
Kyushu	20.3	4.86	24%	(332)	(3,320)	2			4			6
Total	204.9	41	20%	(1,594)	(15,939)	18	0	0	16	0	11	45

Note: Above analysis does not include three reactors operated by Japan Atomic Power Company at Tsuruga and Tokai

Nuclear Reactors-Japan

Jan-2014

EPC Analysis

EPC	Plant	#s of Reactors			Expected Re-start Date								
		Online	Offline	Total	Never	On-Line	Q2 2014	Q3 2014	Q4 2014	FY 2015	2016 +	Total	
Hokkaido	Tomari	0	3	3				3					3
Tohoku	Higashi-dori	0	1	1	1								1
	Onagawa	0	3	3	1			1		1			3
Tokyo	Fukushima 2	0	4	4	4								
	Kashiwazeki	0	7	7				2		5			7
Chubu	Hamaoka	0	3	3				1		2			3
Hokuriku	Shika	0	2	2						2			2
Kansai	Mihama	0	3	3	3								3
	Takahama	0	4	4	2			2					4
	Ohi	0	2	4	2			2					4
Chugoku	Shimane	0	2	2	1					1			2
Shikoku	Ikata	0	3	3	2			1					3
Kyushu	Genkai	0	4	4	2			2					4
Kyushu	Sendai	0	2	2				2					2
JAPC	Tokai 2	0	1	1	1								1
JAPC	Tsuruga	0	2	2	2								2
Total		2	46	48	21	0	0	16	0	11	0		48

Nuclear Reactors-Japan

Plant	Unit	EPC	Capacity	Reactor	Start Date	Status	Application Submitted	Age (Years)	Never	On-Line	Expected Re-start Date				
											Q2 2014	Q3 2014	Q4 2014	FY 2015	2016 +
Tomari	1	Hokkaido	580	PWR	Jun-89	Off-line	July 8 '13	25.5				1			
	2	Hokkaido	910	PWR	Apr-91	Off-line	July 8 '13	23.7				1			
	3	Hokkaido	910	PWR	Dec-09	Off-line	July 8 '13	5.0				1			
Higashi-Dori	1	Tohoku	1100	BWR	Dec-05	Off-line		9.0	1						
Onagawa	1	Tohoku	520	BWR	Jun-84	Off-line		30.5	1						
	2	Tohoku	830	BWR	Jul-95	Off-line	26 Dec 2013	19.4				1			
	3	Tohoku	830	BWR	Jan-02	Off-line		12.9						1	
Fukushima-2	1	Tokyo	1100	BWR	Apr-82	Off-line		32.7	1						
	2	Tokyo	1100	BWR	Feb-84	Off-line		30.9	1						
	3	Tokyo	1100	BWR	Jun-85	Off-line		29.5	1						
	4	Tokyo	1100	BWR	Aug-87	Off-line		27.4	1						
Kashiwazeki	1	Tokyo	1100	BWR	Sep-85	Off-line		29.3						1	
	2	Tokyo	1100	BWR	Sep-90	Off-line		24.3						1	
	3	Tokyo	1100	BWR	Aug-93	Off-line		21.3						1	
	4	Tokyo	1100	BWR	Aug-94	Off-line		20.3						1	
	5	Tokyo	1100	BWR	Apr-90	Off-line		24.7						1	
	6	Tokyo	1100	BWR	Nov-96	Off-line	27 Sept '13	18.1				1			
	7	Tokyo	1100	BWR	Jul-97	Off-line	27 Sept '13	17.4				1			
Hamaoka	1	Chubu	1100	BWR	Aug-87	Off-line	Imminently	27.4						1	
	2	Chubu	1150	BWR	Sep-93	Off-line	Imminently	21.3						1	
	3	Chubu	1270	ABWR	Jan-05	Off-line	31 Dec 2013	9.9				1			

Shika	1	Hokuriku	540	BWR	Jul-93	Off-line		21.4		1
	2	Hokuriku	1200	ABWR	Mar-06	Off-line		8.8		1
Mihama	1	Kansai	340	PWR	Nov-70	Off-line		44.1	1	
	2	Kansai	500	PWR	Jul-72	Off-line		42.4	1	
	3	Kansai	830	PWR	Dec-76	Off-line		38.0	1	
Takahama	1	Kansai	830	PWR	Nov-74	Off-line		40.1	1	
	2	Kansai	830	PWR	Nov-75	Off-line		39.1	1	
	3	Kansai	870	PWR	Jan-85	Off-line	8 Jul-13	29.9		1
	4	Kansai	870	PWR	Jun-86	Off-line	8 Jul-13	28.5		1
Ohi	1	Kansai	1180	PWR	Mar-79	off-line		35.8	1	
	2	Kansai	1180	PWR	Dec-79	off-line		35.0	1	
	3	Kansai	1180	PWR	Dec-91	On-line	8 July '13	23.0		1
	4	Kansai	1180	PWR	Feb-93	On-line	8 July '13	21.8		1
Shimane	1	Chugoku	460	BWR	Mar-74	off-line		40.8	1	
	2	Chugoku	820	BWR	Feb-89	off-line	25 Dec '13	25.8		1
Ikata	1	Shikoku	570	PWR	Sep-77	off-line		37.3	1	
	2	Shikoku	570	PWR	Mar-82	off-line		32.8	1	
	3	Shikoku	890	PWR	Dec-94	off-line	8 July '13	20.0		1
Genkai	1	Kyushu	560	PWR	Oct-75	off-line		39.2	1	
	2	Kyushu	560	PWR	Mar-81	off-line		33.8	1	
	3	Kyushu	1180	PWR	Mar-94	off-line	12 July '13	20.8		1
	4	Kyushu	1180	PWR	Jul-97	off-line	12 July '13	17.4		1
Sendai	1	Kyushu	690	PWR	Jul-84	off-line	8 July '13	30.4		1
	2	Kyushu	690	PWR	Nov-85	off-line	8 July '13	29.1		1
Tokai-2	1	JAPC	1100	BWR	Nov-78	off-line		36.1	1	

Tsuruga	1	JAPC	360	BWR	Mar-70	off-line	44.8	1									
	2	JAPC	1160	PWR	Feb-87	off-line	27.8	1									
Total	<hr/>		48	<hr/>					21	0	0	16	0	11	0	48	

Others

Prototype

Fugen	1	JAEA	170	ATR													
Monju	1	JAEA	280	ATR													
Rokkasho																	

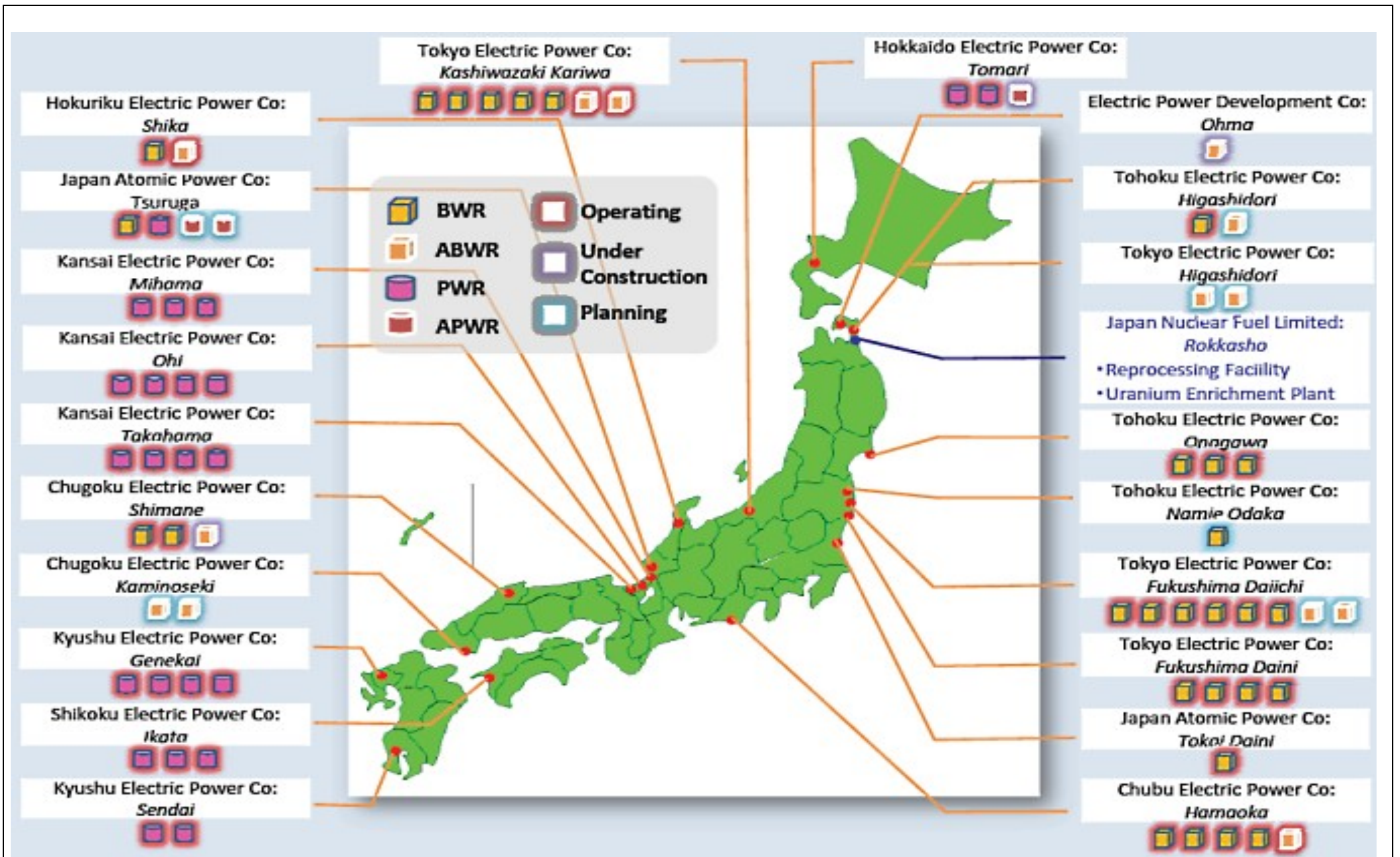
Under Construction

Shimane	1	Chugoku	1370	ABWR													
Ohma	1	J Power	1380	ABWR													

Permanently decommissioned

Hamaoka	2 reactors	Chubu	1380	BWR													
Fukushima-1	6 Reactors	Tokyo	4000	BWR													

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**Remedial Work
Each Japanese Reactor**

Nuclear Reactors-Japan

Jan-2014

Plant	Unit	EPC	Capacity	Reactor	Start Date	Status	Re-start Date	Age (Years)	<u>Nature of Remedial Work</u>	
Tomari	1	Hokkaido	580	PWR	Jun-89	Off-line	not available	23.9		
	2	Hokkaido	910	PWR	Apr-91	Off-line	not available	22.1		
	3	Hokkaido	910	PWR	Dec-09	Off-line	not available	3.4		
Higashi-Dori	1	Tohoku	1100	BWR	Dec-05	Off-line	Jul-15		Active Fault/Must install venting	
Onagawa	1	Tohoku	520	BWR	Jun-84	Off-line	not available	28.9	Must install venting	
	2	Tohoku	830	BWR	Jul-95	Off-line	not available	17.8	Must install venting	
	3	Tohoku	830	BWR	Jan-02	Off-line	not available	11.3	Must install venting	
Fukushima-2	1	Tokyo	1100	BWR	Apr-82	Off-line	Never	31.1	N/a	
	2	Tokyo	1100	BWR	Feb-84	Off-line	Never	29.3	n/a	
	3	Tokyo	1100	BWR	Jun-85	Off-line	Never	27.9	n/a	
	4	Tokyo	1100	BWR	Aug-87	Off-line	Never	25.8	n/a	
Kashiwazeki	1	Tokyo	1100	BWR	Sep-85	Off-line	May-13	27.7	Must install venting	
	2	Tokyo	1100	BWR	Sep-90	Off-line	Sep-15	22.7	Must install venting	
	3	Tokyo	1100	BWR	Aug-93	Off-line	Jul-14	19.8	Must install venting	
	4	Tokyo	1100	BWR	Aug-94	Off-line	Feb-15	18.8	Must install venting	
	5	Tokyo	1100	BWR	Apr-90	Off-line	Oct-13	23.1	Must install venting	
	6	Tokyo	1100	BWR	Nov-96	Off-line	Dec-13	16.5	Must install venting	
	7	Tokyo	1100	BWR	Jul-97	Off-line	May-13	15.8	Must install venting	
Hamaoka	1	Chubu	1100	BWR	Aug-87	Off-line	not available	25.8	Levee too low	

	2	Chubu	1150	BWR	Sep-93	Off-line	not available	19.7	Levee too low
	3	Chubu	1270	ABWR	Jan-05	Off-line	not available	8.3	Levee too low
Shika	1	Hokuriku	540	BWR	Jul-93	Off-line	not available	19.8	Must install venting
	2	Hokuriku	1200	ABWR	Mar-06	Off-line	not available	7.2	Must install venting
Mihama	1	Kansai	340	PWR	Nov-70	Off-line	not available	42.5	
	2	Kansai	500	PWR	Jul-72	Off-line	not available	40.9	
	3	Kansai	830	PWR	Dec-76	Off-line	not available	36.4	
Takahama	1	Kansai	830	PWR	Nov-74	Off-line	not available	38.5	No quake resistant bldg
	2	Kansai	830	PWR	Nov-75	Off-line	not available	37.5	No quake resistant bldg
	3	Kansai	870	PWR	Jan-85	Off-line	Jul-13	28.3	No quake resistant bldg
	4	Kansai	870	PWR	Jun-86	Off-line	Jul-13	26.9	No quake resistant bldg
Ohi	1	Kansai	1180	PWR	Mar-79	off-line	not available	34.2	
	2	Kansai	1180	PWR	Dec-79	off-line	not available	33.4	
	3	Kansai	1180	PWR	Dec-91	On-line	not available	21.4	
	4	Kansai	1180	PWR	Feb-93	On-line	not available	20.3	
Shimane	1	Chugoku	460	BWR	Mar-74	off-line	FY 2015	39.2	Must install venting
	2	Chugoku	820	BWR	Feb-89	off-line	FY2015	24.3	Must install venting
Ikata	1	Shikoku	570	PWR	Sep-77	off-line	not available	35.7	Doesn't need levee
	2	Shikoku	570	PWR	Mar-82	off-line	not available	31.2	Doesn't need levee
	3	Shikoku	890	PWR	Dec-94	off-line	Jul-13	18.4	Doesn't need levee
Genkai	1	Kyushu	560	PWR	Oct-75	off-line	not available	37.6	Doesn't need levee
	2	Kyushu	560	PWR	Mar-81	off-line	not available	32.2	Doesn't need levee
	3	Kyushu	1180	PWR	Mar-94	off-line	Jul-13	19.2	Doesn't need levee
	4	Kyushu	1180	PWR	Jul-97	off-line	Dec-13	15.8	Doesn't need levee
Sendai	1	Kyushu	690	PWR	Jul-84	off-line	Jul-13	28.9	Doesn't need levee

	2	Kyushu	690	PWR	Nov-85	off-line		Jul-13	27.5	Doesn't need levee
Tokai-2	1	JAPC	1100	BWR	Nov-78	off-line	not available		34.5	Must install venting
Tsuruga	1	JAPC	360	BWR	Mar-70	off-line	Never		43.2	Active Fault
	2	JAPC	1160	PWR	Feb-87	off-line	Never		26.3	Active Fault
Total	<hr/>		48							

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Commentary - May 2013-Reactors costing EPCs \$12billion of annual maintenance although only two are operational

Based on recent FY 2012 financial and strategic announcements by Japan's nine main electric power companies (EPCS) Kyushu, Hokkaido, and Kansai EPCs are most exposed to nuclear dependencies

At least 12 reactors of the 45 owned by the nine Utilities at 16 sites may never re-start excluding the reactors at Fukushima Dai Ichi that have been permanently decommissioned.

The three reactors owned by Japan Atomic Power Company (JAPC) at Tokai and Tsuruga may not re-start.

Re-start dates for reactors as publicized recently when FY 2012 results were released in many cases appear to be extremely optimistic with TEPCO projecting that one of its reactors at Kashiwazaki would re-start last month

Significant Remedial Action and Time-Scales imposed by the Nuclear Regulatory Authority (upgrades to cost \$12 billion)

(NRA will begin accepting applications from EPCs for safety screening from July)

Filtered radiation venting equipment must be installed on containment vessels with no grace period allowed for BWRs.

Coastal levees must be installed at all exposed plants to protect against tsunami.

A quake and tsunami-resistant, suitably shielded, and ventilated back-up operations building with all necessary instrumentation must be installed at all sites.

Active faults must be assessed at five NPP sites and the Monju prototype fast breeder reactor site.

Risk and implications of hydrogen explosions should be re-visited with a view to installing systems to reduce or discharge hydrogen.

Back-up power supplies need to be diversified and battery storage capabilities need to be reviewed and strengthened.

Cooling functions inside reactors including water injection functions need to be remedied.

Cooling functions for spent fuel pools and their sitings needs to be strengthened and reviewed.

Proximity of reactors at each site to be reviewed as this severely hampered Fukushima emergency rescue efforts.