

CHRONOLOGY of INCIDENTS INVOLVING the JCO ACCIDENT
AND NUCLEAR ENERGY in JAPAN (As of the end of Sep. 2001)

DATE	JCO	NUCLEAR ENERGY
1999	<p data-bbox="376 1048 799 1189">Criticality accident at the conversion test building of JCO Co., Tokai Village, Ibaraki Prefecture. (30/Sep./1999)</p> <p data-bbox="376 1234 799 1630">Residents were examined for health effects from the accident (consultation, blood and urine tests, and an optional surface body exposure check.) Results were mailed on 11 Oct. 1999 to each of the 1,838 individuals who were examined. (2~4/Oct./1999) Public explanation sessions on the results were held on 16 and 17 Oct. 1999.</p> <p data-bbox="376 1709 799 1962">The Ibaraki Prefecture Mito Labor Standards Inspection Office recognizes the injuries of the three severely exposed JCO employees as symptoms caused by occupational exposure. (26/Oct./1999)</p>	<p data-bbox="815 577 1359 752">Transportation of spent nuclear fuel from domestic power plants begins to the already constructed storage pool of the Rokkasho Reprocessing Plant which is not fully completed yet. (3/Sep./1999)</p> <p data-bbox="815 797 1359 972"><i>The Independent</i> reveals that the British Nuclear Fuels plc (BNFL) had falsified quality control data for MOX fuel manufactured for Japan's Takahama 3 reactor. (14/Sep./1999)</p> <p data-bbox="815 1016 1359 1158">MOX fuel manufactured by a Belgian company Belgonucleaire for Fukushima 3 arrives at Fukushima Plant, Okuma Town, Fukushima Prefecture. (22/Sep./1999)</p> <p data-bbox="815 1202 1359 1341">MOX fuel manufactured by BNFL for Takahama 4 reactor arrives at Takahama Plant in Takahama Town, Fukui Prefecture. (01/Oct./1999)</p>

<p>2000</p>	<p>Law on Compensation for Nuclear Damage revised to increase the upper limit for compensation from one billion yen to 12 billion for high-enriched uranium processing facility and to 2 billion for low-enriched uranium processing facility. The changes here were not applied to damages incurred by the JCO accident.(Dec./1999)</p> <p>One of the severely exposed JCO employee Yutaka Yokokawa leaves the hospital. (20/Dec./1999)</p> <p>The most severely exposed JCO employee Hisashi Ouchi dies at Tokyo University Hospital. (21/Dec./1999)</p> <p>The JCO Criticality Accident Investigation Committee of the government releases its final report. Radiation exposure victims estimated at 150. (24/Dec./1999)</p> <p>JCO pays 50,000 yen to residents living within 350m radius of the plant, which was the designated evacuation area, and 30,000 yen to residents who lived outside that area but evacuated to the designated community centers. Some residents refused to receive this payment. (27~28/ Dec. /1999)</p> <p>First-ever anti-nuclear candidate elected as village assembly member at Tokai Village. (23/Jan./2000)</p> <p>The Science and Technology</p>	<p>Kansai Electric cancels the use of BNFL manufactured MOX fuel for its Takahama 4 reactor due to the revelation by <i>The Guardian</i> and the U.K. Nuclear Installations Inspectorate (NII) that quality control data was also falsified for this fuel as well as the fuel for Takahama 3. (16/Dec./1999)</p>
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<p>Agency (STA) releases its renewed exposure dose estimate which was revised by taking into consideration shielding effects based on the survey carried out by the Agency on the residents of 350 m radius of their actions taken on the day and the following day of the accident. Number of estimated exposure victims raised to 439. (31/Jan./2000)</p> <p>Local residents independently set up the JCO Accident Victims' Group. (14/Feb./2000)</p> <p>JCO announces that it has agreed to pay about 90% of the claims made for damage compensation. The total of the agreed compensation was about 9.8 billion yen. (22/March/2000)</p> <p>The Nuclear Safety Commission (NSC)'s Health Review Management Committee releases a report where it asserts that statistically no excess cases of cancer has been seen with exposure under 50 mSv. It recommends Ibaraki Prefecture to carry out annual health counseling and check-ups for the time being. (27/March/2000)</p> <p>STA revokes JCO's business license. The company will be able to apply for its license after March 2002. (28/March/2000)</p>	<p>A 37 years-old construction plan for Ashihama nuclear plant at the border of Nanto Town and Kisei Town, Mie Prefecture is canceled. (22/Feb./2000)</p> <p>The Agency for Natural Resources and Energy (ANRE) amends its 1998 plan for the construction of nuclear reactors from 16~20 reactors by 2010 to 13 reactors by 2010. (09/March/2000)</p> <p>The Town Assembly of Yaku Town, Kagoshima Prefecture sets and act that bans the entry of radioactive materials and the construction of nuclear related facilities. (27/March/2000)</p> <p>Large volume of coolant loss at Mihama 2</p>
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	<p>STA reports that the accident was Japan's worst nuclear accident and ranks as level 4 on the International Nuclear Events Scale (INES). (26/April/2000)</p> <p>The second severely exposed JCO employee Masato Shinohara dies at the Tokyo University Hospital. (27/April/2000)</p> <p>Ibaraki Prefecture conducts the first annual health counseling for local residents. This was available to anyone who wished to be consulted. A total of 252 residents receives counseling. (25~27/April/2000)</p> <p>JCO's president Koji Kitani resigns his post to take responsibility for causing the accident. Tomoyuki Inami, a former employee of JCO's parent company Sumitomo Metal Minings, takes over as the new president. (30/April/2000)</p> <p>The government and Ibaraki prefecture jointly holds the first annual health check-up. Criteria for residents who could receive this free check-up were 1) residents who were exposed to doses above 1 mSv (annual dose limit for general public according to Japanese law) and desire check-ups 2) residents living and those with workplaces located within 350 m radius who desire check-ups (people qualified under 1 & 2 were informed by mail). 3) those</p>	<p>reactor, Mihama Town, Fukui Prefecture. (07/April/2000)</p> <p>The Town Assembly of Horonobe Town, Hokkaido Prefecture passes an act that bans the entry of radioactive materials. (11/May/2000)</p> <p>Law for the Disposal of Specified Radioactive Waste (i.e. vitrified high-level radioactive waste) passed at the Japanese</p>
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<p>who received health counseling but still wished to have a check-up. Health check-ups were given to a total of 338 people. (13,14 and 21/May/2000)</p> <p>Nuclear Disaster Law enacted. (16/June/2000)</p> <p>Amendments made to the Law on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors are enacted to strengthen the safety control of the nuclear business. For example, the law requires annual inspections for not only nuclear power plants, which was the case prior to the changes, but for nuclear processing facilities as well. (1/July/2000)</p> <p>JCO pays Ibaraki Prefecture 0.23 billion yen to compensate accident response expenses incurred by the Prefecture. (1/Aug./2000)</p> <p>Marine products processing company sues JCO over perceived damage compensation claim. (20/Sep./2000)</p> <p>JCO Victims' Group holds its first negotiations with the STA, Ministry of Health, and Ministry of Labor, for the issuance of</p>	<p>Diet. This law promotes the reprocessing of spent nuclear fuel and recommends geological disposal for high-level waste which is produced as a by-product of reprocessing when plutonium is extracted from spent fuel. (31/May/2000)</p> <p>The Town Assembly of Hamatonbetsu Town, Hokkaido Prefecture passes an act that bans the entry of radioactive materials and the construction of nuclear waste disposal related facilities. (28/June/2000)</p> <p>The City Assembly of Nishino-omote City, Kagoshima Prefecture passes an act that bans the entry of radioactive materials and the construction of nuclear related facilities. (30/June/2000)</p> <p>A Worker falls into a sump tank in a radioactive waste treatment building of Tomari Plant in Tomari Village, Hokkaido and dies at the hospital. (17/Aug./2000)*</p> <p>The Town Assembly of Naka-Tane Town, Kagoshima Prefecture passes an act that</p>
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<p>Radiation Exposure Victims' ID card and payments for medical expenses. (20/Sep./2000)</p> <p>The Atomic Energy Society of Japan releases its own independent report on the accident which, contrary to the government's report, concluded that the accident was not caused by a human error but was due to an organizational error. (10/Oct./2000)</p> <p>Six JCO employees, including the former president and the only survivor of the three seriously exposed employees, are arrested by the Ibaraki Police. (11/Oct./2000)</p> <p>STA reports that 667 people were exposed to radiation because of the accident. (Later amends the figure to 666.) (13/Oct./2000) (See Table 1)</p> <p>JCO's parent company Sumitomo Metal Minings reports that it paid about 15 billion in compensation for the accident. (27/Oct./2000)</p> <p>First annual comprehensive nuclear disaster drill lead by the central government under the requirements of the Nuclear Disaster Law is held in Shimane Prefecture. (28/Oct./2000)</p> <p>The six arrested JCO employees are indicted by the Mito District Prosecutor's Office. (01/Nov./2000) (See Table 2.)</p> <p>The Mito District Court releases the six JCO employees on bail.</p>	<p>bans the entry of radioactive materials and the construction of nuclear related facilities. (28/Sep./2000)</p> <p>The City Assembly of Nishino-omote City, Kagoshima Prefecture sets and act that bans the entry of radioactive materials and the construction of nuclear related facilities. (30/Sep./2000)</p> <p>The Fukushima Prefecture Tomioka Labor Standards Inspection Office recognizes a nuclear worker's death as an injury caused by occupational exposure. (25/Oct./2000)**</p> <p>Japan's Federation of Electric Power Companies (FEPC) announces its plans for building a MOX fabrication plant in</p>
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<p>2001</p>	<p>(07/Nov./2000)</p> <p>Second negotiation between the JCO Accident Victims' Group and the government is held. (5/Dec./2000)</p> <p>The uranium solution which was the source of the accident is reprocessed at the Tokai Reprocessing Plant. (Some-time between the campaign that ran through 20/Nov./2000 and 19/Dec./2000)</p> <p>Nuclear Disaster Cooperation and Support Treaty is signed by 14 prefectures and put into effect. (31/Jan./2001)</p> <p>The third negotiation between the JCO Victims' Group and government ministries are held. (20/Feb./2001)</p>	<p>Rokkasho Village, Aomori Prefecture. (10/Nov./2000)</p> <p>Tokai Reprocessing Plant re-started after being shut down for 2 and a half years following the 1997 fire and explosion at the plant. (20/Nov./2000)</p> <p>The latest revision of the Long-term Program for the Research, Development, and Utilization of Nuclear Energy is released. This Long-term Program is the basis of Japan's nuclear policy. This revision was the first one not to include specific numerical targets for various nuclear programs. (24/Nov./2000)</p> <p>The Town Assembly of Kami-yaku Town, Kagoshima Prefecture passes an act that bans the entry of radioactive materials and the construction of nuclear related facilities. (25/Dec./2000)</p> <p>Following the restructuring of the central ministry, nuclear energy is put under the control of the Cabinet Office, the Ministry of Economy, Trade, and Industry (METI) and the Ministry of Education, Culture, Sports, Science and Technology (MEXT). (06/Jan./2001)</p> <p>Tokyo Electric announces that it will freeze plans for additional construction of all power plants. (08/Feb./2001) Under pressure from central and local governments, the company announces the next day that nuclear plants are exceptions to the freezing of construction plans.</p> <p>The 6th shipment of Japanese vitrified high-level radioactive waste arrives from Europe to Japan. (21/Feb./2001)</p> <p>Residents near Shika Plant in Shika Town,</p>
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	<p>Ibaraki prefecture holds its second annual health counseling open to all residents. Mere 16 people take this opportunity. (23~25/March/2001)</p> <p>Radiation Damage Prevention Law and the Law on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors are amended to adopt the 1990 recommendation of the ICRP (International Committee for Radiation Protection). As a result, qualification factor for the effect of neutrons on human body is raised from 10 times that of the effects from gamma ray to 20 times. However, the STA claims that "the dose estimate (of exposure from JCO accident) was done prior to the government's adoption of the ICRP 1990 recommendation and thus we have no intentions to re-do the calculation." It was already known that Japan would adopt the 1990 recommendation when the STA had made the calculations in 1999. (1/April/2001)</p> <p>Second annual health check-up for local residents held by Ibaraki Prefecture in cooperation with the government (criteria the same as last year). A total of</p>	<p>Ishikawa Prefecture form an autonomous disaster prevention organization. 690 people signed up for membership. (10/March/2001)</p> <p>The Village Assembly of Toshima Village, Kagoshima Prefecture passes an act that bans the entry of radioactive materials and the construction of nuclear related facilities. (21/March/2001)</p> <p>Belgonucleaire-manufactured MOX fuel for Kashiwazaki-Kariwa 3 arrives at the plant in Niigata Prefecture. 300 people gathered to protest the arrival of this shipment. (23/March/ 2001)</p> <p>Tokyo Electric postpones the use of MOX fuel at Fukushima I-3 due to strong local opposition. (29/March/2001)</p>
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<p>268 people receive check-ups. (8, 14 and 15/April/ 2001)</p> <p>JCO instructs 24 of about 100 of its employees to temporarily transfer to Sumitomo Heavy Metal Minings and work at the construction site of the reprocessing plant at Rokkasho Village, Aomori Prefecture. On the same day, JCO opens up its low-level waste facility to the public for touring. (16/April/2001)</p> <p>First session of the JCO accident case held at the Mito District Court. (23/April/2001)***</p> <p>Second session of the JCO accident case held at the Mito District Court. (14/May/ 2001)</p> <p>Third session of the JCO accident case held at the Mito District Court. (4/June/ 2001)</p>	<p>Fukushima Prefecture sets up a committee to comprehensively review the Prefecture's energy policy -- including the MOX fuel program. (21/May/2001)</p> <p>Referendum on the use of MOX fuel held at Kariwa Village, Niigata Prefecture. The majority votes against the use of MOX fuel. (27/May/2001)</p> <p>Tokyo Electric postpones the loading of MOX fuel at its Kashiwazaki-Kariwa 3 reactor in Niigata Prefecture. (01/June/2001)</p> <p>770,000 signatures against the re-start of Monju Prototype Fast Breeder Reactor collected and submitted to the central government. (05/June/2001)</p> <p>Japan's Atomic Energy Commission decides to apply to have the International Thermolnuclear Experimental Reactor (ITER) built in Japan. (05/June/2001)</p> <p>JNF applies to METI for permission for its construction alteration plans for Monju to prepare for its re-start. (6/June/2001)</p>
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<p>METI authorizes the first Off Site Center located in Hokkaido near Tomari Nuclear Plant. (12/June/2001)****</p> <p>Forth session of the JCO accident case held at the Mito District Court. (25/June/2001)</p> <p>Kume Natto, a fermented beans production company unhappy with the negotiations with JCO, sues the company for about 3.6 billion yen as compensation for perceived damage. (15/July/2001)</p> <p>Fifth session of the JCO accident case held at the Mito District Court. (16/July/2001)</p> <p>METI makes its second authorization of an Off Site Center at Ehime Prefecture. (9/Aug./2001)</p> <p>Emergency radiation exposure treatment facilities completed at Fukui Hospital and is open to the media. (5/Sep./2001)*****</p> <p>Sixth session of the JCO accident case held at the Mito District Court. (21/Sep./2001)</p>	<p>The government's outlook on long-term energy supply and demand is released. It states that in order to meet the CO₂ reduction target set by the Kyoto Protocol, Japan must build 13 additional nuclear power plants by 2010. (28/June/2001)</p> <p>Nuclear energy is excluded from CDM and JI mechanisms as a technology for reducing CO₂ emissions at the U.N.'s climate change conference held in Bonn, Germany. (27/July/2001)</p> <p>Kyushu Electric postpones its plans to begin the use of MOX fuel from the original schedule of early 2000 to by 2010 (21/August/2001). (See Tables 3 &4.)</p>
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* The worker was treated for decontamination before being taken away by an ambulance, but was still wearing contaminated clothes when he arrived at the hospital. The unprepared hospital staff wore protective gears for X-rays when treating this worker who died at the hospital later in the day. Because the ambulance staff were not informed of the fact that the worker had been contaminated, and since the hospital workers were not trained to treat such patients, this incident was criticized by some that

nothing had been learned from the JCO accident.

** The worker had worked at nuclear plants in Fukushima Prefecture and died of leukemia, at the age of 47, in November 1999. Aside from the three radiation victims of the JCO accident, this was the fifth case in which injuries were recognized as caused by occupational radiation exposure. All five cases involved people who contracted leukemia and only one of them was recognized while the victim was still alive.

*** The defendants (the six employees and the company itself) have pleaded guilty to all charges. However, it is assumed that they are bargaining for a lesser penalty by pleading guilty. In the course of the open sessions, JCO has shown some eagerness to disclose the responsibilities of the government and the corporation which placed the order for the uranium solution which became the source of the accident. For example, at the third open hearing, one of the defendant testified that when JCO applied for the approval of amendments to processing procedures, the STA altered JCO's application without the company's knowledge and gave permission based on their own alterations. It is likely that more information will be disclosed as the case progresses.

****According to the new Nuclear Disaster Prevention Law, local governments with nuclear plants/facilities were instructed to build an off site center (OSC) which will be the center for local and central government's nuclear emergency response headquarters in times of accidents. OSC's must be equipped with government supplied communication and radiation measurement devices. Once it is completed, it must be officially approved by the government as an OSC. All of the designated twenty OSCs were supposed to be completed within FY 2000 (April/2000 ~ March 2001). However, as of 15 Sep. 2001, only two OSCs have been completed and licensed.

*****Following the accident, the Ministry of Health and Labor instructed and provided subsidies to 18 hospitals to equip themselves with emergency radiation treatment facilities. All of these hospitals are now equipped with facilities like sterile rooms and decontamination rooms necessary for treatment of radiation exposure.

Table 1 Exposure Dose According to STA's Report Released on 13 October, 2000

Description of the exposed people		number	Dose
Nuclear-related employees		172	
JCO employees directly involved in the process leading to the accident (measured)		3	16-20 GyEq ¹⁾ 6.0-10 GyEq ²⁾ 1-4.5 GyEq ³⁾
Employees involved in containing criticality (extraction of coolant etc.) (measured)		18	3.8-48 mSv
Employees involved in containing criticality (ones who poured borate solution) (measured)		6	0.7-3.5 mSv
Others at the site at the time of the accident	(measured)	49	0.6-48 mSv
	(estimated)	96	0.06-17 mSv
Accident response task-force members		260	
Employees of government associated Japan Atomic Energy Research Institute and Japan Nuclear Cycle Development Institute (measured)		56	0.1-9.2 mSv
Fire fighters involved in the rescuing of the three JCO employees (measured)		3	4.6-9.4 mSv
Officials of local governments (estimated)		167	0.0002-7.2 mSv
Officials of the central government (estimated)		8	0.49-2.1 mSv
Media (estimated)		26	0.014-2.6 mSv
Citizens in the locality at the time of the accident		235	
Local residents (measured)		7	6.7-16 mSv
Residents and area employees (estimated)		200	0.01-21 mSv
Temporary transients (estimated)		28	0.01-3.8 mSv
TOTAL		667	

1) Mr. Ouchi, died on 21 December, 1999

2) Mr. Shinohara, died on 27 April, 2000

3) Mr. Yokokawa, left hospital on 20 December, 1999

Table 2 JCO, its employees and their charges

Name	Position (at the time of the accident)	Charges
Kenzo Koshijima	Tokai Plant Chief Director	1+2+3
Hiromasa Kato	Manufacturing Director and Manufacturing Group Supervisor	1+2
Hiroyuki Ogawa	Manufacturing Section Planning Group Supervisor	1+2
Hiroshi Watanabe	Manufacturing Section Manufacturing Group Workplace Supervisor	2
Kenji Takemura	Manufacturing Section Planning Group Manager	2
Yutaka Yokokawa	Manufacturing Section Manufacturing Group Sub-Supervisor	2
JCO Co.		1+3
Hiroharu Kitani	President	-

1. Violation of the Law on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors
2. Professional negligence resulting in death
3. Violation of the Law on Labor Safety and Sanitary

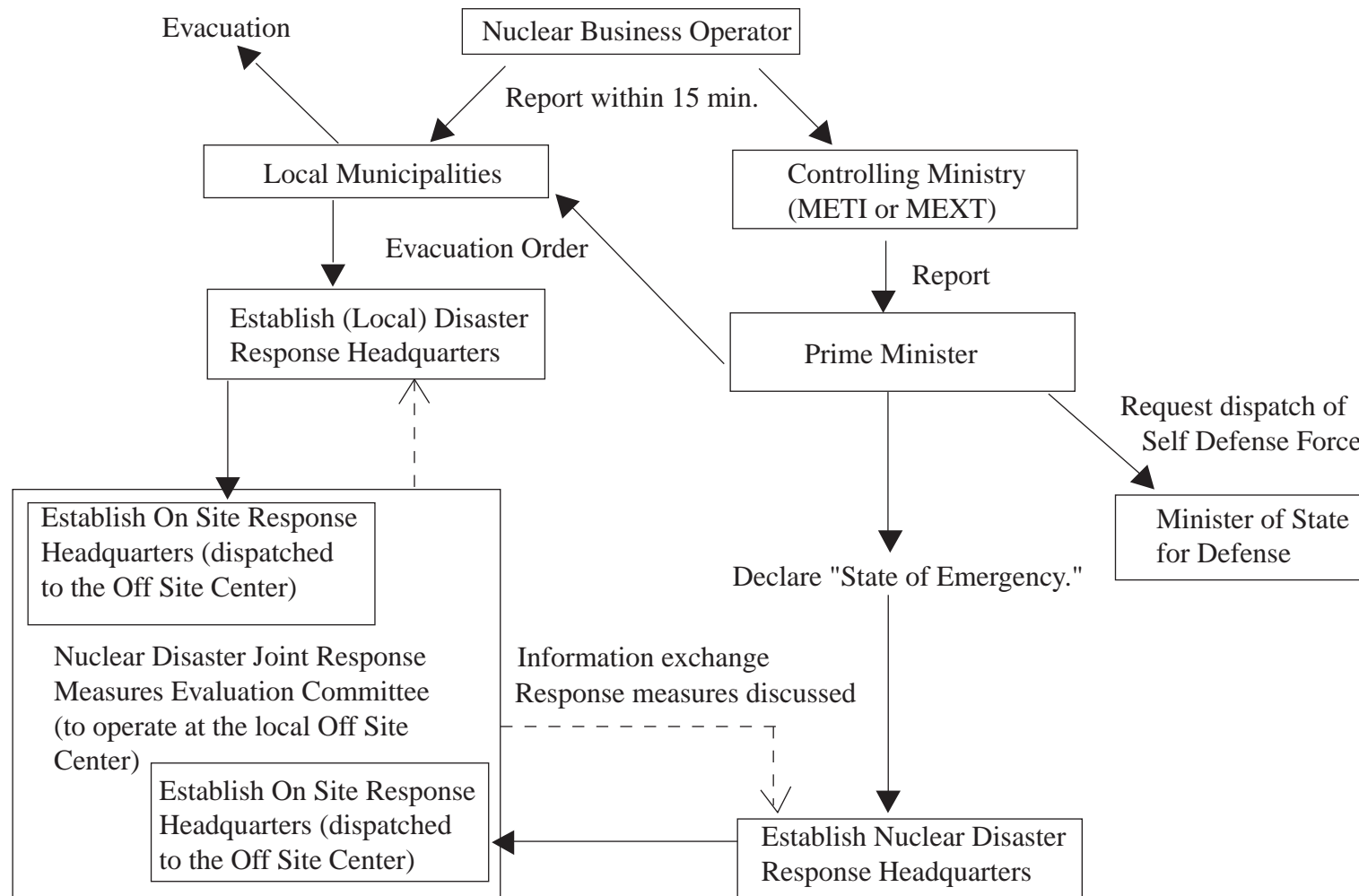
Table 3 MOX Program Schedule according to the Federation of Electric Power Companies(FEPC) released in Feb.1997

Electric company	1999	2000	early 2000	~2010
TEPCO	Fukushima I-3	Kashiwazaki-Kariwa 3	1 reactor	0~1 reactor
KEPCO	Takahama 4	Takahama 3		1~2 reactors
Chubu			1 reactor	
Kyushu			1 reactor	
Japan Atomic Power Co.			2 reactors	
Hokkaido				1 reactor
Tohoku				1 reactor
Hokuriku				1 reactor
Chugoku				1 reactor
Shikoku				1 reactor
Electric Power Development Co.				1 reactor
Accumulative TOTAL	2 reactors	4 reactors	9 reactors	16~18 reactors

Table 4 Status of MOX fuel contracts as of the end of 2000

	Reactor	Assemblies	Contract	Fabrication plant	Note
Manufacture completed	Takahama 4	8	KEPCO-Mitsubishi Heavy Industries-BNFL	MDF (BNFL) Sellafield, U.K.	Use cancelled because of QC data falsification scandal
	Takahama 3	8			
	Fukushima I-3	32	TEPCO-Toshiba-COMMOX (COGEMA 60%; Belgonucleaire 40%)	P0 (Belgonucleaire) Dessel, Belgium	
	Kashiwazaki-Kariwa 3	28			
Being manufactured	Takahama 4	?	KEPCO-Nuclear Fuel Industries-COMMOX	MELOX (COGEMA) Marcoule, France	
	Takahama 3				
	Fukushima I-3	220	TEPCO-Japan Nuclear Fuel-COMMOX		
	Kashiwazaki-Kariwa 3				

NUCLEAR DISASTER RESPONSE SYSTEM UNDER THE NEW NUCLEAR DISASTER LAW



Report standard: Radiation of 5 microSv/h or greater at the boundary of a nuclear plant/facility

Standard for issuing "state of emergency": 500 microSv/h

Evacuation standard: 10~50mSv (Stay indoors)

50mSv (Evacuate or stay inside a concrete built building)

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