NIRS-RSD-39

RADIOACTIVITY SURVEY DATA in Japan

NUMBER 39
Sept. 1974

National Institute of Radiological Sciences
Chiba, Japan

ERRATA

Survey Data

Page	Column	Lines	Error	Right
3	left	16↓	chinese	Chinese
〃	〃	3↑	the General Institute of Medical Radiation	National Institute of Radiological Sciences
〃	right	4↓		
〃	〃	10↓		
13		Fig 5	Gross Beta - Radioactivity in Upper Air	Gamma ray Spectrum of Airborne Dust Sample
14		Table	Table 8. The Microbarographic Disturbances	Teble 9. The Microbarographic Disturbances

Radioactivity Survey Data in Japan

Number 39

Sept. 1974

Contents

THE SURVEY RESULTS OF THE 16TH NUCLEAR EXPLOSION TEST CARRIED OUT BY THE PEOPLE'S REPUBLIC OF CHINA

Science and Technology Agency
National Institute of Radiological Science

THE SURVEY RESULTS OF THE 16TH NUCLEAR EXPLOSION TEST CARRIED OUT BY THE PEOPLE'S REPUBLIC OF CHINA

Preface

This edition is provided for the radioactivity survey results of fallout by the 16th Chinese nuclear explosion test.

The 17th of June in 1974, The people's Republic of China carried out the 16th nuclear explosion test. Concerning this test, atmospheric disturbance was observed at the nation-wide meteorological observatories. The scale of this explosion was equivalent to TNT 1 megatone.

Fallout radioactivity measurement of this tests was carried out at the nation-wide radioactivity survey stations from the 18th to the 25th of June.

Meantime, comparatively high radioactivity was measured, i.e., 1603pCi/m^3 of beta radioactivity in upper air at Western Area and no especially significant levels were recorded of radioactivity iodine in milk.

The radioacivity survey results of this test were considerably lower than the values in the provisional guide of radioacitivty countermeasures established by Radioactivity Countermeasures Headquarters.

1. The 16th Chinese Nuclear Test

(1) The Indian Atomic Energy Commission announced the Chinese nuclear test on 17 June 1974 as follows: "At 6 a.m. Greenwich Mean Time, China conducted a nuclear test in the atmosphere of the order of one megaton at Lop Nor in the Sinkiang- Wiegel (phonetic) autonomous region." (6 a.m. GMT is 3 p.m. Japanese time.)

(2) On 17 June the United States Atomic Energy Commission (AEC) announced: "At about 2 a.m. (EDA) on 17 June at the Lop Nor test site China carried out a weapons test in the atmosphere. Its scale was between 200kilotons and 1 megaton."

(3) The Meteorological Agency, acting on these reports, carried out investigations to assemble data of abnormalities in atmospheric pressure at all observation posts but was unable to verify abnormal variations or oscillation in the atmospheric pressure.

2. Daily Record of Action taken against Radioactivity from the 16th Chinese Nuclear Test

17 June: The Indian Atomic energy Commission announced on 17 June that China had carried out a 1 megaton nuclear test in the atmosphere at Lop Nor at 3 p.m. (Japan time).

18 June: The Headquarters for Countermeasures against Radioactivity called the 90th executive meeting at the special conference room in the Science and Te chnology Agency from 10.30 a.m. It decided to establish the radioactivity surveillance system for the period from the time the test was conducted.

19 June: Particles collected at 3 a.m. in the Western region (Tsuiki-Kumamoto-nyutabaru-Tsuiki) at 35,000 feet showed a radio-activity reading well above normal. At 9 a.m. on the same day, other particles from the upper atmosphere showed the same levels of radioactivity.

20 June: The radioactivity in the upper atmospheric particles collected at 30,000 feet at 12:00 and 17:00 hours on the 19th in the Western region (same flight path as above) fell to levels some 10 times the normal figures. Effects thought to be of the nuclear test were noticed at monitoring posts in one prefectural area. No especially significant changes were noticed in the observed levels of radioacitivity in rain-out and ground-level dust.

21 June: Radioacitivity in the upper atmospheric particles in the western and central regions was the same as the previous day. In the rain-out and dust, effects became apparent in Western Japan.

22 June: Radioactivity levels in rain and dust were returning to normal. Particles in suspension continued to show the same raioacitivity.

23 June: Upper atmospheric particles collected in the western region on the 19th were subjected to Gamma ray spectrometer analysis in a Ge (Li) semiconductor testing instrument at the Technical Research Headquarters of the Self-Defence Agency. The results of tests revealed that the particles came from a nuclear test explosion and that they included ^{239}NP, $^{99}MO - ^{99}TC$.

24 June: Tests at the Niigata Prefectural Pollution and Sanitation Research Laboratory showed radioacitvity some ten times normal levels in the dust and rain water after the rain which fell from the 23rd to the 24th. Also as a result of gamma ray spectrometer analysis in an Na I (Tl) scintillation instrument it was reported that particles from a nuclear test explosion, including ^{239}Np, $^{99}Mo - ^{99}Tc$, were detected. Radioactivity in upper atmospheric particles and in rain-out and dust was returning to normal levels.

25 June: From 2 p.m. the 91st executive meeting of the HCR met in the fourth conference room of the Science and Technology Agency and discussed what further investigations were needed to check on radioactivity arising from this Chinese nuclear test. Since particles in suspension in the upper atmosphere and at ground level had almost entirely returned to normal levels of radioactivity, it

was decided that the surveillance system would revert back to normal operations and all authorities concerned would be so informed, unless some unusual levels of radioactivity were detected that day.

3. Points of Understanding reached at the Executive Level Meeing of the Headquarters for Countermeasures against Radioacitivity

(1) The 90th Executive Level Meeting: 18 June 1974

The Headquarters for countermeasures against Radioactivity held the 90th Executive Level Meeting at the conference room of the Science and Technology Agency at 10:30 a.m. on 18 June, and countermeasures against radioactivity in connection with the chinese nuclear explosion test conducted on 17 June were discussed.

It was predicted that the effects of the nuclear test would appear from 19 that an investigation to check radioactivity should be conducted as set out below and that a close watch on the movements of the results of the investigation should be mainteined.

It was further decided that Executive Level Meetings would be held as often as required, and that the next meeting would be held at 2 p.m. on 25 June.

Investigation Procedures

(a) For the investigation of floating dust at the high altitudes of 6,000 to 12,000 metres, the Self Defence Agency was to carry out checks several times per day from that day for as long a period as seemed necessary, over the northern, central and western districts of Japan.

(b) Monitoring posts to carry out checks were to be established at two stations operated by the Meteorological Agency and by 18 prefectural stations.

(c) Checks on dust suspended at ground level were to be conducted daily at five Meteorological Agency stations and at the General Institute of Medical Radiation from that day for as long a period as was considered necessary.

(d) Checking of rainout and fallout dust was to be conducted daily at 30 places in various prefectures, 13 stations of the Meteorological Agency, as well as at the General Institute of Medical Radiation from that day onward for as long a period as was considered necessary.

(e) Analysis of nuclear particles was to be pursued by chemical and mechanical methods at the Meteorological Agency, the Self Defence Agency, the Ministry of Agriculture and Forestry, the General Institute of Medical Radiation, etc.

(2) The 91st Executive Level Meeting: 25 June 1974

The Headquarters for Countermeasures against Radioactivity called the 91st Executive Level Meeting at 2 p.m. on 25 June, and discussed about the countermeasures against radioactivity concerning the Chinese nuclear test.

(a) The effects of the 16th Chinese nuclear test upon Japan started to appear after 19 June causing an increase in the radioactivity reading in the high altitude and ground level suspended dust and in rainout, however, after that, the radioacitvity count decreased to near the normal reading as shown by the tests conducted on 24 June.

As far as the effects of radioactivity from the nuclear test on human beings was concerned, it was considered that there were no problems. The readings taken were comparatively low in comparision with the provisional index.

4. The Results of Investigation in connection with the 16th Chinese Nuclear Test

(1) Gross Beta-Radioactivity in Rain and Dry Fallout

Checking of Gross Beta-Radioactivity in Rain and Dry Fallout was to be conducted daily at 30 places in various prefectures by Japan Meteorological Agency, as well as at National Institute of Radioligical Sciences. The results are as follows.

Table 1. Gross Beta-Radioactivity in Rain and Dry Fallout
(Japan Meteorological Agency)

Upper row: Concentration (pCi/cm^3)
Lower row: Deposition (mCi/Km^2)

Station \ Date	June 1974 17~18	18~19	19~20	20~21	21~22	22~23	23~24	24~25
Wakkanai	–	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	–	–
Sapporo	–	0.1 0.4	–	0.2 1.0	0.0 0.0	–	–	–
Kushiro	–	0.0 0.0	0.0 0.0	–	–	0.1 3.0	0.1 1.0	–
Sendai	0.0 0.0	0.0 0.0	–	0.0 0.0	0.0 0.0	0.0 0.0	0.1 1.0	–
Akita	0.0 0.0	0.0 0.0	–	–	0.1 4.0	–	0.1 0.3	0.1 2.0
Tokyo	0.0 0.0	–	0.0 0.0	–	0.0 0.0	–	0.1 2.0	0.1 0.2
Hachijojima	–	0.0 0.0	0.0 0.0	–	–	0.1 0.2	0.1 0.2	–
Wajima	0.0 0.0	0.0 0.0	–	–	0.0 0.0	–	–	–
Osaka	0.1 5.0	–	–	–	0.1 5.0	–	0.1 1.0	–
Yonago	0.0 0.0	–	–	0.4 4.0	0.0 0.0	–	0.1 0.1	0.2 0.2
Murotomisaki	0.0 0.0	–	–	0.1 0.2	0.0 0.0	–	0.1 0.9	–
Fukuoka	–	–	–	0.1 2.0	0.1 0.2	–	–	–
Kagoshima	0.1 7.0	0.0 0.0	–	0.1 0.4	0.0 0.0	–	0.1 0.2	–

Notes: 1. – means no precipitation or under 1.0 mm
2. Every survey data are at 6 hours after sampling
3. Normal value is under 1.0 pCi/cm^3

Figure 1.

Gross Beta-Radioactivity in Rain and Dry Fallout

(Japan Meteorological Agency)

1. Wakkanai
2. Sapporo
3. Kushiro
4. Sendai
5. Akita
6. Tokyo
7. Hachijojima
8. Wajima
9. Osaka
10. Yonago
11. Murotomisaki
12. Fukuoka
13. Kagoshima

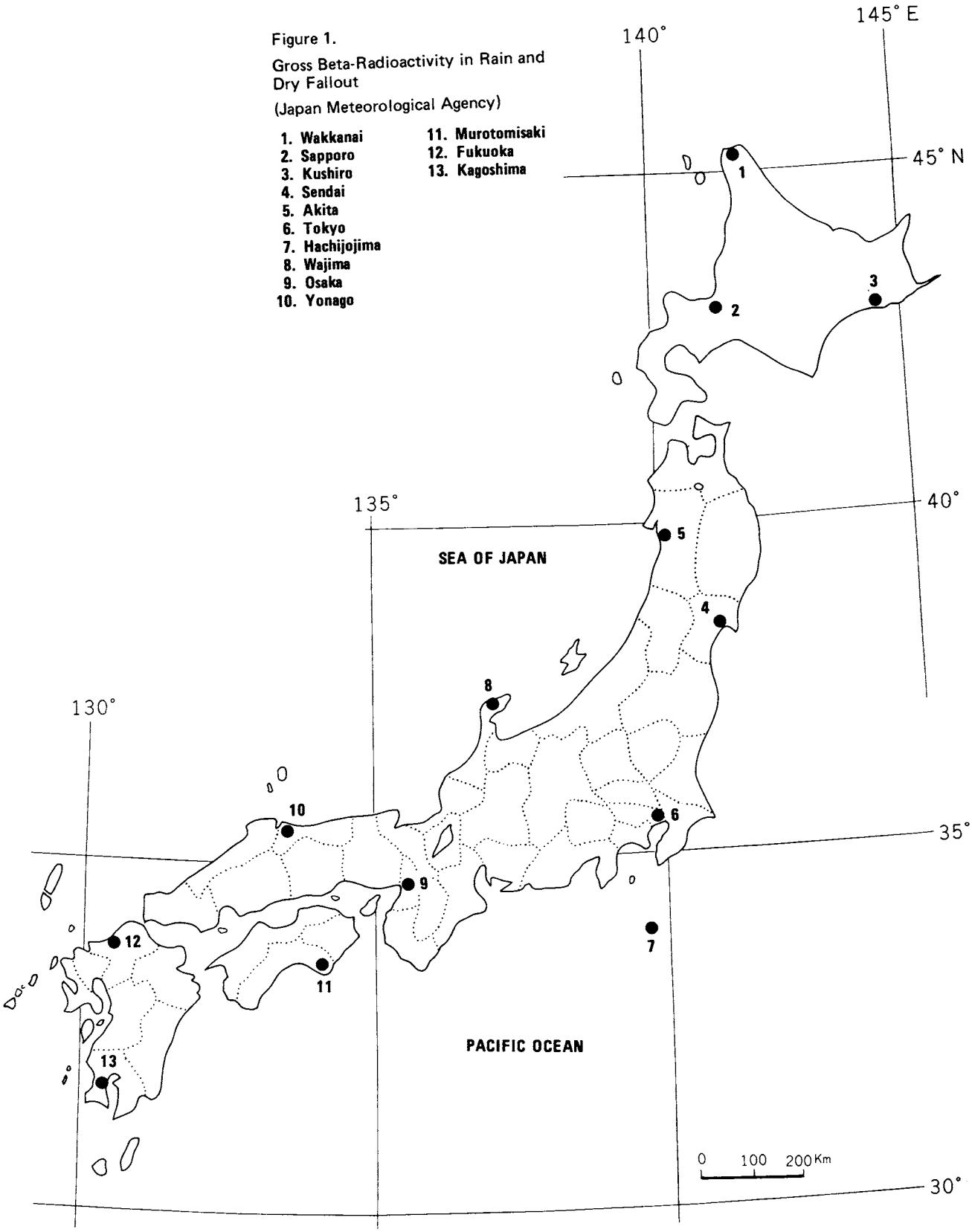


Table 2. Gross Beta-Activity in Rain and Dry Fallout
(Prefectural Institutes and Laboratories)

Upper row: Concentration (pCi/cm^3)
Lower row: Deposition (mCi/km^2)

Station \ Date	June 1974 18~19	19~20	20~21	21~22	22~23	23~24
Hokkaido	–	–	0.58 2.88	–	–	–
Akita	–	–	–	0.1 4.0	–	–
Yamagata	–	–	–	0.07 3.3	–	–
Tokyo	–	–	–	0.1 2.52	–	–
Kanagawa	–	–	–	–	–	–
Niigata	–	–	5.9 1.75	0.2 2.8	–	–
Ishikawa	–	–	–	0.15 4.1	0.42 0.40	–
Osaka	–	–	–	–	–	0.15 2.18
Tottori	–	–	1.68 1.08	0.06 0.67	–	–
Shimane	–	–	0.09 1.02	–	–	–
Okayama	–	–	2.0 0.14	0.35 4.88	–	–
Yamaguchi	–	–	0.09 4.9	–	–	–
Fukuoka	–	–	0.08 1.55	–	0.05 0.09	–
Saga	–	–	0.13 3.04	0.11 0.07	0.22 0.22	–
Kagoshima	–	–	0.22 0.65	–	–	–
Okinawa	–	–	–	–	0.19 3.6	–

Figure 2

Gross Beta-Radioactivity in Rain and Dry Fallout

(Prefectural Institutes and Laboratories)

1. Sapporo
2. Akita
3. Yamagata
4. Tokyo
5. Kanagawa
6. Niigata
7. Ishikawa
8. Osaka
9. Tottori
10. Shimane
11. Okayama
12. Yamaguchi
13. Fukuoka
14. Saga
15. Kagoshima
16. Okinawa

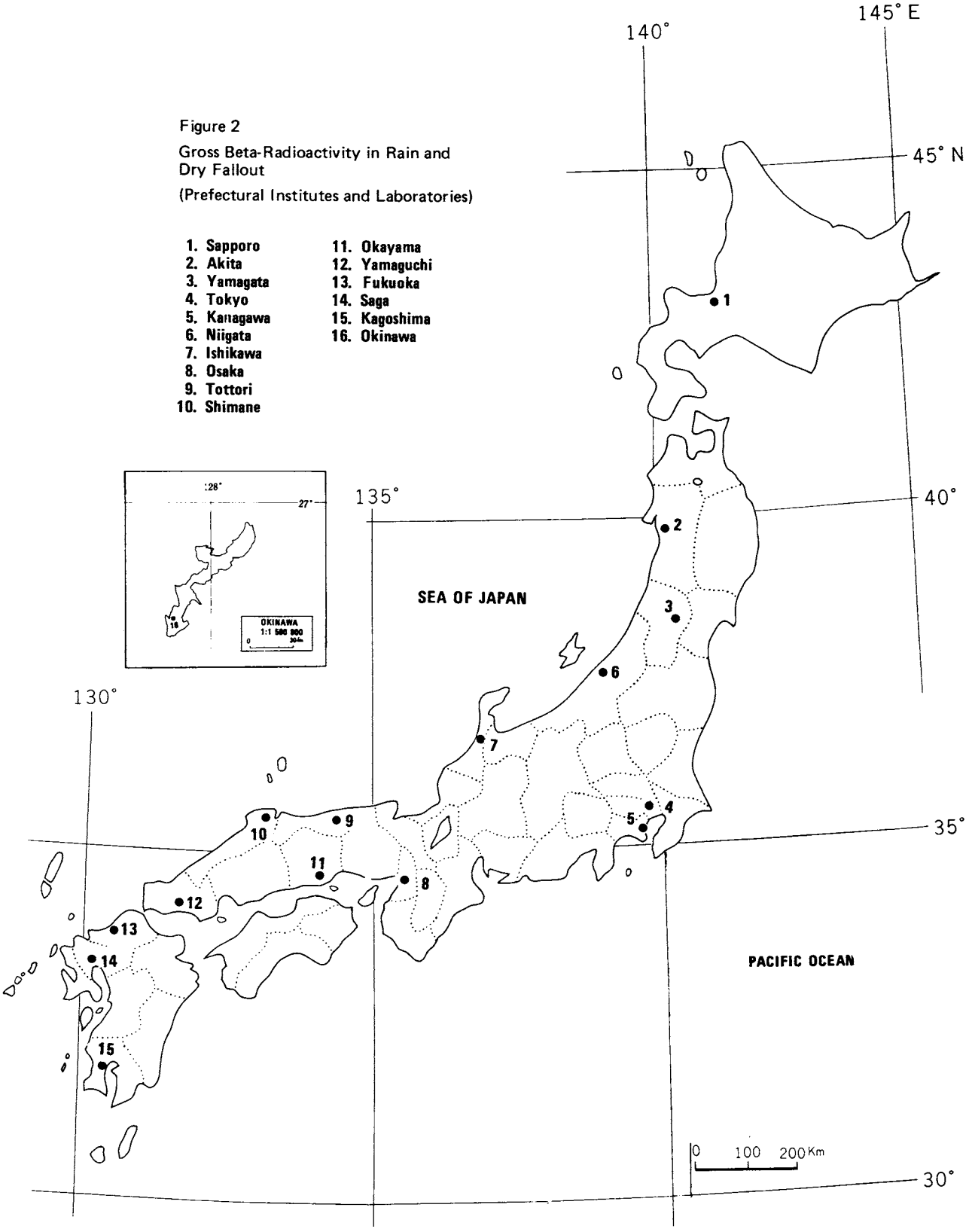


Table 3. Gross Beta-Radioactivity in Rain and Dry Fallout
(Natioanl Institute of Raiological Sciences)

Date of Sampling	Gross β-activity (mCi/Km²)	Highly Radioactivity
June 18th 09:00 ~ June 19th 09:00	0.025	no detected
" 19th " ~ " 20th "	0.029	"
" 21st " ~ " 22nd "	0.017	"
" 22nd " ~ " 23rd "	2.68	"
" 23rd " ~ " 24th "	0.57	"
" 24th " ~ " 25th "	0.241	"

(2) Gross Beta-Radioactivity in Airbone Dust

Checking of Gross Beta-Radioactivity in Airbone Dust was to be conducted daily at Japan Meteorological Agency and National Insitute of Radiological Sciences.

The following are the results of the investigation.

Table 4. Gross Beta-Radioactivity in Airbone Dust
(Japan Meteorological Agency)

(pCi/m³)

Station \ Date	June 1974 19	20	21	22	23	24
Sapporo	0.1	0.1	0.0	0.0	0.1	0.3
Sendai	0.2	0.2	0.2	0.1	0.2	0.1
Tokyo	0.2	0.2	0.2	0.4	0.2	0.2
Osaka	0.3	0.7	0.6	0.4	0.8	0.7
Fukuoka	0.5	0.9	0.2	0.4	0.5	0.2

Notes: 1) The figures were obtained 20 hours after the completion of collecting operation, which is from 09:00 to 14:00 (about 5 hours) every day.
2) The normal figure is from 0.0 to 1.0 picocurie/cubic meter.

Figure 3
Gross Beta-Radioactivity in Airbone Dust
(Japan Meteorological Agency)

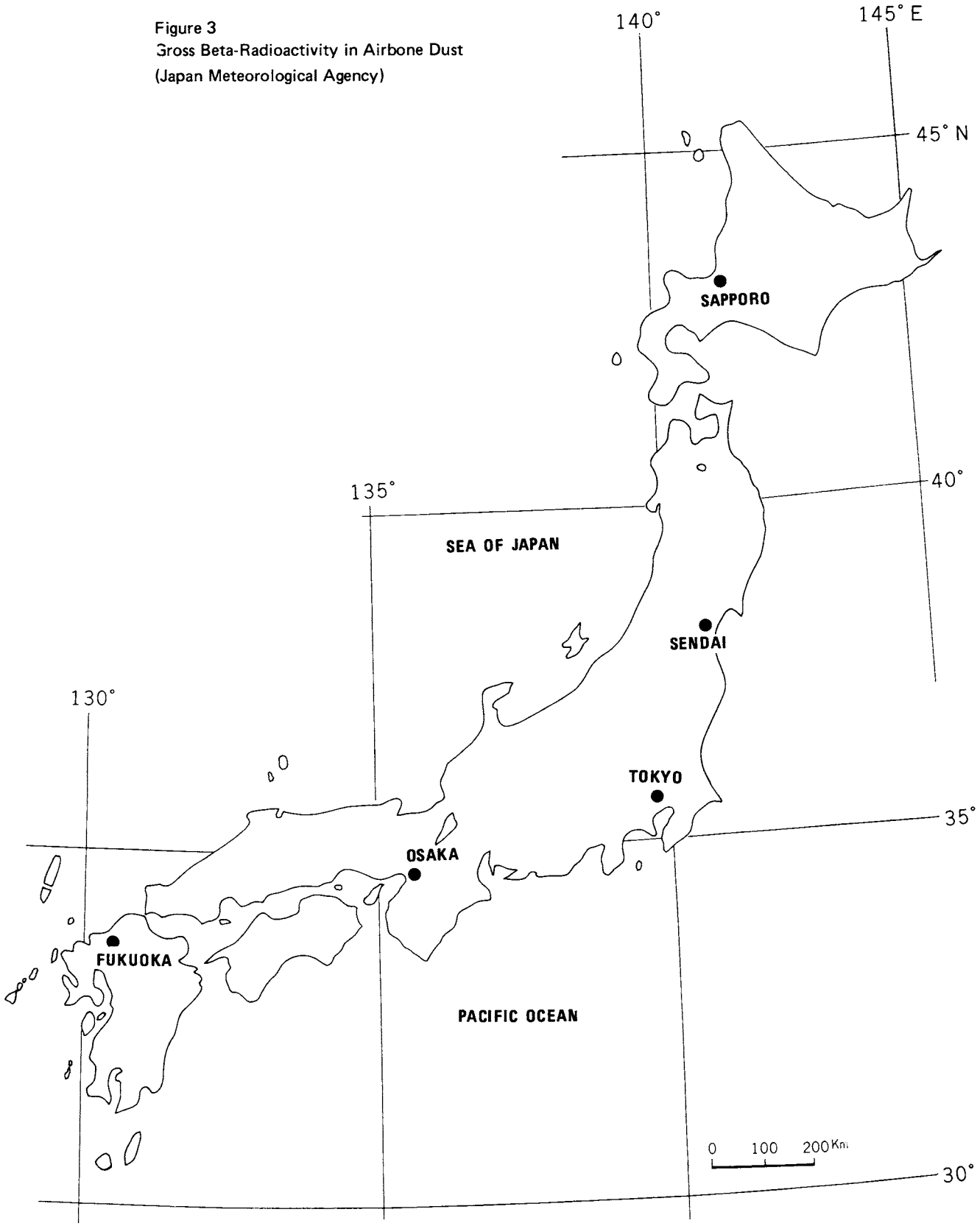


Table 5. Gross Beta-Radioactivity in Airbone Dust
(National Institute of Radiological Sciences)

Date of Sampling						Time (WS)	Estimated Value after Sampling Stop* 72 hr (pCi/m³)	5 hr (pCi/m³)
June	17th	10:30 ~	June	19th	11:20	48.8	0.06	0.4
"	19th	11:40 ~	"	20th	10:00	22.3	0.09	0.8
"	20th	10:00 ~	"	21st	10:00	24	0.07	0.7
"	21st	10:00 ~	"	22nd	10:00	24	0.07	0.6
"	22nd	10:00 ~	"	23rd	10:00	24	0.07	0.9
"	23rd	10:00 ~	"	24th	10:00	24	0.10	0.6
"	24th	10:00 ~	"	25th	10:00	24	0.08	0.7

*Every estimated values are corresponding to the natural radioactivity

(3) Gross Beta-Radioactivity in Upper Air (Research and Development H.Q., Japan Defence Agency)

Since 1960, Research and Development H.Q., Japan Defense Agency has measured the beta-activity of dust in the lower layer of the stratosphere and tropopause using aircrafts as collectors.

The samples were taken over three areas of Japan using dust samplers attached under the aircraft wings.

An aircraft made a sampling flight at a selected altitude. The inlet shutter of a sampler was opened just after arrival at the altitude and closed at sampling stop just before dropping of its altitude. Sampling time is given about 60 minutes. Dust sampling was made through filter of the attached sampler.

Table 6. Gross Beta-Radioactivity in Upper Air
(Research and Development H.Q., Japan Defence Agency)

Area	Take – Off date	Take – Off time	Method	Model of Plane	Flight Course	Altitude (feet)	Activity (pCi/m³)
Western Area (Tsuiki)	Jun. 18th	22:00~	Under the main plane	F – 86F	Tsuiki-Kumamoto-Nyutabaru-Tsuiki	34,000 ~35,000	0.84 ± 0.12
	" 19th	3:01~ 3:36	"	"	"	35,000	1016 ± 2
	" "	9:01~ 9:33	"	"	Tsuiki-Kumamoto-Nobeoka-Nakatsu-Tsuiki	30,000	1603 ± 2
	" "	12:03~12:39	"	"	Tsuiki-Kumamoto-Nyutabaru-Tsuiki	30,000	5.18 ± 0.4
	" "	17:00~19:33	"	"	"	30,000	8.4 ± 0.2
	" 20th	10:00~11:00	"	"	Tsuiki-Kumamoto-Miyazaki-Kumamoto-Miyazaki-Tsuiki	30,000	0.43 ± 0.03
	" "	15:56~16:32	"	"	Tsuiki-Kumamoto-Miyazaki-Tsuiki	20,000	19.1 ± 0.2
	" 22nd	10:25~11·15	"	"	Tsuiki-Miho-Komatsu-Iruma	25,000	0.13 ± 0.02
Central Area (Iruma)	Jun. 19th	3:10~ 3:40	Under the main plane	F – 86F	Iruma-Oshima-Hamamatsu-Iruma	36,000	0.14 ± 0.07
	" "	20:00~20:30	"	"	"	30,000	2.1 ± 0.7
	" "	10:00~10:20	"	"	Iruma-Sado-Wajima-Iruma	30,000	25.3 ± 0.3
	" 22nd	10:00~10:40	"	"	Iruma-Sado-Wajima-Iruma	20,000	0.50 ± 0.03
	" 24th	13:15~14:51	"	"	Iruma-Maebashi-Kamo-Iruma	20,000	1.28 ± 0.03*
Northern Area (Misawa)	Jun. 19th	10:10~10:35	Under the main plane	F – 86F	Misawa-Yokote-Niigata-Hyakuri	35,000	63.8 ± 0.5**
	" 24th	13:09~14:30	"	"	Misawa-Niigata-Iruma	26,000	0.98 ± 0.03

* Regular ** Yokote ~ Niigata

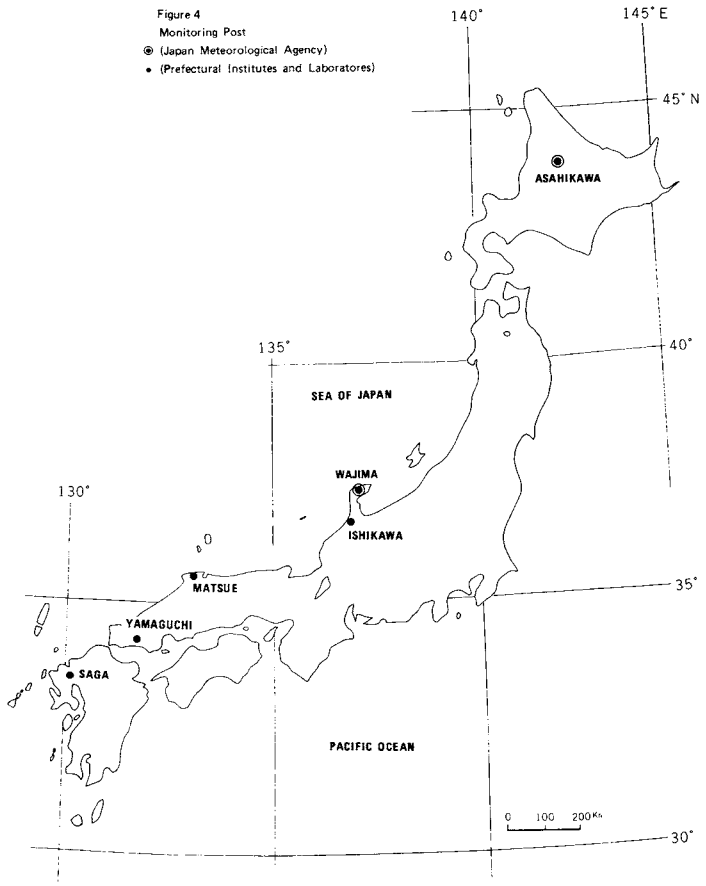
(4) Monitoring Post

(Meteorological Institues and Laboratories)
(Meteorological Agency)

Most of the monitoring posts in Meteorological Agency (Asahikawa, Wajima) and in 18 prefectures showed the same as normal value, except four sites (Yamaguchi, Ishikawa, Shimane, Saga) which did a little high as follows.

Table 7. Counting rate obtained with the monitoring posts – June 20th to 23th 1973
(Meteorological Agency)
(Prefectural Institutes and Laboratories)

Station		Normal Value	Highest Value
Asahikawa	Japan Meteorological Agency	14 CPS	19 CPS
Wajima	〃	14 CPS	16 CPS
Yamaguchi	Prefectural Institutes and Laboratories	21 CPS	34 CPS
Ishikawa	〃	15 CPS	20 CPS
Shimane	〃	15 CPS	21 CPS
Saga	〃	12 CPS	19 CPS



(5) Nuclides Analysis

(a) Particles in the Upper Atmosphere

The results of tests undertaken at the Self-Defence Agency Technical Research Headquarters on 19 June on upper atmospheric particles collected at 30,000 feet in the western region analysed by a gamma ray spectrometer using a Ge (Li) semi-conductor instrument are shown in Figure (attached as Annex).

(b) Fallout in Rain and Dust

Rainwater and dust collected on 19 June was subjected to Na I (Tl) scintillation gamma ray spectrometer analysis at the Niigata Prefectural Pollution and Sanitation Research Laboratory. The results showed that this nuclear test had dispersed ^{239}NP, ^{99}MO–^{99}TC.

(c) Measurement of Radioactive Iodine in Milk

Hokkaido National Agricultural Experiment Station (Sapporo), National Institute of Animal Industry (Chiba), Kyushu Agricultural Experiment Station (Kumamoto), National Institute of Radiological Sciences, and 14 prefectural sanitation research laboratories (pollution research laboratories) conducted tests for radioactive iodine in milk from the time of the nuclear test every day for the duration of the radioactivity surveillance period. the analysis was done in a gamma ray spectrometer Na I (Tl) scintillation instrument but no especially significant levels were recorded.

The following are the results of the investigations.

Figure 5 Gross Beta-Radioactivity in ,per Air

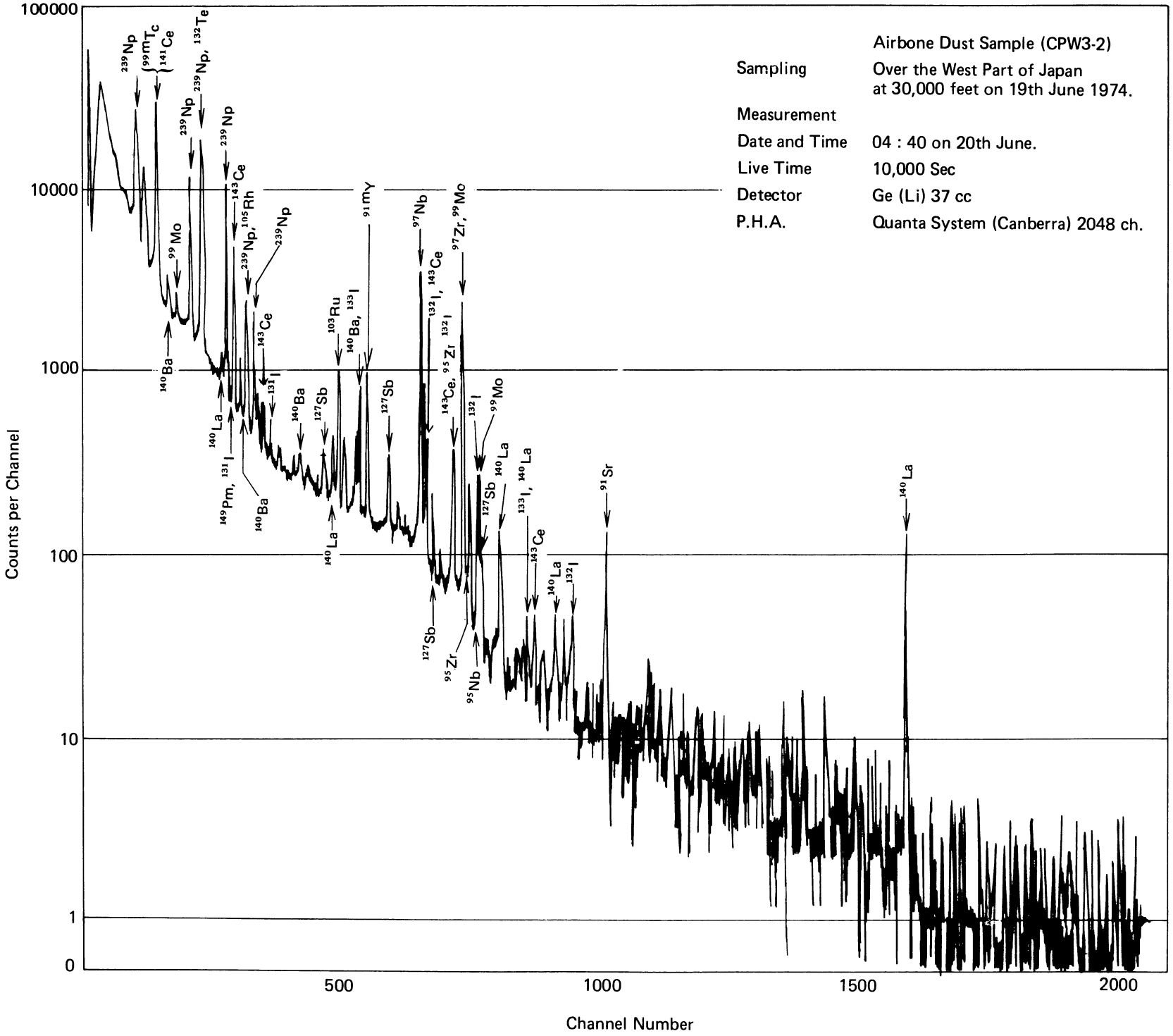


Table 8. Iodine-131 in Milk
(Hokkaido National Agricultural Experiment Station)
(National Institute of Animal Industry)
(Kyushu Agricultural Experiment Station)

Date of Sampling / Determination Agency	June 18th 09:00	19th 09:00	20th 09:00	21st 09:00	17:00	22nd 09:00	23rd 09:00	24th 09:00	25th 09:00
Hokkaido National Agricultural Experiment Station (Sapporo)	–	–	–	+	+	+	–	–	/
National Institute of Animal Industry (Chiba)	–	–	–	–	/	–	–	–	/
Kyushu Agricultural Experiment Station (Kumamoto)	–	–	–	+	/	+	+	–	/

5. The Microbarographic Disturbances and Upper Atmospheric Weather Chart

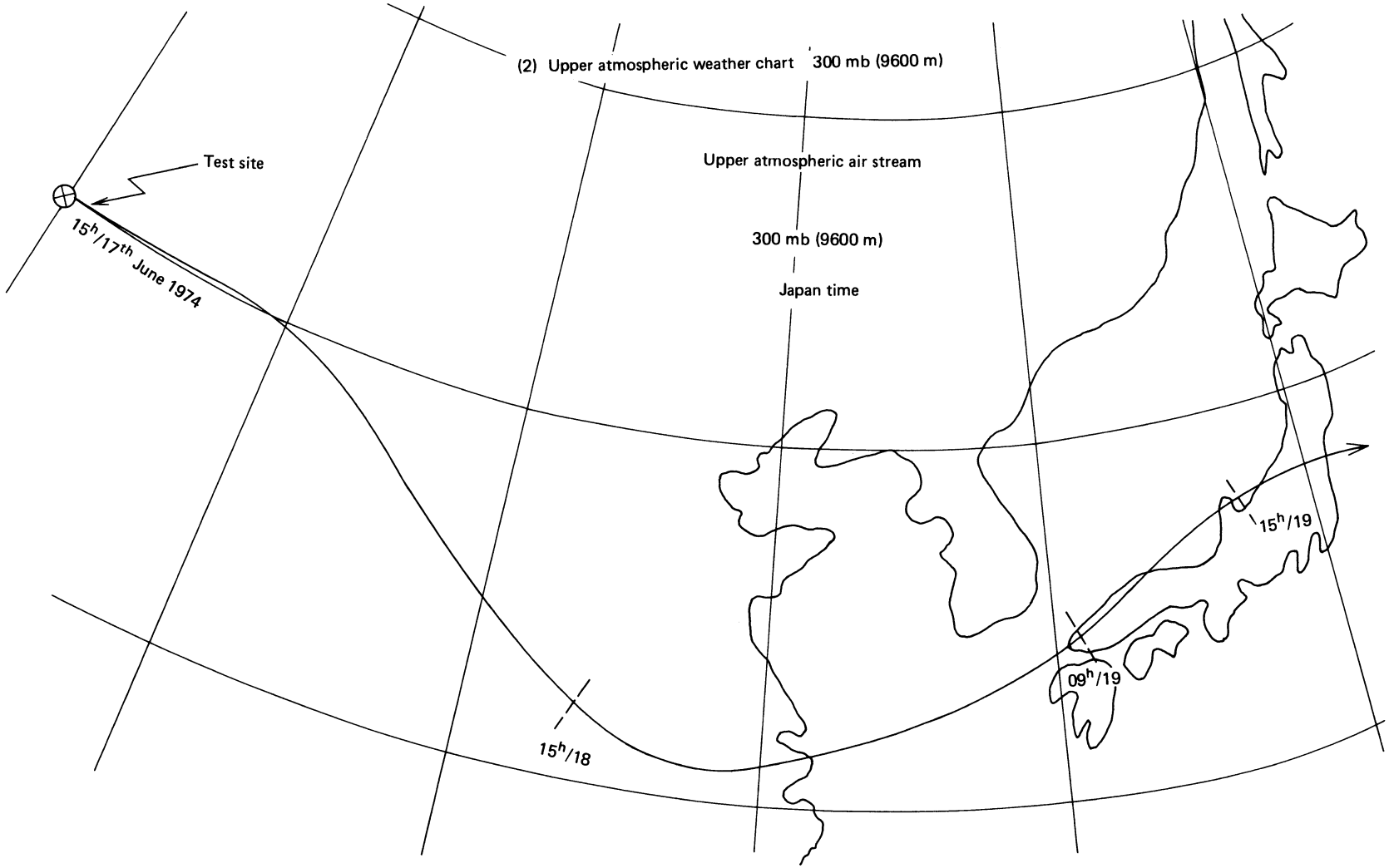
(1) The Microbarographic Disturbances and Upper Atmospheric Weather Chart

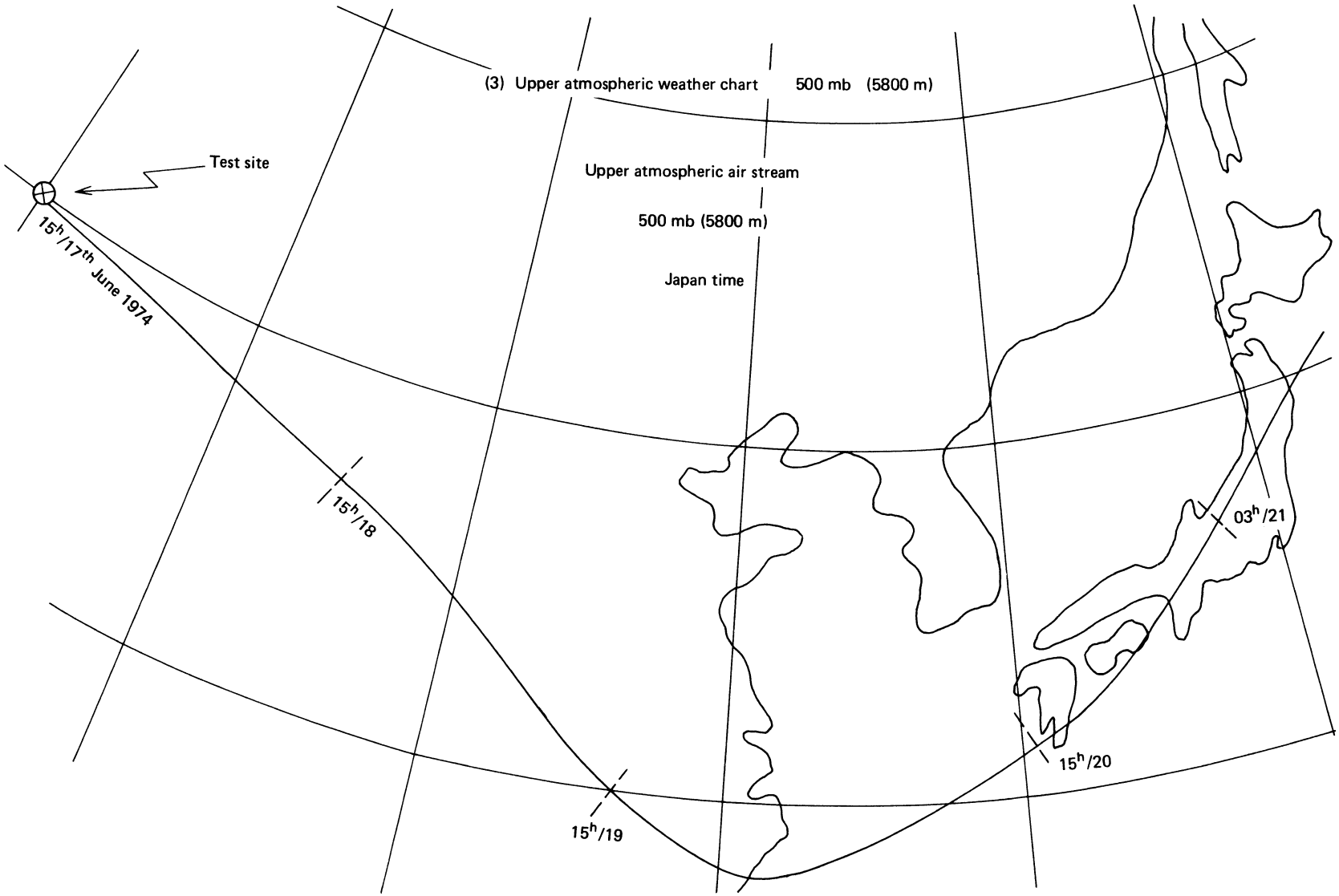
Slight abnormal microbarographic disturbance which was caused by the nuclear test was observed at several stations in Japan as follows.

Slight abnormal microbarographic disturbance could not be confirmed in every point of observation.

Table 8. The Microbarographic Disturbances
(Japan Meteorological Agency)

	Station	Time (G.M.T.)	Amplitude (mb)	Period (min)	Duration (min)
Wakkanai	(N45 25 E141 41)	being unknown			
Kushiro	(N42 59 E144 24)	〃			
Akita	(N39 43 E140 06)	〃			
Wajima	(N37 23 E136 54)	〃			
Tokyo	(N35 41 E139 46)	〃			
Yonago	(N35 26 E133 21)	〃			
Murotomisaki	(N33 15 E134 11)	〃			
Kagoshima	(N 31 34 E130 33)	〃			


(2) Upper atmospheric weather chart 300 mb (9600 m)
Test site
Upper atmospheric air stream
300 mb (9600 m)
Japan time
15h/17th June 1974
15h/18
09h/19
15h/19


(3) Upper atmospheric weather chart 500 mb (5800 m)
Test site
Upper atmospheric air stream
500 mb (5800 m)
Japan time
15h/17th June 1974
15h/18
15h/19
15h/20
03h/21

6. Chinese Nuclear Test and Their Effects Upon Japan

The First Test

China announced its first atomic bomb test in the Western region was successful. The U.S. Atomic Energy Commission announced that the Chinese nuclear test used uranium 235.

(a) Date Test was Conducted: 16 Oct. 1964
(b) Scale of Test: Small scale (TNT powder, in the order of tens of kilotons)
(c) Place Test was Conducted: Around Lake Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	19 Oct. 1964	20 Oct. '64	762 picocurie/cubic meter (Western part)
Gross Beta-Radioactivity in Rain and Dry Fallout	20 Oct. 1964	23 Oct. '64	200 millicurie/square kilo meter/ day
Gross Beta-Radioactivity in Airbone Dust	19 Oct. 1964	22 Oct. '64	38 picocurie/cubic meter (Fukuoka)

The Second Test

China announced "a nuclear explosion was carried out over the western district". The test was thought to be an airdrop test using uranium 235.

(a) Date Test was Conducted: 14 May, 1965
(b) Scale of Test: Small scale (TNT powder, in the order of tens of kilotons)
(c) Place Test was Conducted: Around Lake Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	17 May 1965	18 May '65	941 picocurie/cubic meter (Central part)
Gross Beta-Radioactivity in Rain and Dry Fallout	20 May 1965	21 May '65	430 millicurie/square kilo meter/ day
Gross Beta-Radioactivity in Airbone Dust	20 May 1965	21 May '65	28 picocurie/cubic meter (Osaka)

The Third Test

China announced "an explosion containing thermo-nuclear materials" It was understood that the test was aimed at the development of a hydrogen bomb (nuclear fusion).

(a) Date Test was Conducted: 9 May 1966
(b) Scale of Test: Small-medium range (TNT powder, 20-200 kilotons)
(c) Place Test was Conducted: Around Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air		25 May 1966	240 picocurie/cubic meter (Western part)
Gross Beta-Radioactivity in Rain and Dry Fallout	11 May 1966	11 May 1966	930 millicurie/square kilo meter/ day (Sendai)
Gross Beta-Radioactivity in Airbone Dust		13 May 1966	36 picocurie/cubic meter (Osaka)

The 4th Test

China announced "the test of a guided missile nuclear weapon was successful and the nuclear warhead hit the target accurately".

(a) Date Test was Conducted: 27 Oct. 1966
(b) Scale of Test: Small scale (TNT powder, 20-30 kilo tons)
(c) Place Test was Conducted: Around Lake Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air		5 Nov. '66	6.1 picocurie/cubic meter (Western part)
Gross Beta-Radioactivity in Rain and Dry Fallout	1 Nov. 1966	5 Nov. '66	42.3 millicurie/square kilo meter/ day (Akita)
Gross Beta-Radioactivity in Airbone Dust	20 Nov. 1966	2 Nov. '66	20.0 picocurie/cubic meter (Tokyo)

The 5th Test

U.S. Atomic Energy Commission announced that it detected uranium 238 from the explosion which was of several hundreds tons. The test was seen as the first step towards a hydrogen bomb.

(a) Date Test was Conducted: 28 Dec. 1966
(b) Scale of Test: Medium scale (TNT powder, 200-300 kilotons)
(c) Place Test was Conducted: Around Lake Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	20 Dec. 1966	30 Dec. '66	9693 picocurie/cubic meter (Central part)
Gross Beta-Radioactivity in Rain and Dry Fallout	"	30 Dec. '66	5600 millicurie/square kilo meter/day (Wajima)
Gross Beta-Radioactivity in Airbone Dust	"	31 Dec. '66	150 picocurie/cubic meter (Fukuoka)

The 6th Test

China announced "the test of a hydrogen bomb over the western district was successful". U.S.A.E.C. stated that it was a test of a hydrogen bomb with a scale of several megatons.

(a) Date Test was Conducted: 17 June 1967
(b) Scale of Test: Large scale (TNT powder, several megatons)
(c) Place Test was Conducted: Around Lake Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	18 June 1967	18 Une 1967	580 picocurie/cubic meter (Western part)
Gross Beta-Radioactivity in Rain and Dry Fallout	"	23 June 1967	5.5 millicurie/square kilo meter/ day (Cape Muroto)
Gross Beta-Radioactivity in Airbone Dust	"	21 ~ 22 June 1967	1.2 picocurie/cubic meter (Osaka and Fukuoka)

The 7th Test

U.S.A.E.C. announced that it detected the 7th Chinese nuclear test in the upper atmospheric layer over the western part of China, and declared that the explosion was small.

(a) Date Test was Conducted: 24 Dec. 1967
(b) Scale of Test: Small scale (TNT powder, less than 20 kilotons)
(c) Place Test was Conducted: Around Lake Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air		25 Dec. 1967	17960 picocurie/cubic meter (Over Central part at an altitude of 12000 meters)
Gross Beta-Radioactivity in Rain and Dry Fallout	25 Dec. 1967	29 Dec. 1967	22 millicurie/square kilo meter/ day (Wajima)
Gross Beta-Radioactivity in Airbone Dust		25 Dec. 1967	1.6 picocurie/cubic meter (Fukuoka)

The 8th Test

China announced "the test of a new hydrogen bomb conducted on 27 December was successful". U.S.A.E.C. stated that China carried out its 8th nuclear test on 27 December.

(a) Date Test was Conducted: 27 Dec. 1968
(b) Scale of Test: TNT powder, about 3 megatons
(c) Place Test was Conducted: Around Lake Lop Nor
(d) Effects on Japan:

Radioactivity of 400–750 picocurie/cubic meter in the floating dust at an altitude of 10,000 meters between Hachinohe and Matsushima was determined on 28 December, however, the rainout and supended dust at ground level readings were at normal levels and virtually no effects on the ground would be determined.

The 9th Test

Radio Peking announced on 4 Oct. 1969: "China conducted its first underground nuclear test on 23 September".

(a) Date Test was Conducted: 23 Sept. 1969
(b) Scale of Test: Not known
(c) Place Test was Conducted: Thought to be in vicinity of Lake Lop Nor
(d) Effects on Japan:

There was no effects at all due to the fact that the test was carried out underground.

The 10th Test

U.S.A.E.C. announced that it detected a Chinese nuclear test early in the morning of 29 September 1969. According to Radio Peking, on 4 October: "China tested a newly hydrogen bomb successfully on 29 September over the western districts".

(a) Date Test was Conducted: 29 Sept. 1969
(b) Scale of Test: TNT powder, around 3 megatons
(c) Place Test was Conducted: At a comparitively low atmospheric level over the Lake Lop Nor area
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	1 Oct. 1969	1 Oct. '69	55 picocurie/cubic meter (At an altitude of 10,000 meters over northern district)

The 11th Test

U.S.A.E.C. announced that china seemed to have conducted an atomospheric nuclear explosion around 4:30 p.m. (Japan time) on 14 Oct. 1970 and the strength was estimated at 3 megatones.

(a) Date Test was Conducted: 14 Oct. 1970
(b) Scale of Test: 3 megatons
(c) Place Test was Conducted: Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effect Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	15 Oct. 1970	15 Oct. 1970	31 picocurie/cubic meter (At an altitude of 12,000 meters over northern district)

The 12th Test

U.S.A.E.C. announced that China conducted nuclear test with the power equivalent to 20 kilotons of TNT in atmosphere over Lop Nor in the western district.

(a) Date Test was Conducted: 18 Nov. 1971
(b) Scale of Test: TNT powder 20 kilotons
(c) Place Test was Conducted: Around Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effect Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Rain and Dry Fallout	23 Nov. 1971	23 Nov. '71	94 millicurie/square kilo meter/ day (Fukuoka)
Gross Beta-Radioactivity in Upper Air	23 Nov. 1971	27 Nov. '71	12 picocurie/cubic meter (Fukuoka)

The 13th Test

U.S.A.E.C. announced that China carried out a nuclear explosion test of a small scale under 20 kilotons in the atmosphere at the experimental station at Lop Nor in the western district.

(a) Date Test was Conducted: 7 Jan. 1972
(b) Scale of Test: Small (under 20 kilotons of TNT)
(c) Place Test was Conducted: Lop Nor Experimental Station
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	10 Jan. 1972	10 Jan. 1972	300 picocurie/cubic meter (At an altitude of 5,600 meters over Central District)
Gross Beta-Radioactivity in Rain and	10 Jan. 1972	11 Jan. 1972	774 millicurie/square kilo meter/ day (Sendai)

The 14th Test

U.S.A.E.C. announced that China carried out an atomic bomb test esplosion of the estimated scale ranging from 20 to 200 kilotons at the Atomic Power Experimental station in Lop Nor at 3:00 p.m. (Japan Time) on 18 March 1972.

(a) Date Test was Conducted: 18 March 1972
(b) Scale of Test: 20-200 kilotons
(c) Place Test was Conducted: Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	19 March 1972	19 March 1972	1030 picocurie/cubic meter (At an altitude of 11,600 meter over Nothern District)

The 15th Test

The Barber Atomic Power Institute in India announced that it had detected a Chinese nuclear explosion test at 12.55 p.m. (Japan time) on 27 June, 1973. Radio Peking on 28 June announced "China conducted hydrogen bomb test over the western district of China at 1.00 p.m. (Japan time) on 27 June."

(a) Date Test was Conducted: 27 June 1973
(b) Scale of Test: 1-2 megatons
(c) Place Test was Conducted: Lop Nor
(d) Effects on Japan:

Objects for study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	30 June 1973	30 June 1973	312.7 picocurie/cubic meters (At an altitude of 10,200 meters over Northern District)
Gross Beta-Radioactivity in Rain and Dry Fallout	30 June 1973	1 July 1973	226.8 millicurie/square kilo meter (Kanazawa)
Gross Beta-Radioactivity in Airbone Dust	1 July 1973	4 July 1973	6.0 picocurie/cubic meter (Sendai)

The 16th Test

The Indian Atomic Energy Commission announced that it had detected a Chinese nuclear explosion test at 3:00 p.m. (Japan time) on 17 June, 1974. And U.S.A.E.C. announced as the same, too.

(a) Date Test was Conducted: 17 June 1974
(b) Scale of Test: about 1 megaton
(c) Place Test was Conducted: Lop Nor
(d) Effects of Japan:

Objects for Study	Date First Effects Became Apparent	Highest Figure	
		Date	Figure obtained
Gross Beta-Radioactivity in Upper Air	19 June 1974	19 June 1973	1603±2 picocurie/cubic meter (At an altitude of 35,000 feets over Western District)
Gross Beta-Radioactivity in Rain and Dry Fallout	21 June 1974	21 June 1973	4.9 picocurie/cubic meter

7. CONCERNING PROVISIONAL INDEX FOR COUNTERMEASURES AGAINST RADIOACTIVITY

1. Countermeasures Against Emergency Case

i) Monthly amount of Fallout of Radioactivity

Stage	Monthly amount of Fallout of Radioactivity	Countermeasures to be taken
First Stage	2.5 Curie/square kilo meter	(1) Promoting investigation work of radioactivity (2) Surveillance of the movement of the level of radioactivity.
Second Stage	25 Curie/square kilo meter	(1) To give instructions to drink rain-water only after filtration (2) To guide and assist the production and marketing of foods and drinks.

ii) Iodine 131 in Rain-water & milk

Classification	Concentration of iodine -131	Countermeasures to be taken
Rain-water	3,000 picocurie/litre	(1) To give instructions to wash vegetable thoroughly (2) To give instructions to drink rain-water after filtration
Milk	6,000 picocurie/litre	(1) To give instructions to stop infant baby from drinking fresh milk (2) To give instructions to wash vegetable thoroughly

2. Countermeasure to be Taken Against Continuing Situation

Stage	Interpreted amount of Fallout of strontium 90	Countermeasures to be taken
First Stage	20 millicurie/square kilo meter	To observe increase/decrease of the level of environmental radioactivity, and to promote the study of countermeasures
Second Stage	100 millicurie/square kilo meter	To guide and assist the promotion and marketing of foods and drinks