

IAEA ACTIONS RELATED TO FUKUSHIMA ACCIDENT

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Division of Radiation, Transport and Waste Safety



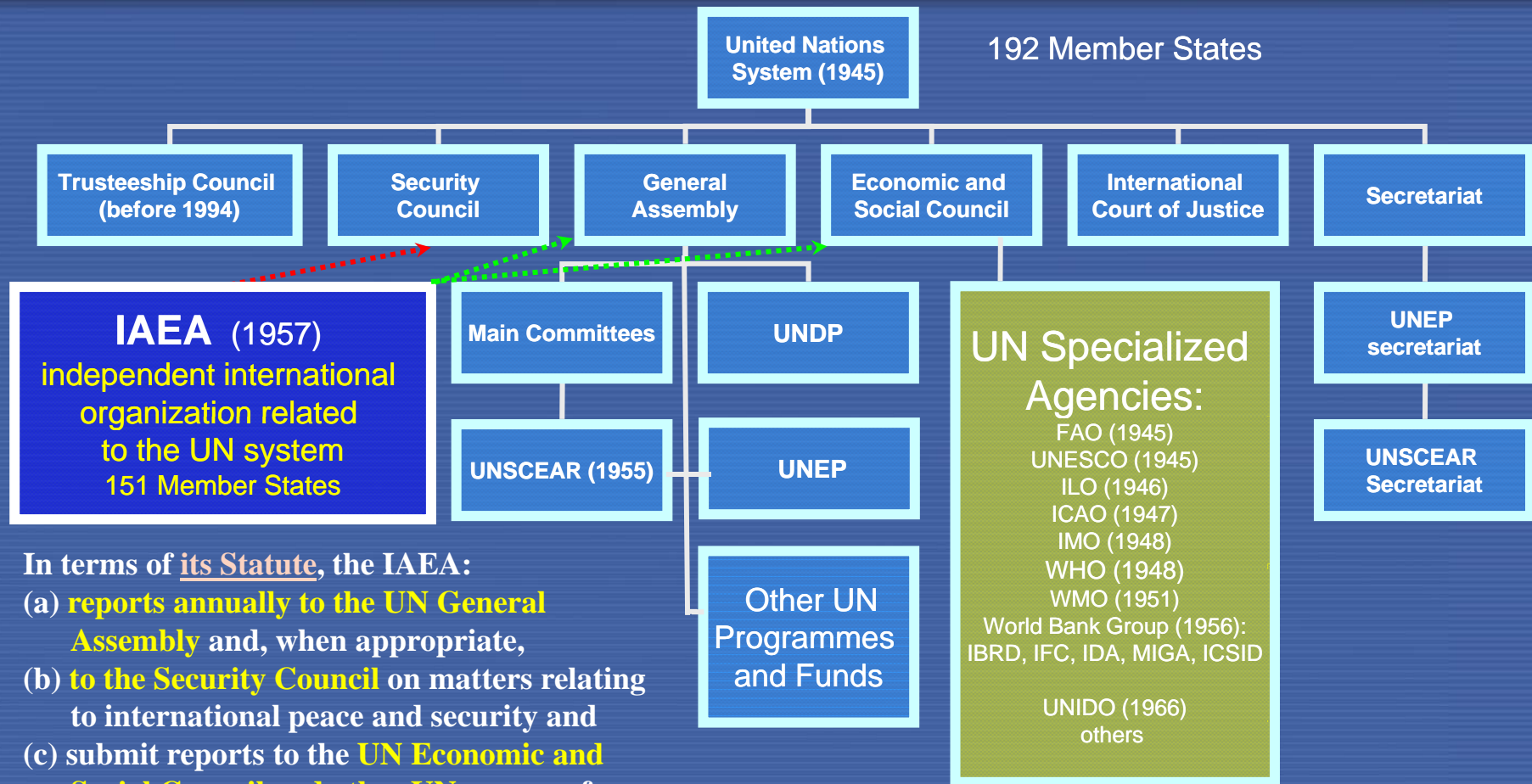
IAEA

International Atomic Energy Agency

Agenda

- IAEA role within UN system.
- Joint Emergency Plan.
- Summary of IAEA actions (IEC & Missions)
- IAEA Radiation monitoring at Fukushima & Tokyo.
- Issue related to the worker monitoring & Road Map.
- Ministerial Conference on NS & Action Plan

UN & IAEA



In terms of its Statute, the IAEA:

- (a) **reports annually to the UN General Assembly** and, when appropriate,
- (b) **to the Security Council** on matters relating to international peace and security and
- (c) submit reports to the **UN Economic and Social Council and other UN organs** of on matters within the competence of these organs.



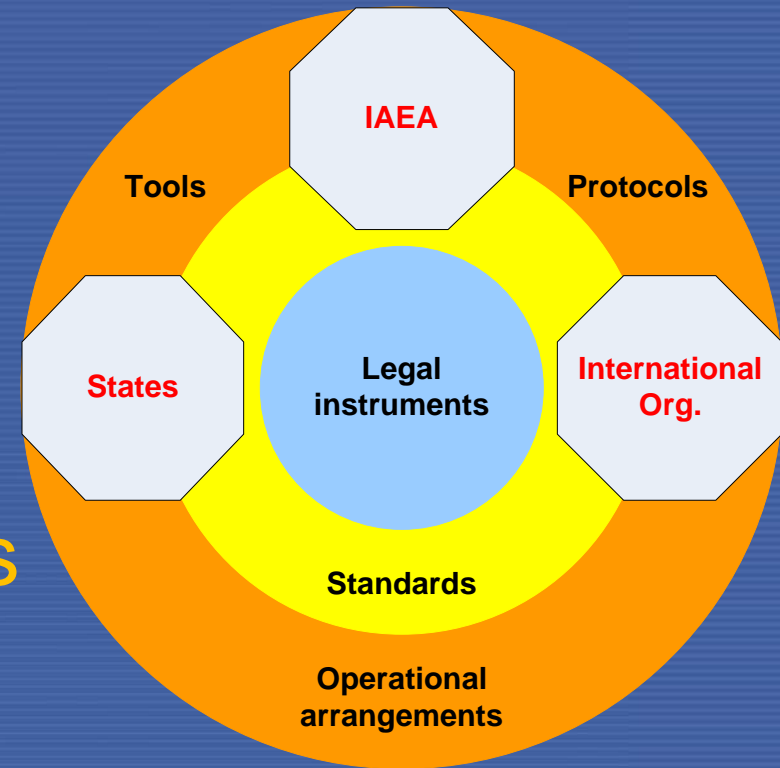
Other independent international organization related to the UN system:

- WTO - World Trade Organization
- ICC - International Criminal Court
- ISA - International Seabed Authority
- ITLOS - International Tribunal for the Law of the Sea
- Standby High-Readiness Brigade - The UN's standing military force
- UNSOG - Special Operations Group

International EPR Framework

Overview

- Legal instruments
- Safety Standards
- Tools, protocols and operational arrangements



International EPR Framework

Legal instruments

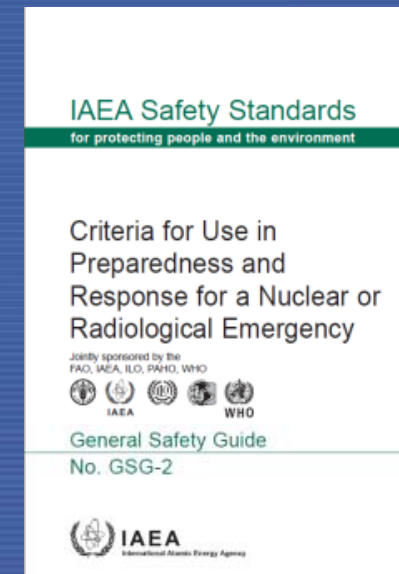
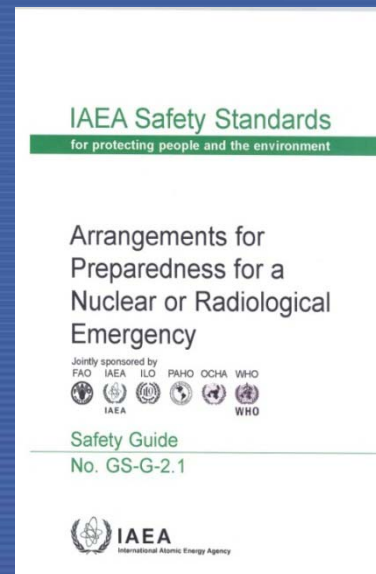
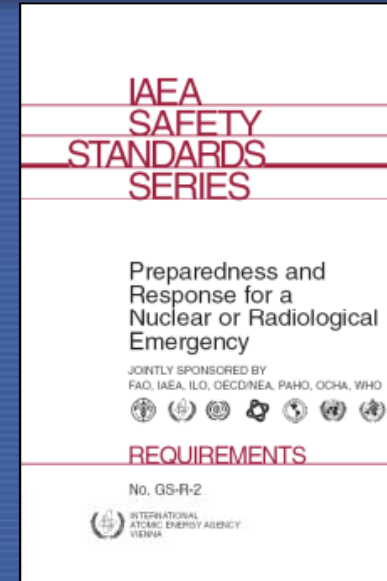
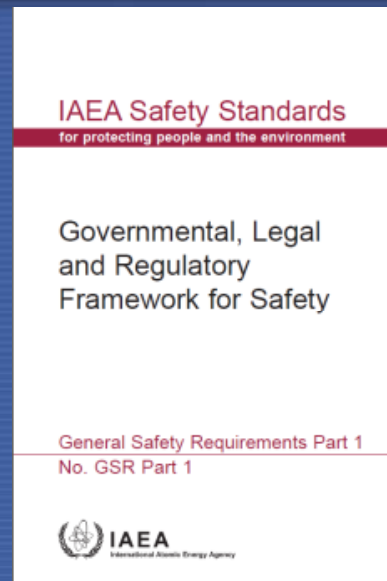
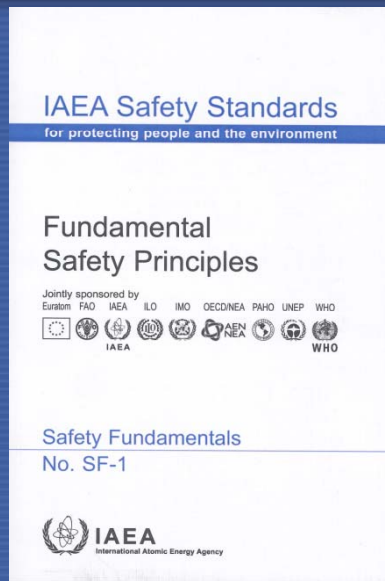
Convention
on Early Notification
of a Nuclear Accident
and
Convention on Assistance
in the Case
of a Nuclear Accident
or Radiological Emergency



INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 1987

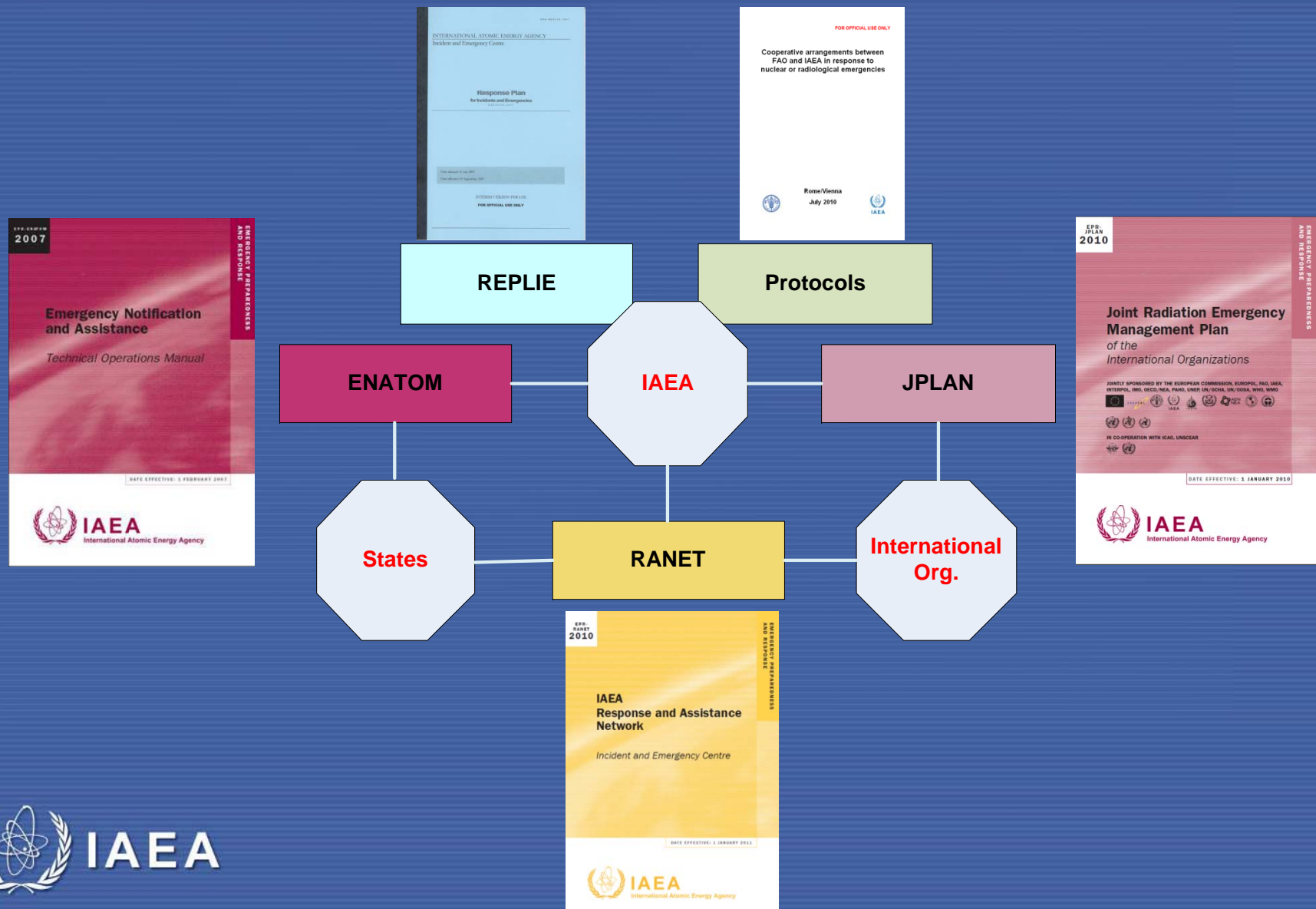
International EPR Framework

Safety Standards



International EPR Framework

Protocols and operational arrangements



IAEA Roles and Responsibilities

- Provision of assistance on request:
 - Facilitate and coordinate
- Provision of public information:
 - Timely, accurate and appropriate
- Coordination of inter-agency response:
 - Achieve synergy, speak with 'one voice'

Joint Radiation Emergency Management Plan (cont.)

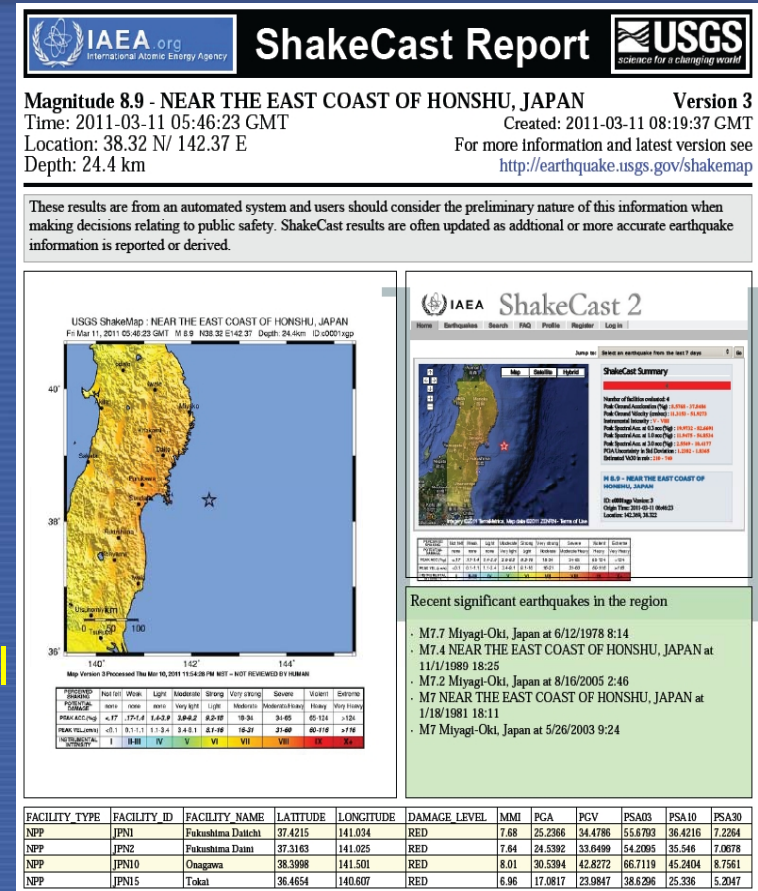
Advice or assistance (on request directly from a State or through international organization)

To offer good offices	IAEA
To send request for advice or assistance to relevant international organizations	IAEA
To arrange for advice or assistance on	
- potential radiological hazards, assessment of facility conditions and accident mitigation	IAEA
- weather information (observations, forecasts, and warnings)	WMO
- atmospheric transport and dispersion predictions	WMO
- physical dosimetric measurement services	IAEA
- radiological assessment and application of international standards	IAEA
- public health risk assessment and response	WHO, PAHO
- biological and clinical dosimetry	WHO, PAHO, IAEA
- re-establishing disrupted police services	INTERPOL
- radiation protection support, personnel and equipment for operations in affected areas	IAEA
- emergency medical response including diagnosis and treatment of radiation casualties	WHO, PAHO, IAEA
- longer term medical follow-up	WHO, PAHO
- mitigation of mental health impact	WHO, PAHO
- agricultural countermeasures	FAO
- environmental monitoring and sampling programmes for interventions related to food	IAEA, FAO
- implementation and enforcement of control measures for imported and exported food/feed	FAO
- control of food and feed	FAO, WHO
- investigating crimes and seeking international suspects	INTERPOL
- environmental monitoring and sampling programmes and assessment of long term impact	IAEA, UNEP, FAO
- relocation, resettlement	IAEA, UNEP
- decontamination, waste management	IAEA
- response on a vessel at sea or in port	IMO

Response to Fukushima Accident

11 March

- 05:46 UTC
 - Earthquake of magnitude 9.0 occurred near East coast of Honshu, Japan
- 06:42 UTC
 - On-call external event specialist informed/alerted on-call ERM about earthquake
 - Possible damage at 4 NPPs and potential for tsunami anticipated
- 07:21 UTC
 - IEC made first phone contact with METI-



11 March

- 07:48 UTC
 - Offer of Agency's assistance sent to METI-NISA Japan (cc PM of Japan to IAEA)
- 08:06 UTC
 - First EMERCON message for MSs and IGOs published on ENAC web site
- 08:20 UTC
 - IEC declares Full response mode operations

ENAC Emergency Notification and Assistance Convention
USGE will replace ENAC in 14 days. For more info, please go here.

CURRENT USER: IEC Status: IEC Status: 2011-03-11 13:30
EMERCON: IEC Status: 2011-03-11 13:30

Emergencies Submitted Messages My Tasks Documents External Links Address Book HEP Logout

Standard Report Form

This form is used for reporting on a nuclear or radiological emergency, except general emergency at a nuclear installation.

MESSAGE HEADER

AEA message number: AEA/2011/01
For distribution use: None
Cover note: None

Name of sub manager: Rodolfo Cruz Saez
Changes by AEA? No
Changes by AEA: None

HEADER

To: AEA(IEC)
Comments: Free for publication
Publication control: Instantly
Instantly: 0 hours

Code word: EMERCON ADVISORY

Note: (Use the fields as mandatory)
Message number: 1
Verified by AEA: Yes
Event: No
First message: No

1. REPORTING STATE

Reporting state: Japan

2. OFFICIAL NOTIFICATION / INFORMATION

This is an official notification under the Early Notification Convention of actual or potential international transboundary release of radiological significance for another State.
No

3. COMPETENT AUTHORITY

Competent authority: Ministry of Economy
Telephone: PJ
Email: UPL
Contact person (official position):

4. NATURE OF EVENT

Event type: Other (described below)
Nature of event: Earthquake
Radiation type: SRP
Emergency class: Emergency class

EVENT CHARACTERISTICS

Detected radiation levels: No
Contamination: No
Release: Has not occurred and unlikely to occur
Est. no. of hospitalized casualties: 0

5. FACILITY / EVENT LOCATION

Facility/event location: Atomic power plant (AP) or other type: OHAGAWA
Coordinates: Latitude (deg. dec): 35.45 ° N Longitude (deg. dec): 141.50 ° E

6. DATE AND TIME OF OCCURRENCE

YYYY-MM-DD: 2011-03-11
HH:MM (24 Hour clock): 08:45 UTC

7. VALIDITY OF INFORMATION

Information valid at: YYYY-MM-DD: 2011-03-11
HH:MM (24 Hour clock): 08:45 UTC

8. EVENT DESCRIPTION

Event summary (200 characters): See attached file

9. ACTIONS BEING TAKEN / PLANNED

Actions taken (200 characters): There is no report of abnormal monitoring readings around SRPs that indicate irregular value at this time. There are no reports of fire or failure. Staff of IAEA are gathering information.

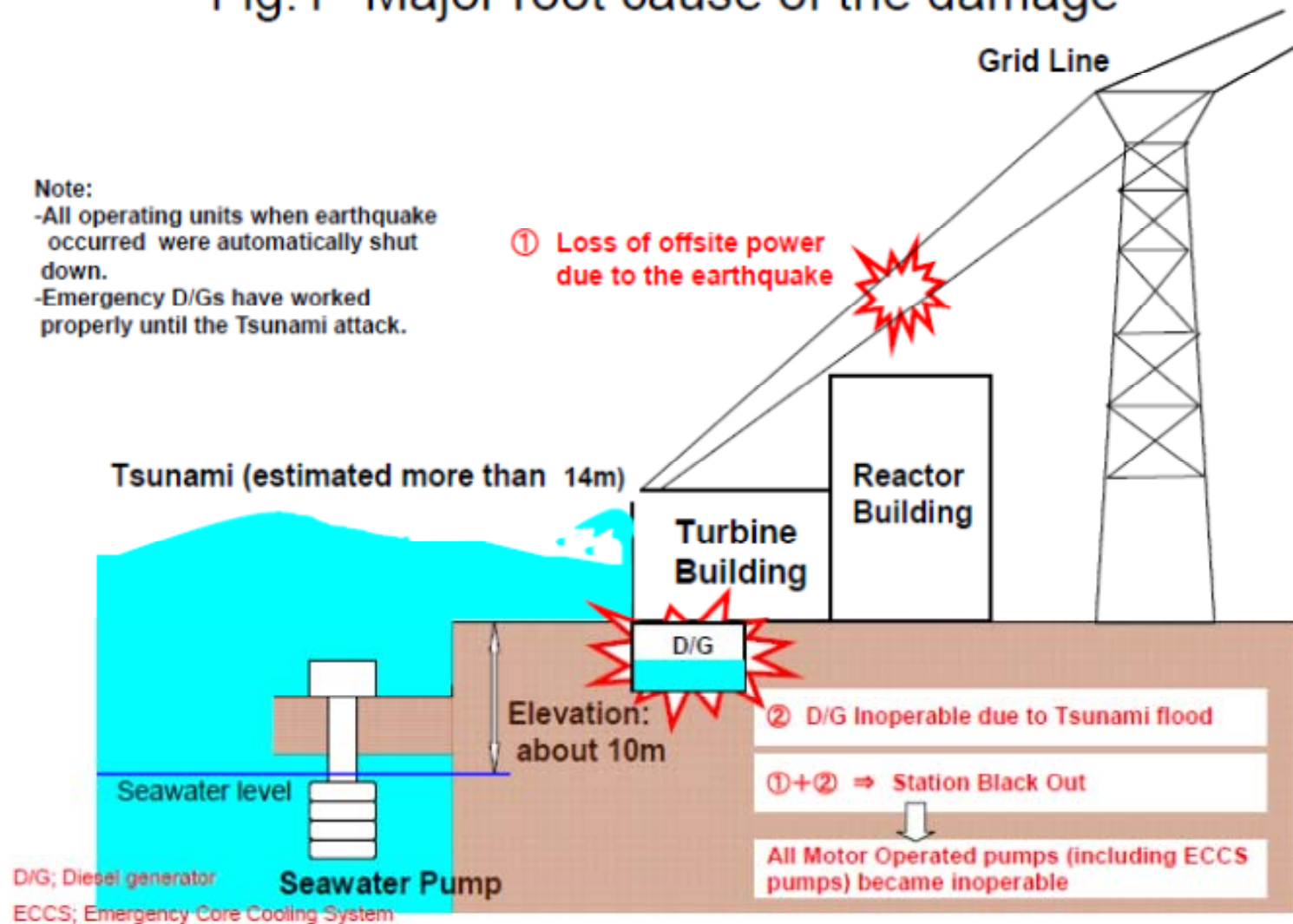
10. MEDIA INFORMATION

Provisional media rating: Media contact list: UPL of public website

11. OTHER RELEVANT INFORMATION

Other relevant information (200 characters): Further information website: Further information attachment:

Fig.1 Major root cause of the damage



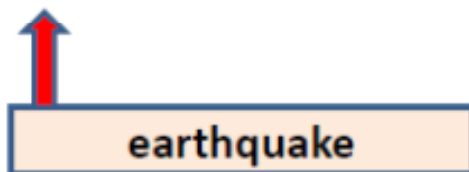


Fukushima Dai-ichi NPS

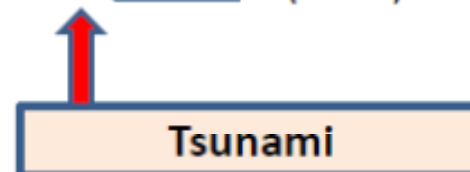
(AC Power supply)

[External power supply] → [Emergency diesel generators]

X	Yonomori -line No.1
X	Yonomori- line No.2
X	Okuma- line No.1
X	Okuma-line No.2
X	Okuma-line No.4
X	TEPCO nuclear line



X	<input type="checkbox"/>	(Unit 1)
X	<input type="checkbox"/>	(Unit 1)
X	<input type="checkbox"/>	(Unit 2)
X	<input type="checkbox"/>	(Unit 2)
X	<input type="checkbox"/>	(Unit 3)
X	<input type="checkbox"/>	(Unit 3)
X	<input type="checkbox"/>	(Unit 4)
X	<input type="checkbox"/>	(Unit 5)
X	<input type="checkbox"/>	(Unit 5)
X	<input type="checkbox"/>	(Unit 6)
X	<input type="checkbox"/>	(Unit 6)
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Incident and Emergency Centre (IEC)

Global focal point for international preparedness and response for nuclear and radiological safety or security related incidents, emergencies, threats or events of media interest and for coordination of international assistance

Implementing
IAEA functions in
EPR



11 March

- 08:30 UTC
 - First IAEA's press statement published on IAEA web site
- 09:29 UTC
 - First request for information from MS
- 09:33 UTC
 - First info to MS provided by phone

Earthquake Hits Japan (11 March 08:30 UTC)

11 March 2011

 Announcements,  Featured

The IAEA's Incident and Emergency Centre received information from the [International Seismic Safety Centre \(ISSC\)](#) at around 07:15 UTC this morning about the earthquake of magnitude 8.9 near the east coast of Honshu, Japan.

The Agency is liaising with the Japanese Ministry of Economy, Trade and Industry (METI) to confirm further details of the situation. Japanese authorities reported that the four nuclear power plants closest to the quake have been safely shut down.

The Agency has sent an offer of Good Offices to Japan, should the country request support.

Current media reports say a tsunami alert has been issued for 50 countries, reaching as far as Central America. The Agency is seeking further information on which countries and nuclear facilities may be affected.

Please refer to this webpage for future updates from the Incident and Emergency Centre regarding this event.

11 March

- 09:39 UTC
 - First IEC request to WMO's Regional Specialized Meteorological Centres standard meteorological products
- 10:39 UTC
 - First fax to METI requesting detailed info on declaration of emergency
- 12:50 – 16:47 UTC
 - First replies to inquiries from MSs sent by e-mails
- 17:03 UTC
 - Fifth EMERCON message published; confirmation of reading requested
 - Emails were sent in parallel to all existing primary and primary back up email addresses

**Environmental Emergency Response
Request for WMO RSMC Support by IAEA**

The IAEA sends the completed form by fax to all RSMCs and RTH Offenbach.
At the same time the IAEA calls the 'Lead' RSMCs (selected on the form) to ensure receipt of this form.

Date/Time of Request: 2011-03-11/09:30(UTC)

STATUS: ☒ EMERGENCY ☐ EXERCISE

REQUESTED RSMCS : (indicate the lead RSMCs by a checkmark below)

☐ EXETER ☐ TOULOUSE ☐ MELBOURNE ☐ MONTREAL ☐ WASHINGTON
☒ BEIJING ☒ TOKYO ☒ OBNINSK ☒ RTH Offenbach

SENDERS NAME : INTERNATIONAL ATOMIC ENERGY AGENCY

COMMUNICATION DETAILS: Tel.: use to confirm receipt of request
Fax: use to confirm receipt of request
Email: use to confirm receipt of request

NAME OF RELEASE SITE AND COUNTRY Fukushima-Daiichi PP - Japan (facility and place)

GEOGRAPHICAL LOCATION OF RELEASE: (MUST BE COMPLETED)
37.42 decimal degrees ☒ N ☐ S
141.3 decimal degrees ☒ E ☐ W

DECLARED EMERGENCY CLASS:
☒ NONE ☐ other, specify:


ACTION REQUIRED :
☐ NONE
☐ GO ON STANDBY (request for products or for assistance on weather conditions is to be expected)
☒ LEAD RSMCs ONLY: GENERATE PRODUCTS* AND SEND TO IAEA ONLY
☐ ALL RSMCs: GENERATE PRODUCTS* AND DISTRIBUTE WITHIN THEIR REGION(S)
☐ OTHER ACTION :

* Appendix II-7, Manual on the Global Data Processing and Forecasting System, WMO No. 486

11 March

- 19:38 UTC
 - First IEC Status Summary Report distributed by fax to all CPs
- 20:02 UTC
 - First IEC Status Summary Report published on ENAC

First IEC
Status Summary
Report – 1 page



IAEA
International Atomic Energy Agency

INCIDENT AND EMERGENCY CENTRE

Subject: Status of the Fukushima Daiichi nuclear power plant

The Incident and Emergency Centre (IEC) is continuing to monitor the status of the nuclear power plants in Japan following the earthquake earlier today. At 18:30 UTC on March 11, 2011 the IEC spoke to its counterparts in Japan the Nuclear and Industrial Safety Agency (NISA) and Ministry of Education, Culture, Sports, Science and Technology (MEXT).

NISA and MEXT confirmed the following information about the three reactor units at the Fukushima Daiichi nuclear power plant:

Unit 1
The reactor is being maintained shutdown. However there is no information regarding the status of the supply of power to Unit 1. The reactor water level is reported to be oscillating. At 15:30 UTC the reactor water was approximately 130 cm above the top of the core. Containment is intact in Unit 1, however due to an increase of pressure within containment the decision has been made to perform a limited controlled venting to avoid over pressurization of the containment.

Unit 2
The reactor is being maintained shutdown. There is currently no supply of power to Unit 2. Work is currently being undertaken to restore power. At 15:30 UTC the reactor water level is reported to be at approximately 350 cm above the top of the core. Containment is intact in Unit 2.

Unit 3
The reactor is being maintained shutdown. Power is being supplied to Unit 3. At 13:00 UTC the reactor water level is reported to be at approximately 450 cm above the top of the core. Containment is intact in Unit 3.

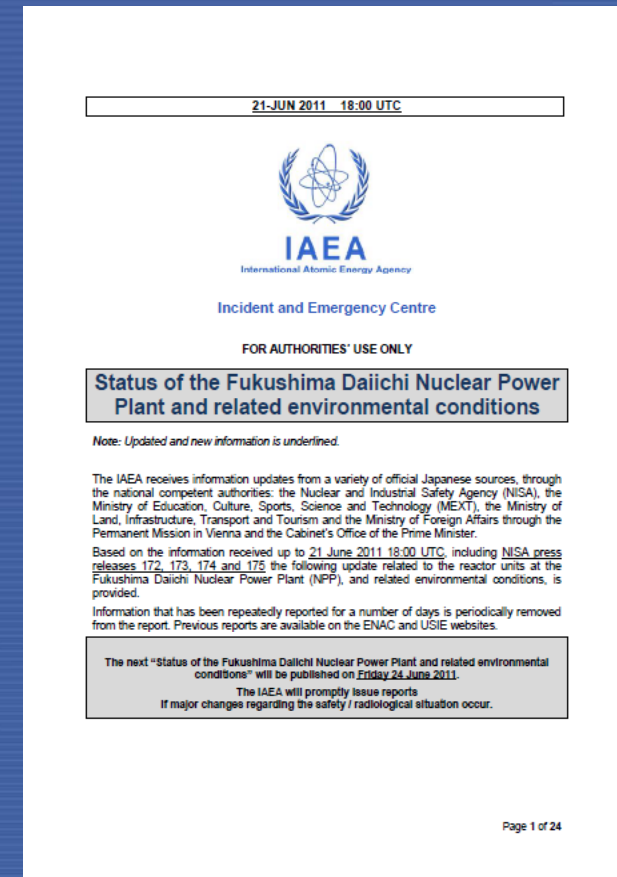
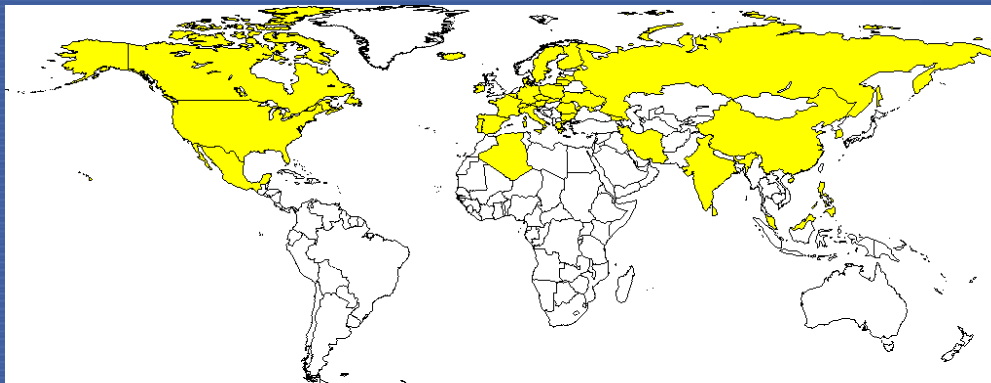
A mobile power generator has arrived at the site of the Fukushima Daiichi nuclear power plant.

Emergency Response Manager
11-March-2011 19:45 UTC

IAEA Incident and Emergency Centre

March 11- June 20

- More than 110 Status Summary Reports prepared
- Monitoring data gathered from 37 Member States



Status Summary Report
on June 21 – **24 pages**

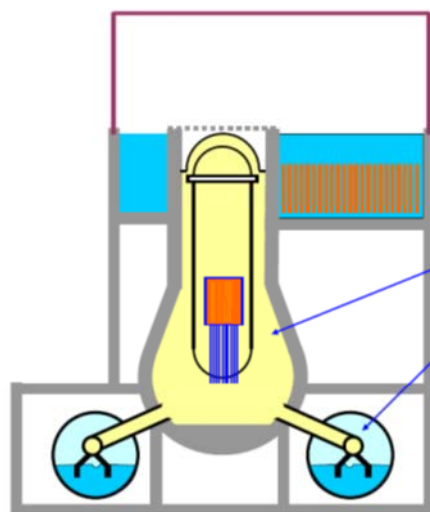
Reporting to MS

Incident and Emergency Centre

FOR AUTHORITIES' USE ONLY

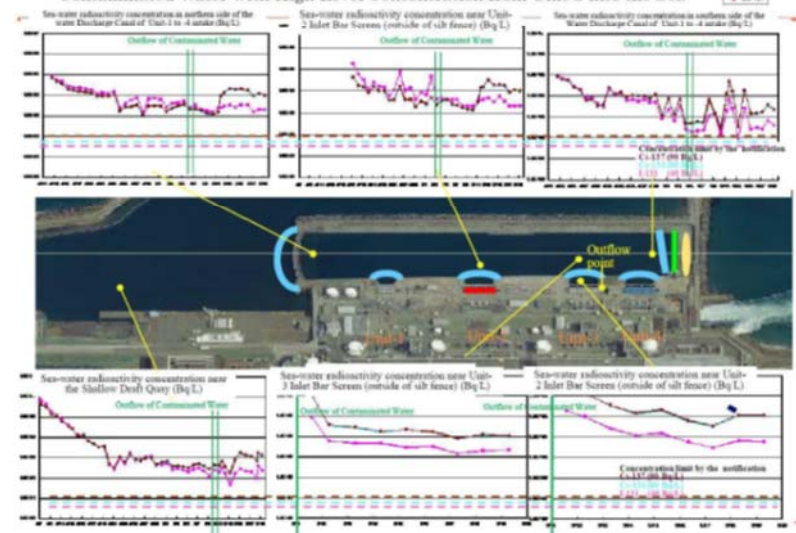
Status of the Fukushima Daiichi Nuclear Power Plant and related environmental conditions



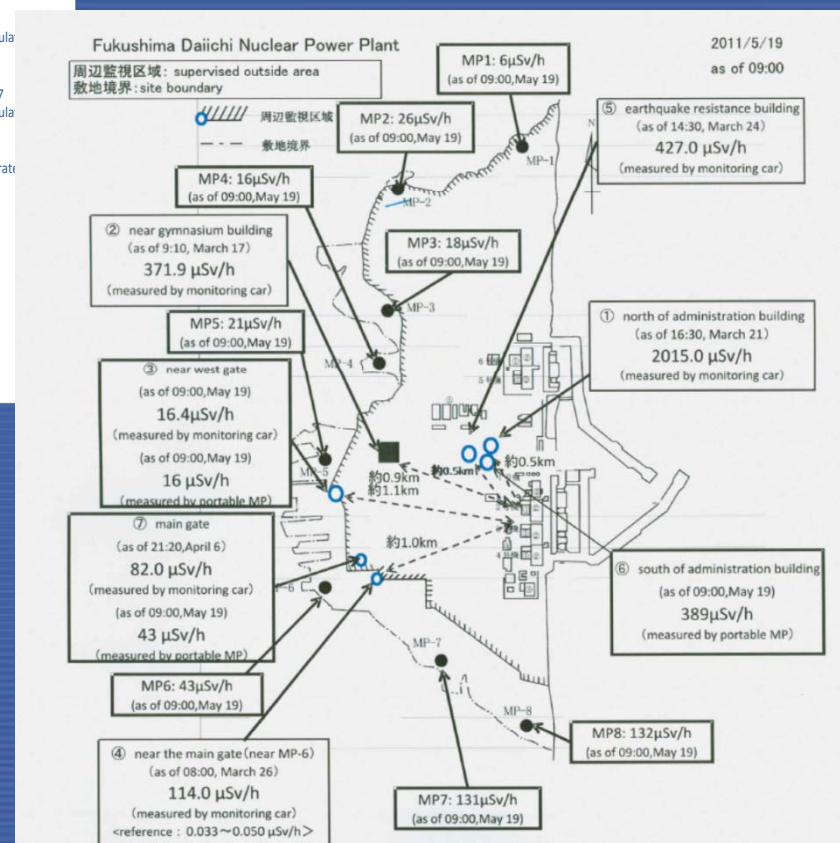
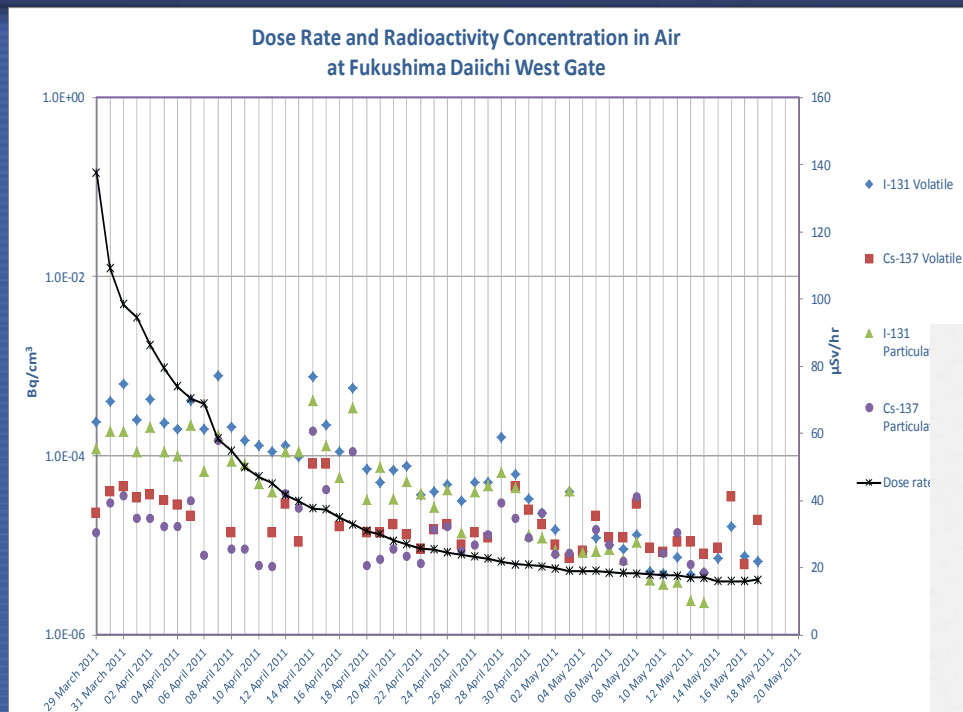


The reactor is located inside a steel containment which consists of two pressure tight compartments: The drywell (yellow) and the wetwell (blue). The wetwell or condensation chamber has the shape of a torus.

Change of Radioactive Material Concentration before and after the Outflow of Contaminated Water with High Level Concentration from Unit 3 into the Sea



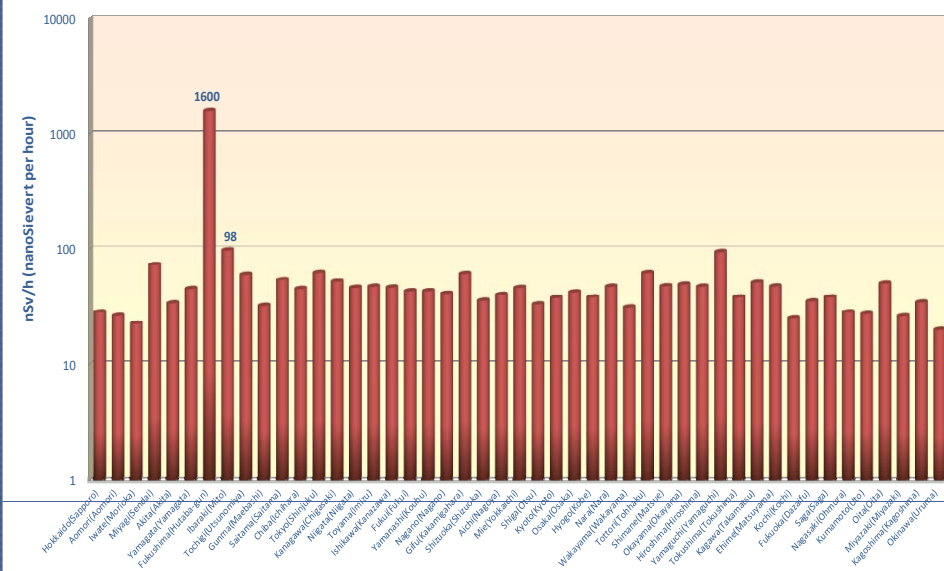
Fukushima Daiichi NPP



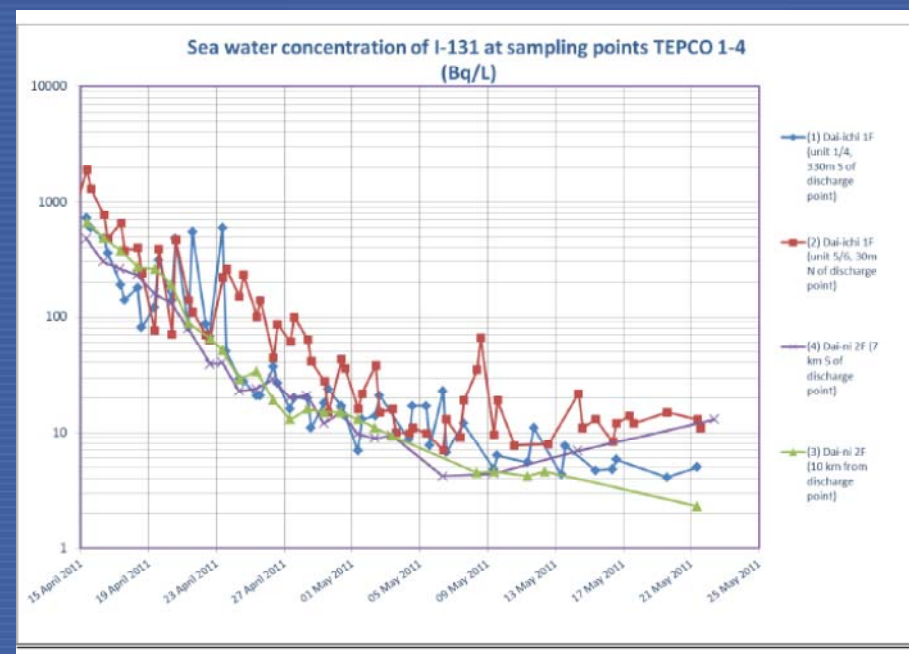
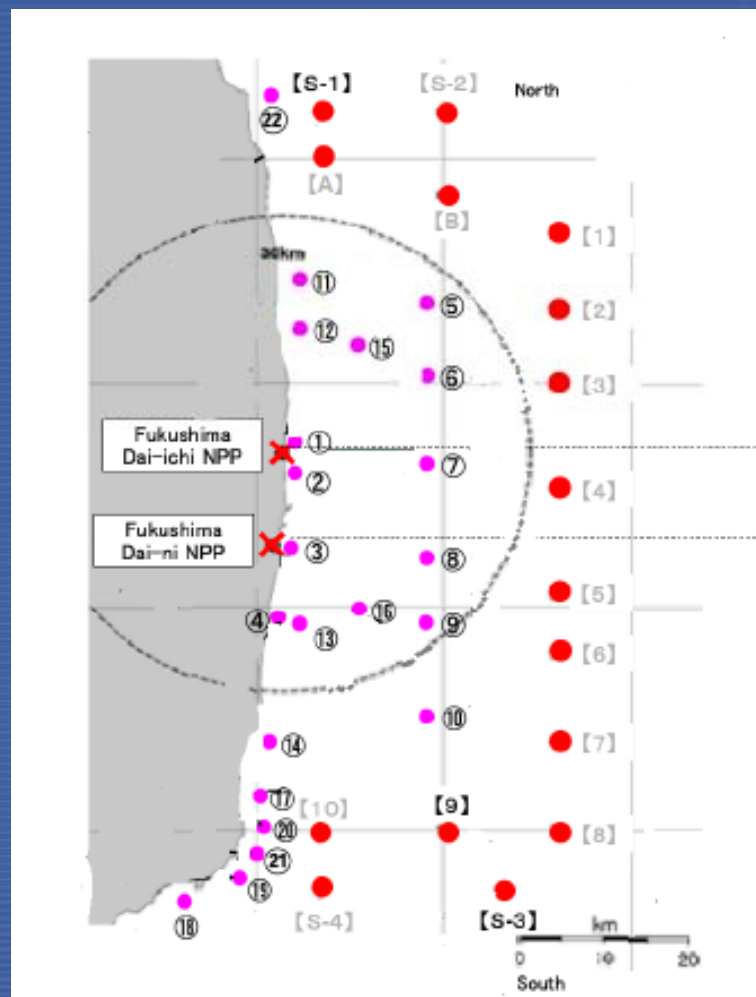
General Monitoring Data



External Gamma Dose Rate (nSv/h) on 18 May 2011 at 09:00 UTC in the 47 Prefectures - Log scale



Sea Monitoring Data



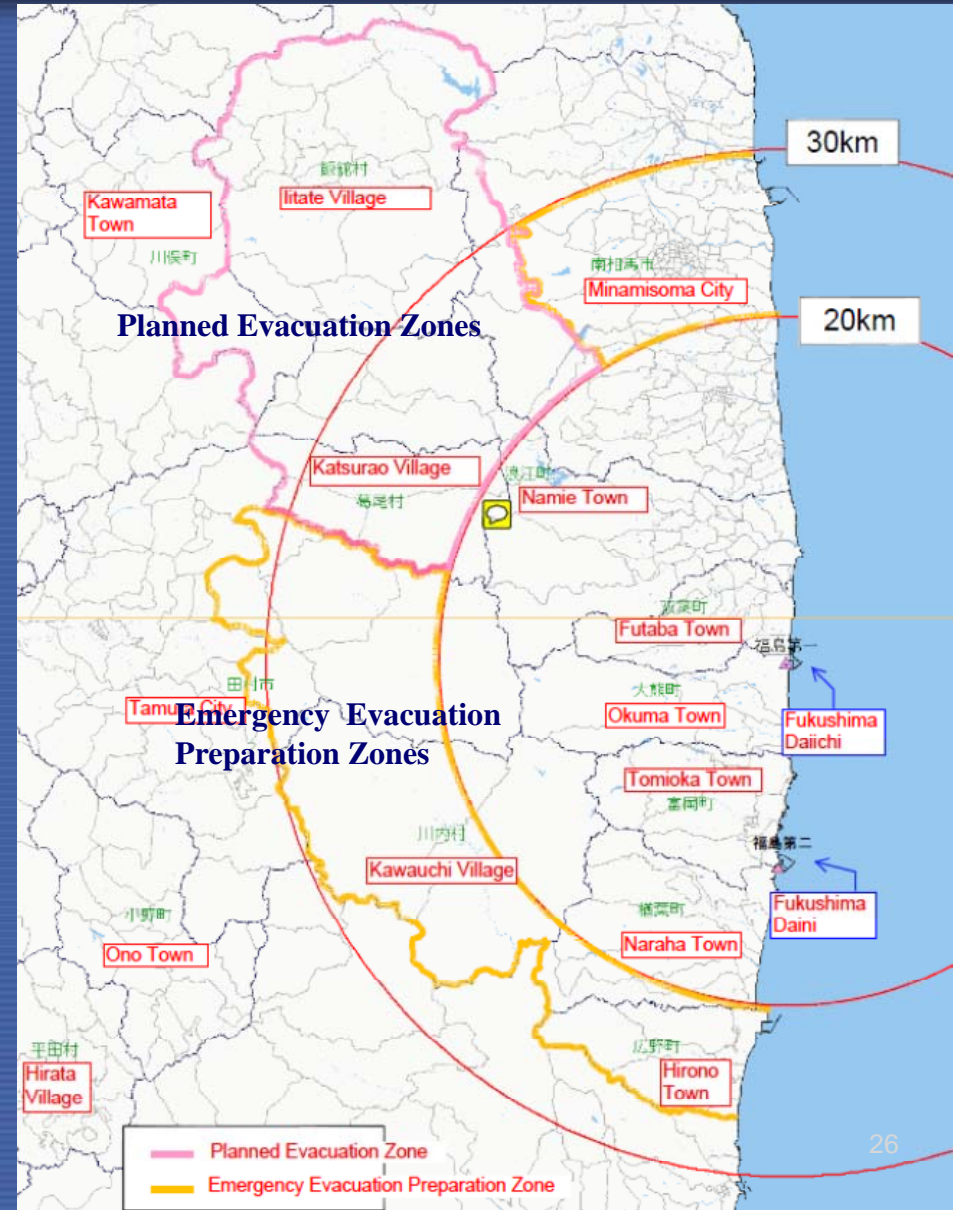
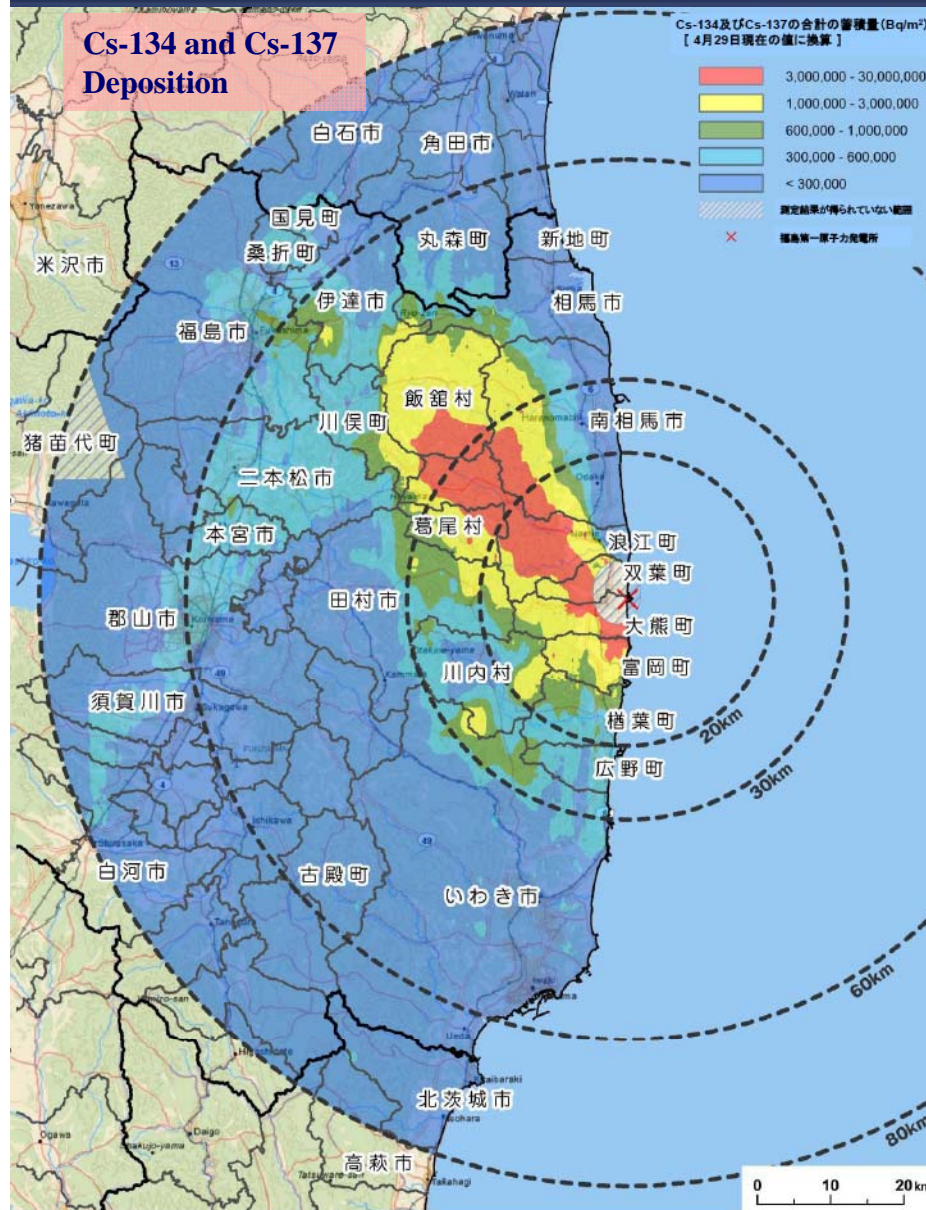
Food Monitoring Data

Provisional regulation values of radioactive materials in food.

	Provisional regulation values of radioactive materials in food in accordance with the Food Sanitation Act (Bq/kg)	
Radioactive iodine (^{131}I)	Drinking water, Milk, dairy products*	300
	Vegetables, Fish	2,000
Radioactive cesium (Sum of ^{134}Cs and ^{137}Cs)	Drinking water, Milk, dairy products	200
	Vegetables, Grains, Meat, eggs, fish, etc.	500
Uranium	Infant foods, Drinking water, Milk, dairy products	20
	Vegetables, Grains, Meat, eggs, fish, etc.	100
Alpha-emitting nuclides of plutonium and transuranic elements (^{238}Pu , ^{239}Pu , ^{240}Pu , ^{242}Pu , ^{241}Am , ^{242}Cm , ^{243}Cm , ^{244}Cm)	Infant foods, Drinking water, Milk, dairy products	1
	Vegetables, Grains, Meat, eggs, fish, etc.	10

*) Provide guidance so that materials exceeding 100 Bq/kg are not used in milk supplied for use in powdered baby formula or for direct drinking.

Regional radiological data and zoning



March 11 – June 20

- Oral briefings for MSs, press briefings have been provided and Update Briefs posted on IAEA's web site



March 11- June 20

- MSs offers for assistance gathered, provided to Japan and published on ENAC web site

OVERVIEW OF CAPABILITIES OFFERED TO JAPAN as of 2011-Mar-23

Details of the offers are kept at IAEA RC

State	Institution	REMOTELY CONTROLLED EQUIPMENT		ENVIRONMENTAL MONITORING			EFFECTS OF RADIATION ON HUMAN HEALTH		OTHER OFFERS
		Equipment	Services	Radiation survey	Environmental sampling and analysis	Assessment and advice on the radiological consequences	Medical support (medical management of casualties, recommendations, treatment, IT supplies, etc.)	Dose assessment	
Argentina	Comision Nacional de energia atómica					Experts		Experts	Experts (interagency dispersion, severe accident management)
Canada	Permanent Mission of Canada	Considering (robots and remotely controlled ground vehicle)	Considering (operators, remote platforms)	Mobile surveillance equipment (equipment for car/helicopter/airplane)	Sampling and analysis (water, soil, food) experts/equipment	Experts in health physics/radiation protection	Population screening/ experts and screening equipment		Offers in specific equipment (hand-held survey meters, dosimeters, mobile survey systems, gamma spectrometers, bioassay capabilities), experts and liaison officers
China	PM of the People's Republic of China			Radiation monitoring			Nuclear medical assistance		Others
European Commission	ECDC			YES (protection and survey)			YES		
European Commission	STUK						YES (chromosome analysis)		
Finland	STUK			Any kind of assistance	Any kind of assistance	Any kind of assistance	Any kind of assistance	Any kind of assistance	Any kind of assistance
France	PM/AN/ISA					[To IAEA: expert from AIN on technical assessment expert from CEA on rad consequences expertise (home based) from IRSN]			Satellite images
	GE-INTIA (EDF, AREVA, CEA)	1 ECR robotized Device for Observation 1 ENIS robotized Device for Observation 1 EUCR measuring vehicle 1 GUERARD remote vehicle 1 ORION robot 1 ERASE Outdoor reconnaissance shielded vehicles dump trucks excavators							
Germany	Ministry of Environment and Nuclear Safety and KWS capabilities in Karlsruhe	Specialized equipment for handling on highly irradiated or contaminated areas, e.g. inside the nuclear power plant		YES (unmanned aerial vehicle)	YES (robot in high dose rate area)				
	Ministry of Environment						Drugs for radiation damage prevention (potassium iodide 1,000,000 down) decontaminating agents		
Hungary	PAKS NPP				YES (helicopter, activity, air sample, dose rate)	YES	YES (whole body counting)		
	NBR						YES (diagnosis, consultation) YES (surgery, chromosome analysis, dose reconstruction)	YES (internal dose assessment)	
	NDGDM				YES (various measurements)			YES	
Latvia	ADI				YES (mobile equipment)		YES (whole body counting)	YES (gamma dose rate measurement)	"Humanitarian aid, nuclear medicine and other necessary specialist"
	Permanent Representative of the Republic of Kazakhstan to the Organization for Security and Co-Operation in Europe				YES				
Korea	Ministry of Education, Science and Technology, Permanent Mission			YES (The offer arrives in a generic way)			YES (The offer arrives in a generic way)		"Severe accident management"
Mexico	Comision Nacional de seguridad nuclear y salvaguardas			YES (radiation exposure level)	YES (qualitative radionuclide analysis)				Source Search and Recovery Assessment and advice on Emergency Response
Poland	PAEA			YES	YES				Any kind of assistance
Poland	NSRP			Any kind of assistance	Any kind of assistance	Any kind of assistance	Any kind of assistance	Any kind of assistance	Unspecified "Assistance and support"
Russia	Federal Environmental, Industrial and Nuclear Supervision Service of Russia								
Sweden	SSM			Any kind of assistance	Any kind of assistance	Any kind of assistance	Any kind of assistance	Any kind of assistance	Any kind of assistance
USA	DOE			YES (aerial)	YES (field monitoring team)				Consequence management response team 30 PEOPLE IN-GTU IN JAPAN

March 11- June 20

- Information on 'soft countermeasures' in MSs have been gathered, evaluated by OECD/NEA and made available on ENAC web site

Emergency Response Governmental Decision and Recommendations Information Exchange

Governmental Decisions and Recommendations

	Country	Decision taken or Recommendation made	Applicable Date	Applicable Population
Q1: What has your government recommended with regard to your citizens living in or visiting Japan?	Australia	<p>As a precautionary measure, that Australians within an 80 km zone from the Fukushima nuclear power plant move out of the area.</p> <p>As the situation continues to develop, all Australians in Japan are strongly encouraged to follow the protective measures recommended by the Japanese and Australian Governments. This may include sheltering.</p> <p>Australians returning home from Japan are highly unlikely to be contaminated or exposed to significant radiation and will not require checks for radioactivity. However, if people wish to seek medical advice they should contact their local GP.</p> <p>ARPANSA and the Chief Medical Officer advise that iodine tablets are only required when exposed to substantial radiation doses from radioactive iodine. There is no current need for those returning from Japan or those in Japan outside the exclusion Zone to consider the use of potassium iodide tablets.</p> <p>At the present time, Australia's food standards Regulator, Food Standards Australia New Zealand (FSANZ), considers the risk of Australian consumers being exposed to radionuclides in food imported from Japan to be negligible.</p> <p>Australia does not import fresh produce from Japan. In fact Australia imports very little food from Japan. Imports are limited to a small range of specialty products, for example seaweed-based products, sauces etc.</p> <p>A joint communique for the World Health Organization, the International Atomic Energy Agency, the World Meteorological Organization, the International Maritime Organization and the International Civil Aviation Organization advises that there is no current restriction on international flight and maritime operations can continue normally into and out of Japan's major airports and sea ports</p> <p>Full text at www.arpansa.gov.au</p>	Last Updated 0900 AEDST (UTC+11) March 19	Various categories - Australians in Japan; Australian Passengers returning from Japan; Medical Practitioners; Food Imports; Advise to Airlines and Shipping
	Austria	<p>Partial travel warning for the north east of Japan. It is also recommended that Austrians should leave this area and in addition the Tokio Province</p> <p>The Austrians in Japan are recommended to strictly follow the instructions of authorities in Japan.</p>	Since 15.03.2011	Travelers; Austrians in Japan
	Belgium	<p>Travel advice for Japan runs as follows: All trips to Japan are advised against till further notice. Belgian citizens whose stay in Japan is not essential are being advised to leave the country.</p> <p>organized consular assistance of Belgian citizens from Japan on a voluntary basis</p>		

March 11- June 20

ENAC web site

- Actively used:
 - Close to 10.000 visits with more that 1.8 million hits
- More than 110 EMERCON messages (mostly from Japan) received and published
- More than 1300 documents published:
 - More than 1000 from Japan
 - 31 from MSs
 - 74 from WMO
 - 110 Status Summary Reports

Inter-agency Coordination

IACRNE and JPLAN



- March 11 - IGOs notified and JPLAN activated
- March 15 - first IACRNE coordination video meeting conducted:
 - Briefings, exchange of information, coordination of response activities, joint press releases, assignment of commonly agreed activities
 - 13 coordination video meetings since March 11
- Liaison officers working in IEC:
 - Staff members of FAO and WHO, experts from WMO

Lessons from Response

International EPR framework

- IAEA's Incident and Emergency System proved to work well overall
- IAEA can respond 24/7 for sustained period
 - 54 days around the clock – first time in Agency's history
- IAEA's existing/formal role in sharing of information largely limited to distributing information validated by State concerned
- IAEA's existing/formal role in response appears not to be in line with perceived/expected role

Way Forward

International EPR framework

- Role of IAEA in EPR requires broadening of responsibilities:
 - To conduct analysis of emergency conditions, progression (possible scenarios of crisis development), consequences and associated radiological impact, and response actions during course of an emergency
 - To expand information sharing with MSs including results of those analysis

Other IAEA Actions

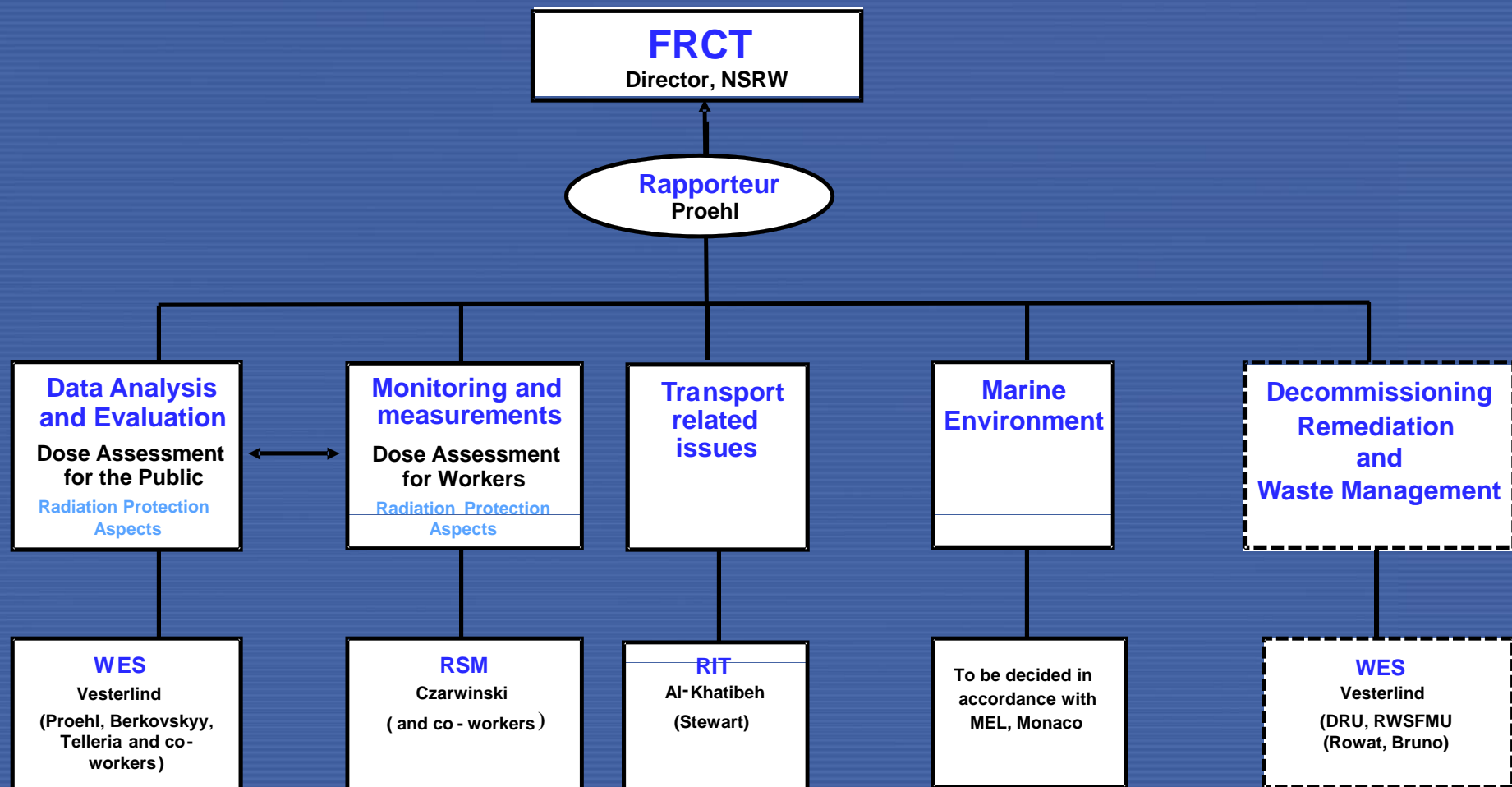
Director general's visit to Tokyo, the Agency's on-the-ground support to Japan became operational

- A senior Agency official was deployed in Japan to coordinate the IAEA's assistance activities;
- The Japanese authorities agreed to the designation of two IAEA liaison officers to work closely with the Nuclear and Industrial Safety Agency (NISA) 24 hours per day;
- The Agency's radiation monitoring team began sending back measurements to Vienna, including from locations close to the Fukushima site.

Fukushima Accident Coordination Team

- **Fukushima Accident Coordination Team (FACT) was formed within the Agency**
 - Fukushima Nuclear Safety Team (FNST)
 - Fuel , reactor , Rad. Water treatment.
 - Fukushima Radiological Consequences Team (FRCT)

The Structure of FRCT



IAEA Labs Actions

- Activities of the IAEA laboratories:
 - IAEA Marine Environmental Studies Laboratory, Monaco
 - Nuclear Applications Environmental Laboratories ,Seibersdorf
 - Radiation Monitoring and Protection Services Laboratories , Vienna

Missions to Japan

1. Radiological monitoring teams (March 18 to April 18)
2. Boiling water reactor expert team. (April)
3. Marine monitoring team (April)
4. Joint IAEA/FAO Food safety assessment team (March)
5. International Fact-Finding Expert mission (May)

IAEA Radiation Monitoring Teams

Objectives :

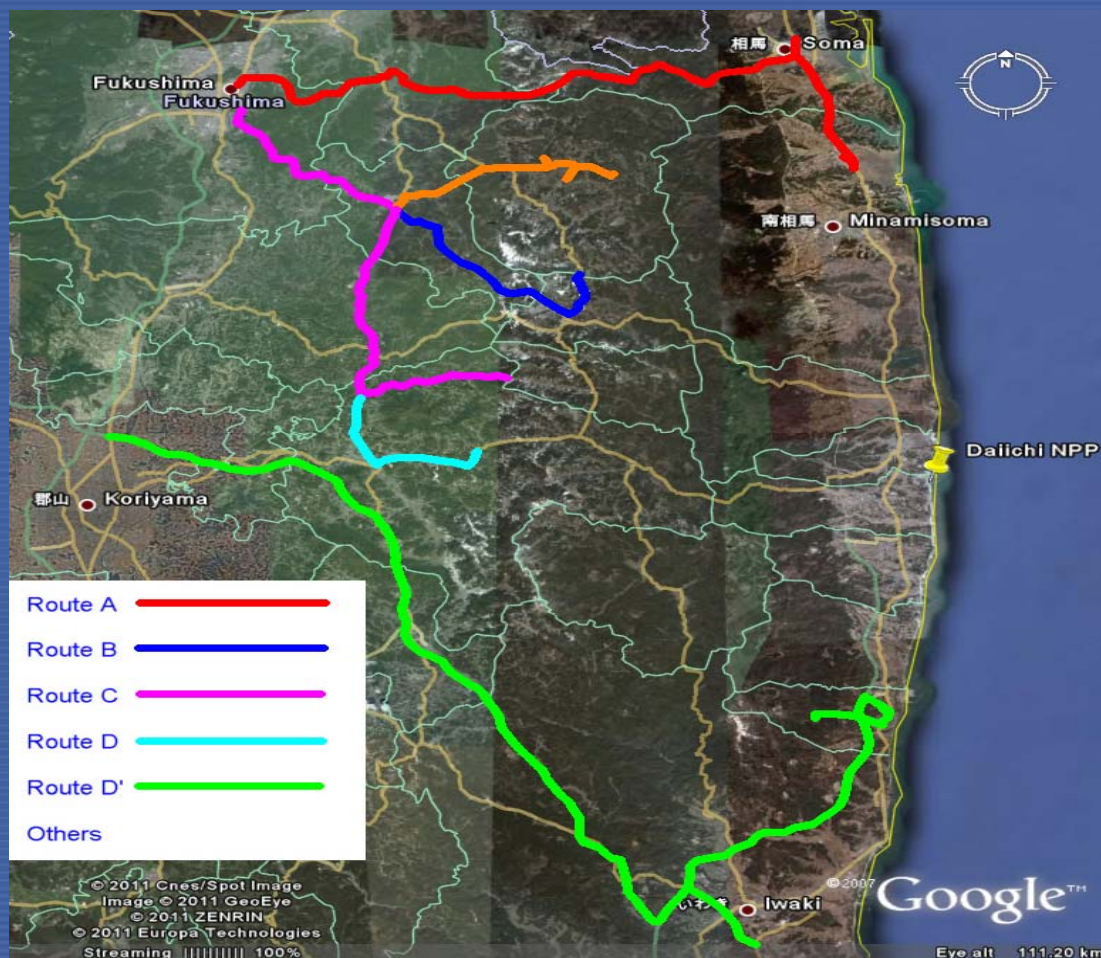
- To perform environmental monitoring of the releases of the Fukushima Daiichi NPP and in Tokyo and surroundings, in order to verify the data provided by the Japanese.
- To provide independent IAEA monitoring results.
- To provide trend analysis for different parameters at each location when number of monitoring points would allow.

Scope

- Dose rate,
- Surface activity concentration
- Collection of different samples (air, smears, soil, vegetation, water, etc.....)
- In-situ gamma spectra for selected locations

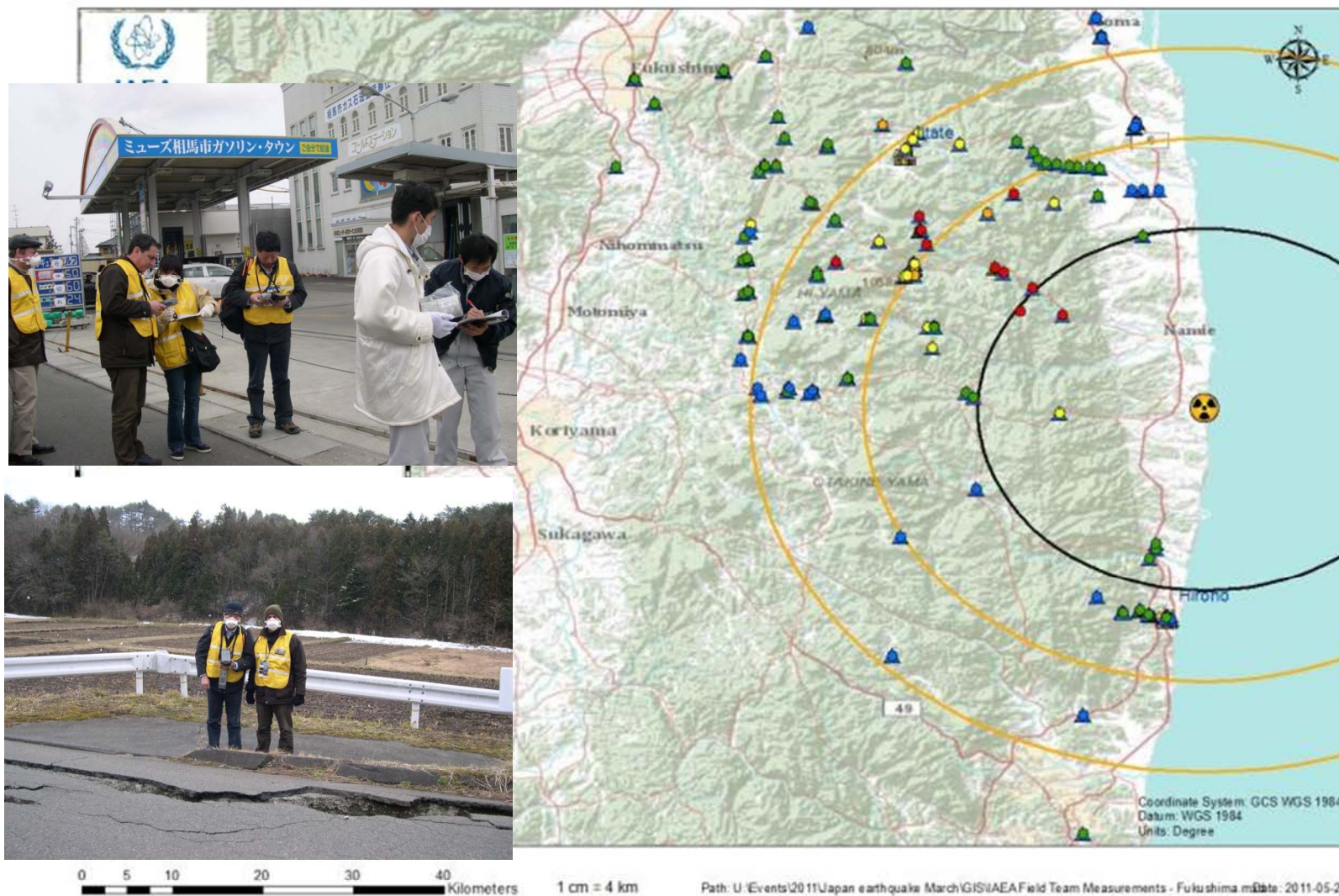
From 20 Km to around 80 of Fukushima Daiichi NPP
and in Tokyo surroundings

Monitoring Routes



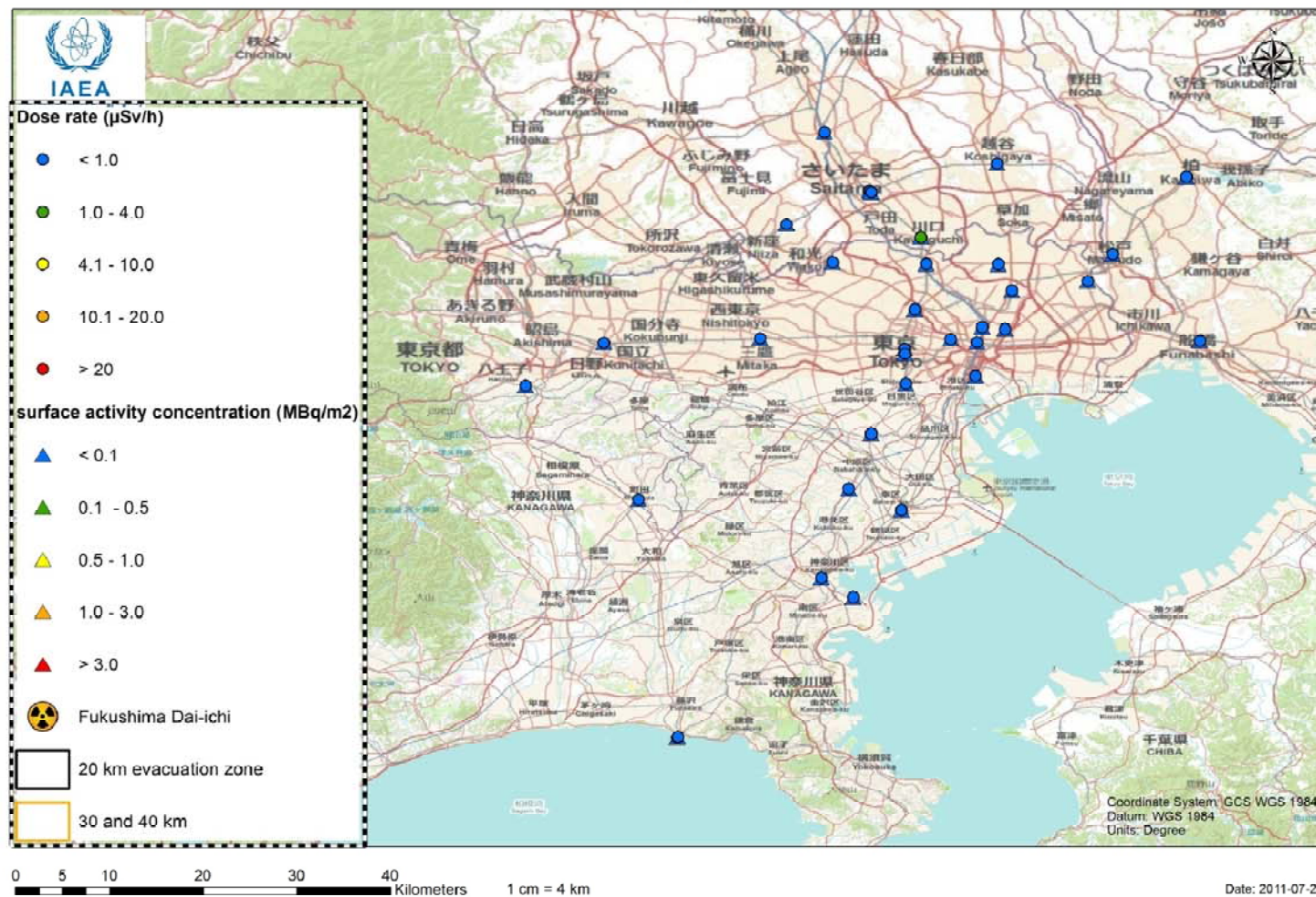
IAEA Field Team Measurements

Team Fukushima



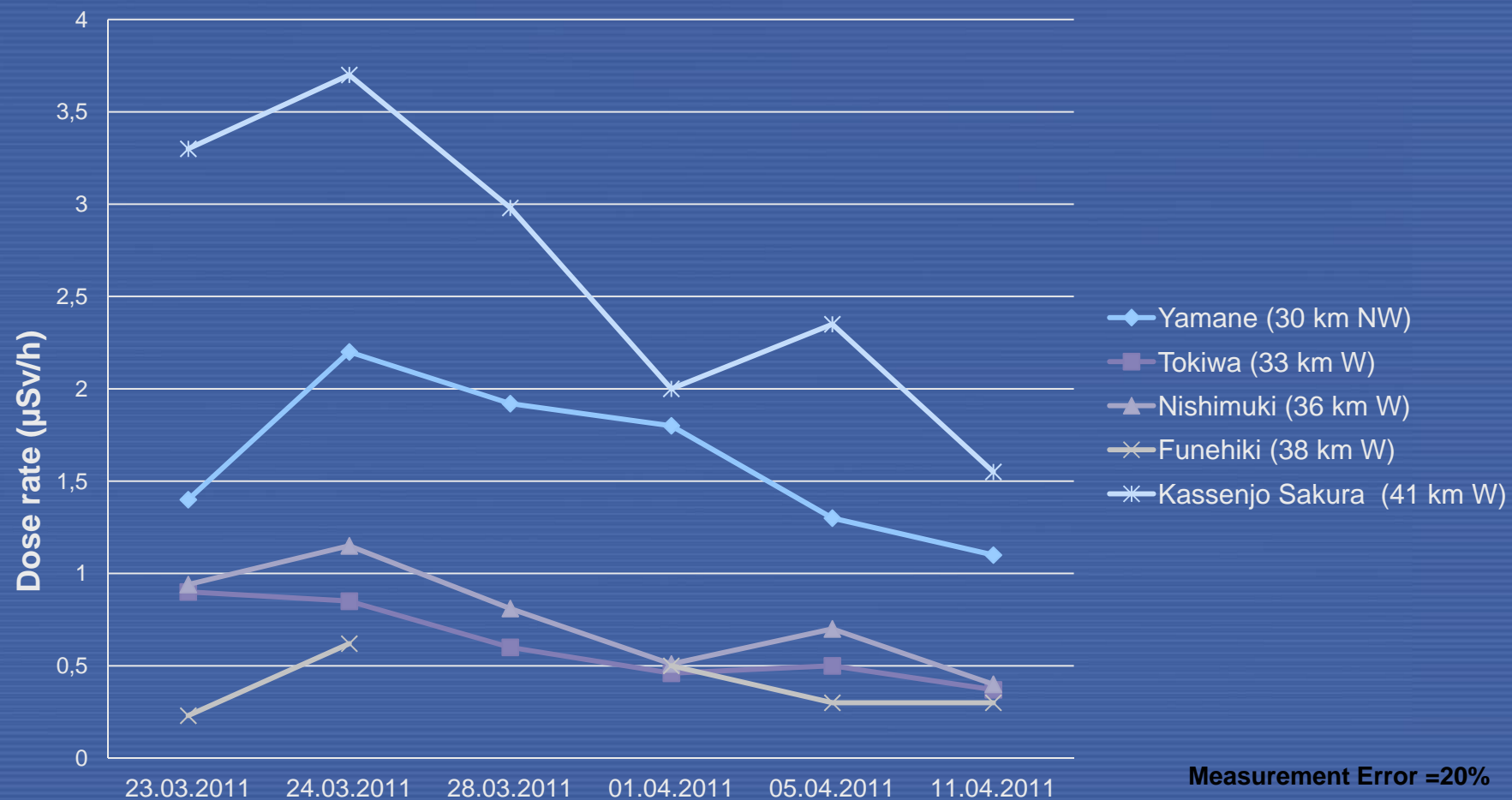
IAEA Field Team Measurements

Team Tokyo



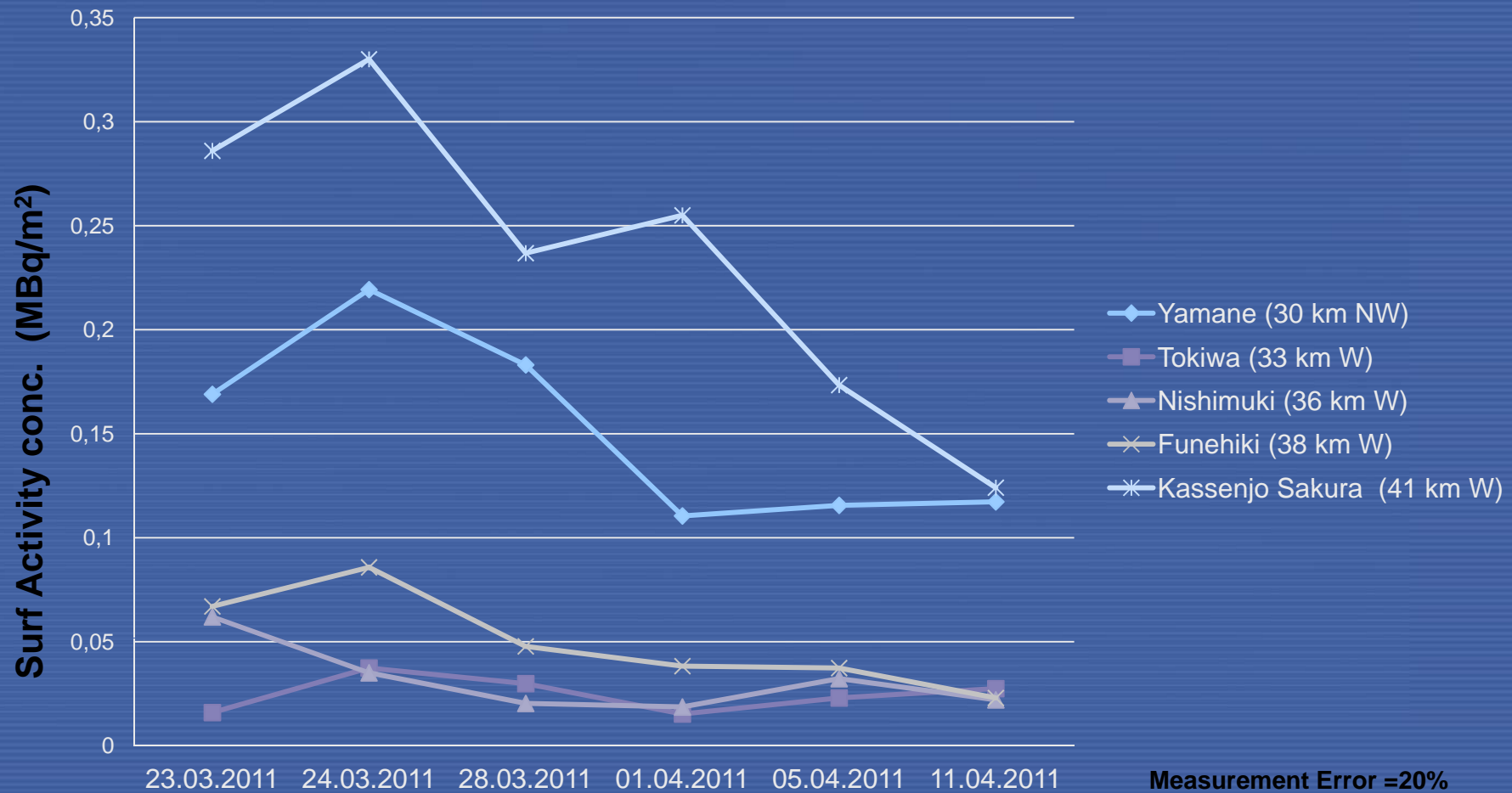
IAEA measurements - Route D

Dose rate ($\mu\text{Sv/h}$)

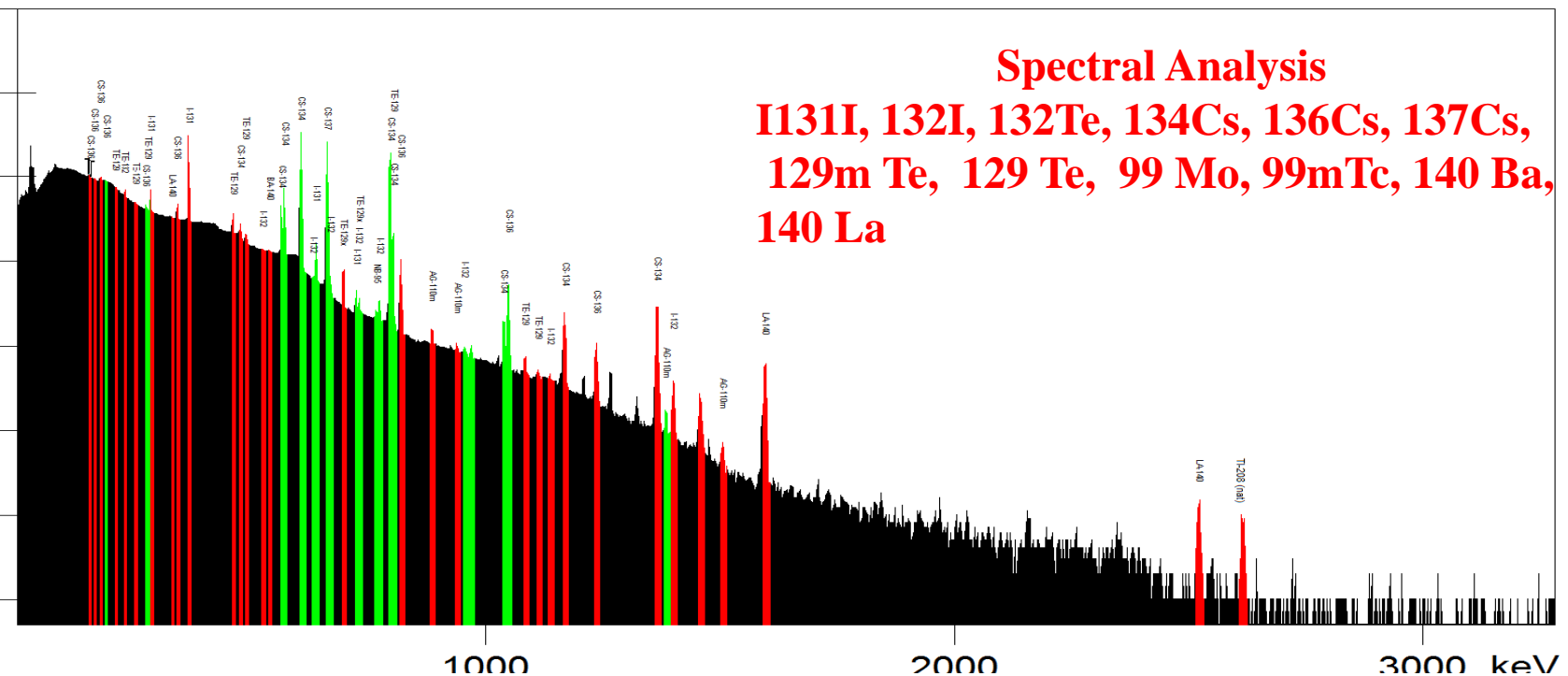


IAEA measurements - Route D

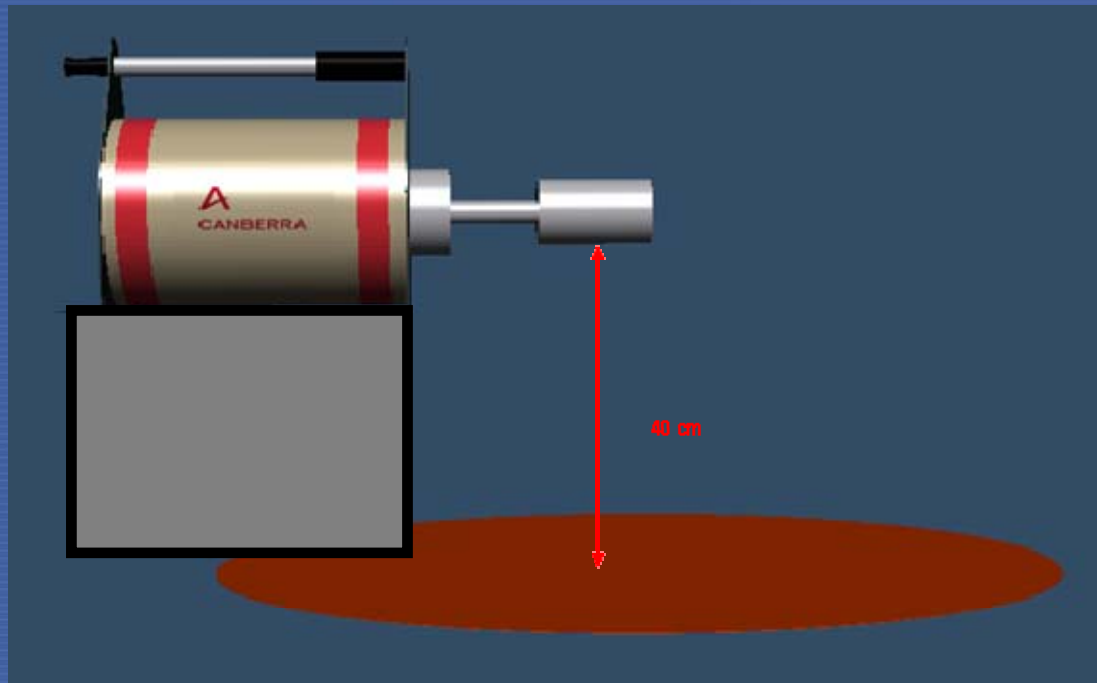
Surface Activity Concentration (MBq/m²)



In Situ Object Counting System software package developed by Canberra Industries – (SG- Portable & Resident NDA)



In Situ Object Counting System software package developed by Canberra Industries – (SG- Portable & Resident NDA)

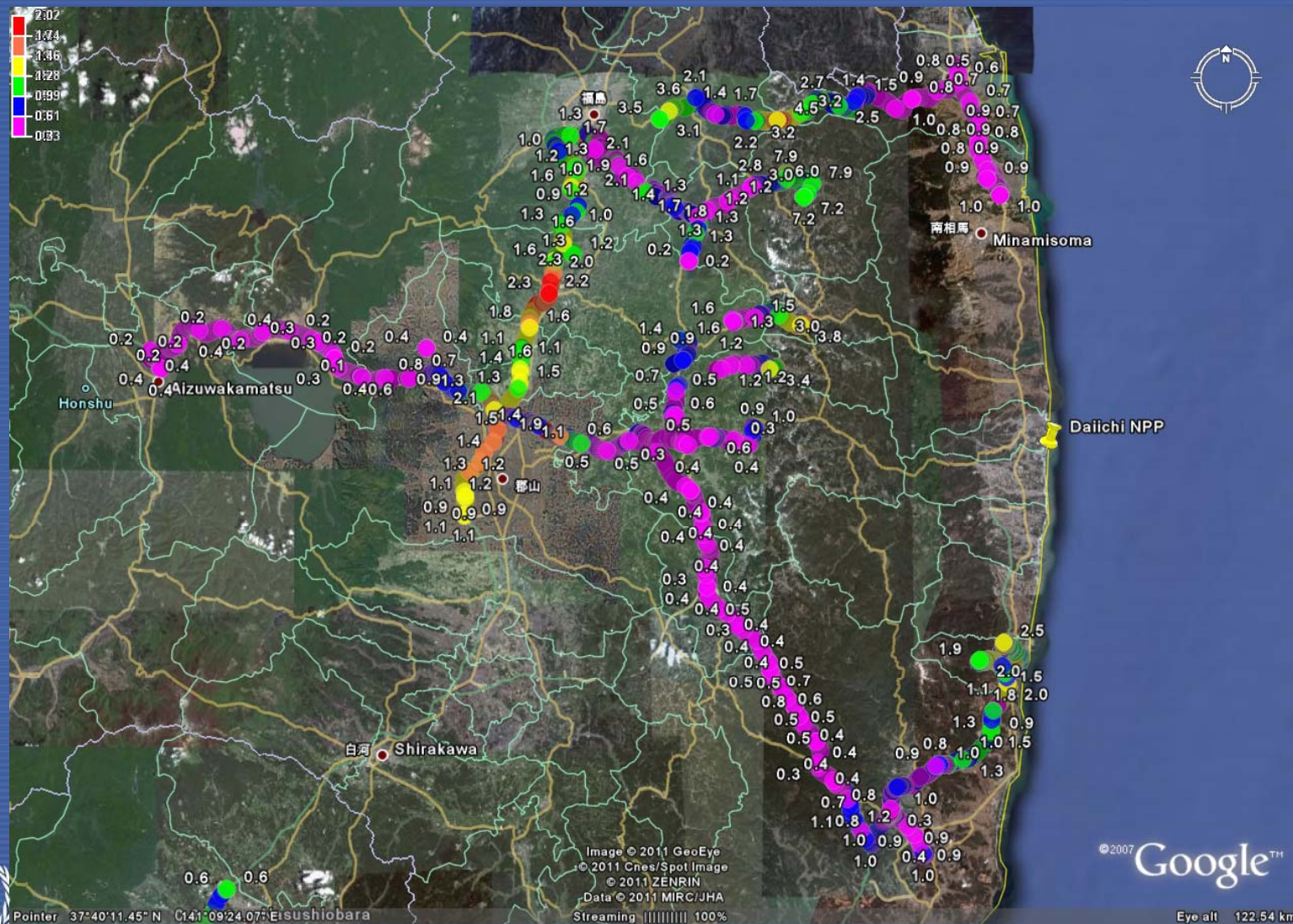


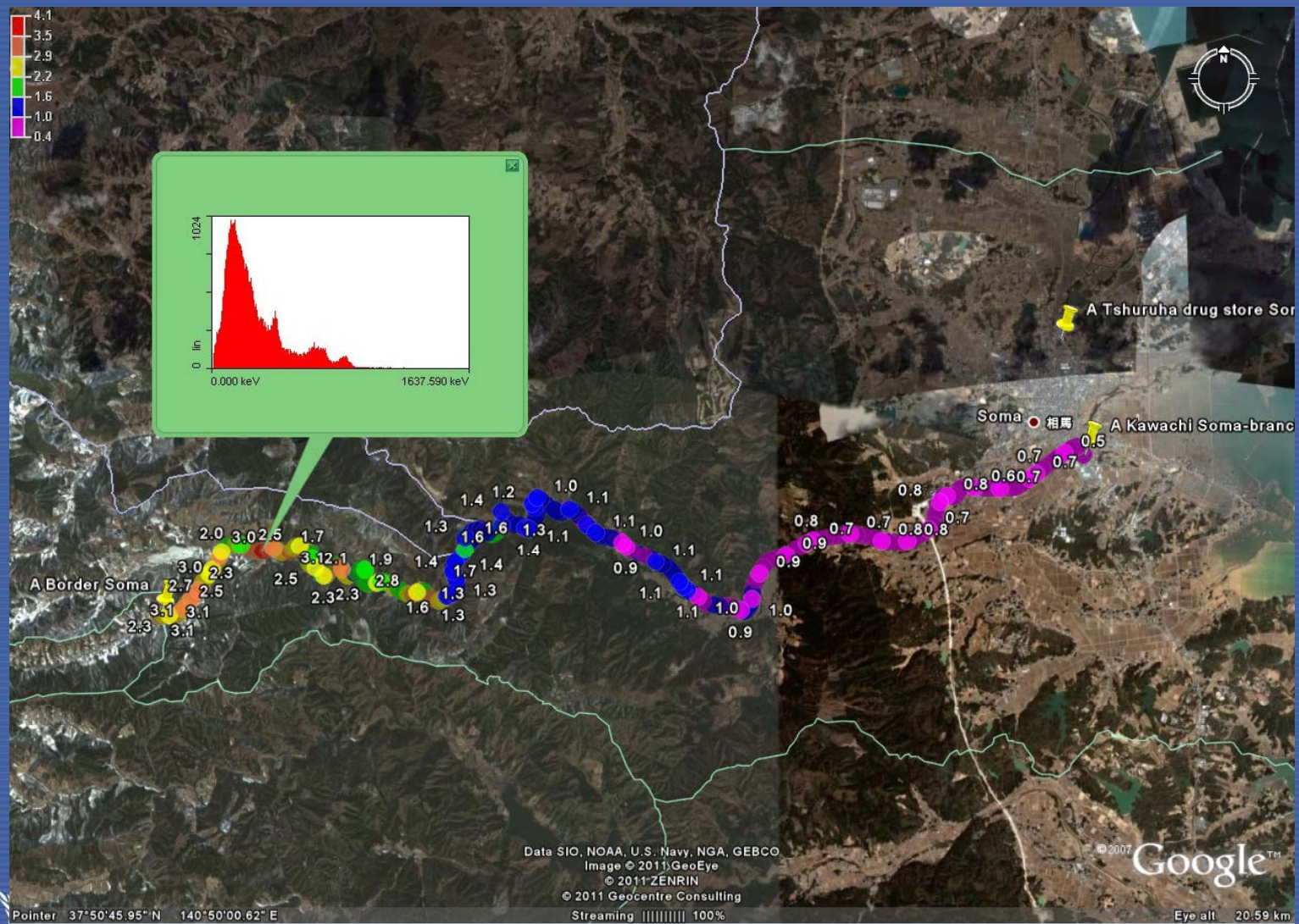
Air filters & smears sampling and measurement



Backpack data- NSL

(All routes-FT2)



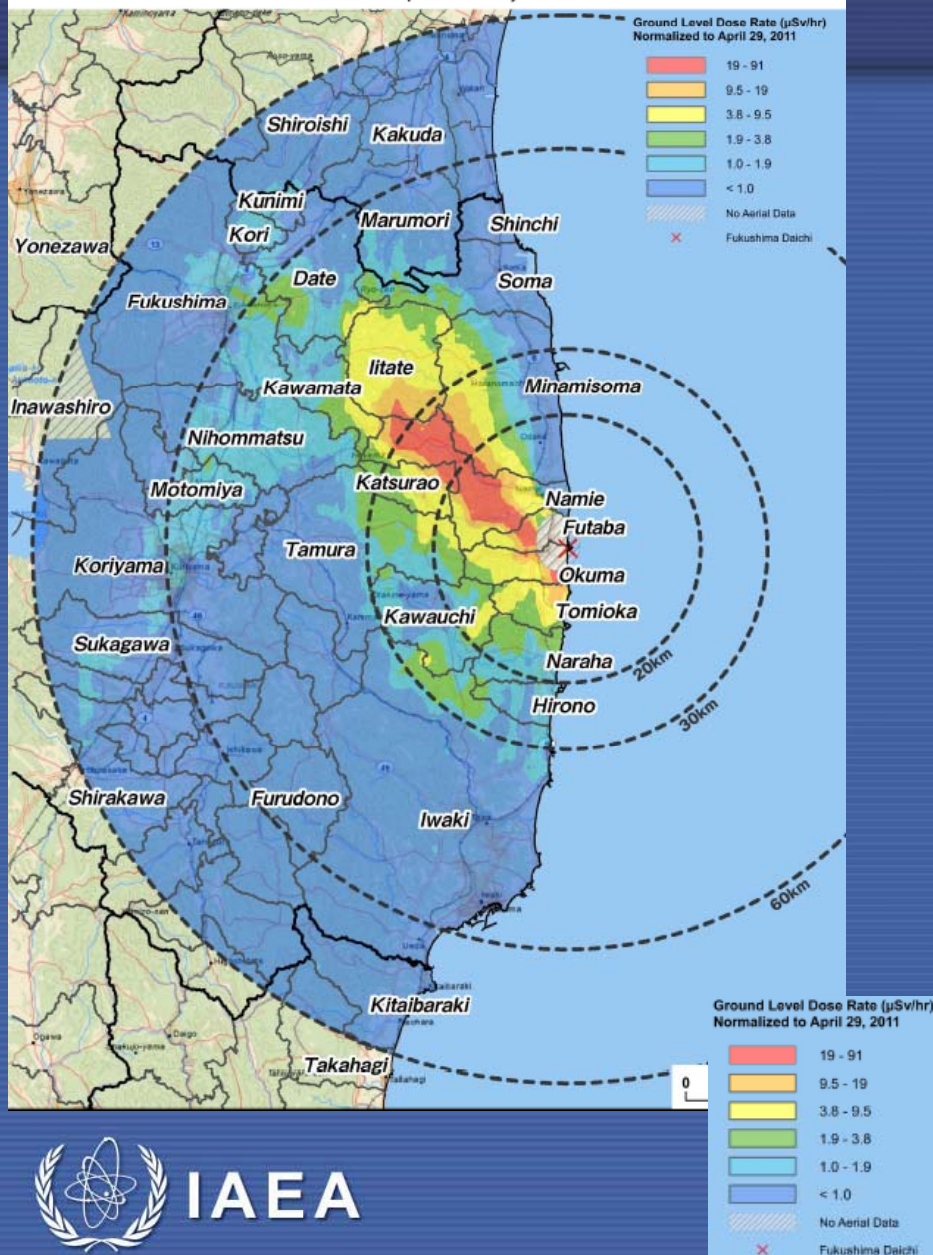


As a follow up actions:

- **Part II** of this report will contain the results of the analysis of all samples collected in the field.
- **Part III** will present a comparison and validation of the IAEA monitoring results in comparison with the Japanese data collected at the same locations.

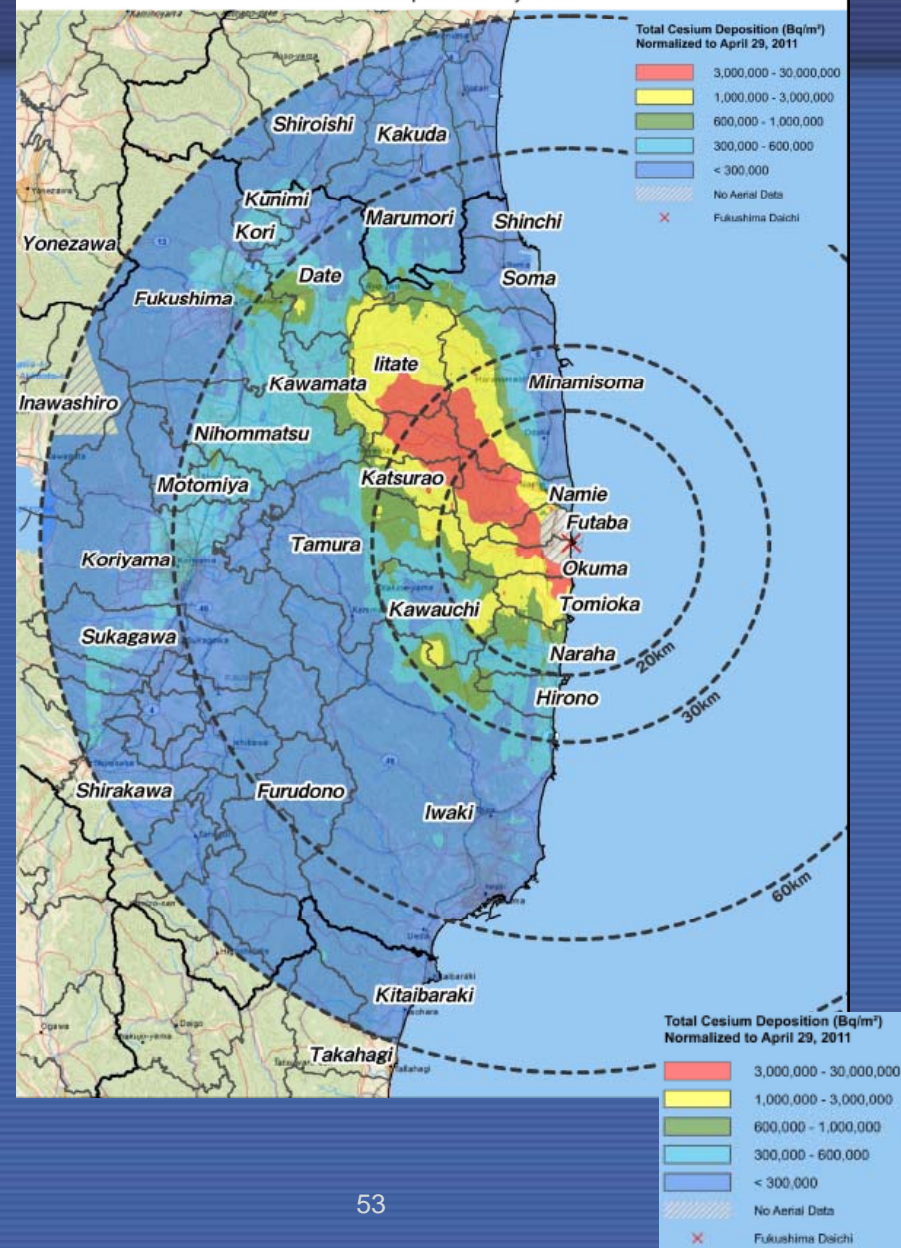
Aerial Measuring Results

Joint US / Japan Survey Data



Aerial Measuring Results

Joint US / Japan Survey Data



Evaluation Status of Site Workers' Exposure Doses during Emergency Work at Fukushima Daiichi Nuclear Power Station

J Village (March 17)

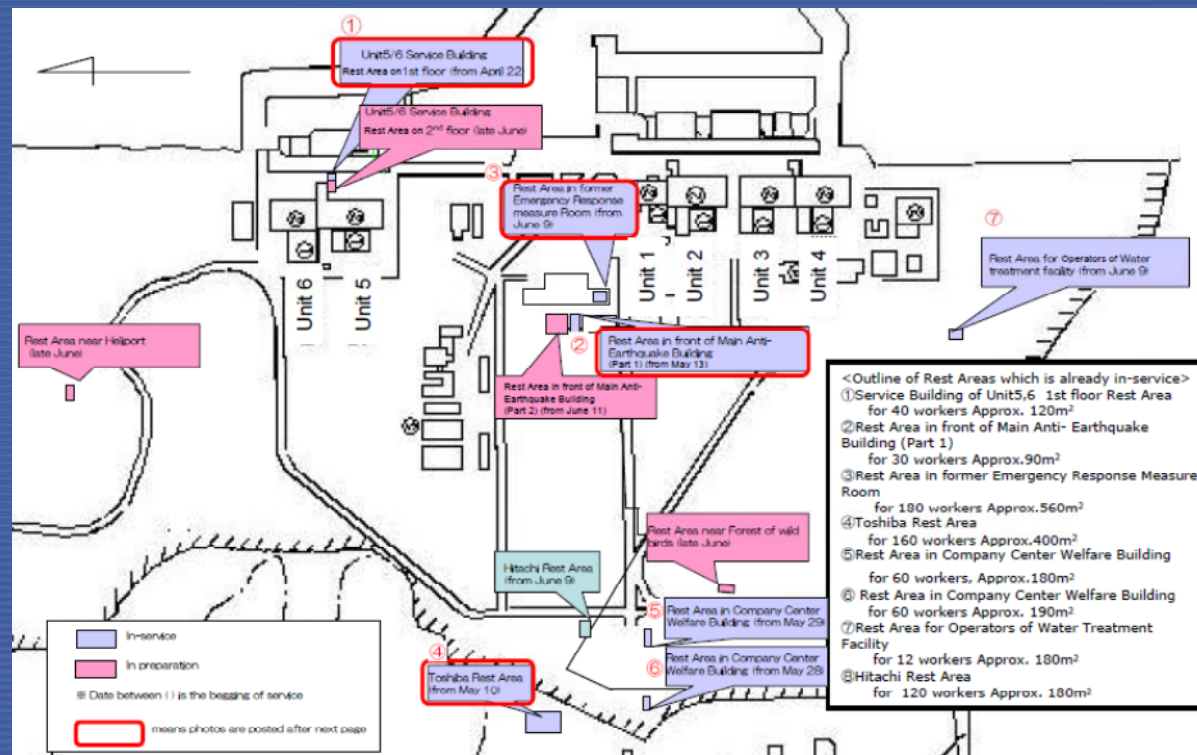
- A soccer training facility located at a point about 20 km south of Fukushima Dai-ichi NPS, utilized as a place for preparing workers for entry into Fukushima Dai-ichi NPS, where they put on their protective equipment, and performed decontamination tests when leaving, etc.
- Due to the high concentration of radioactive materials over the entire site of Fukushima Dai-ichi NPS, TEPCO requires workers to wear Tyvek and other protection clothes, gloves, and protection masks. It also requires appropriate protective clothes (anoraks, etc.), rubber gloves, and shoe covers taking into consideration weather conditions and contamination levels of the work sites.
- Dose limit for workers during emergency at FD NPS - **250 mSv**



TEPCO- Press Release (Jun 13,2011)

External Dose

- APD at the site for leader of operational groups.
- APD for all workers after April 1. DMS as April 14.
- Transit doses not included (?)



TEPCO- Press Release (Jun 13,2011)

Internal Dose

- On site Whole Body Counter - unusable!
- Mobile Whole Body Counter and other facilities.
- Intake Assumption - acute exposure at the time start to work - conservative !
- No information on radionuclides.
- Hearing to be organized when situation allow.
- For high doses additional investigations by JAEA

No. of workers engaged in emergency work in March	External exposure	Internal exposure (Primary evaluation)		External exposure + Internal exposure (Primary evaluation)
3726 in total	3726 ➡ Table 1	WBC before May 31	2367 ➡ Table 2	2367 ➡ Table 3
		After June 1	1359	1359

External Dose

Categories (mSv)	TEPCO employee	Workers of partner companies	Total
Over 250	0	0	0
Over 200 - 250 or less	0	0	0
Over 150 - 200 or less	4	3	7
Over 100 - 150 or less	14	3	17
Over 50 - 100 or less	75	41	116
Over 20 - 50 or less	163	134	297
Over 10 - 20 or less	241	286	527
10 or less	930	1,832	2,762
Total	1,427	2,299	3,726
Maximum (mSv)	173.77	198.24	198.24
Average (mSv)	13.0	7.3	9.5

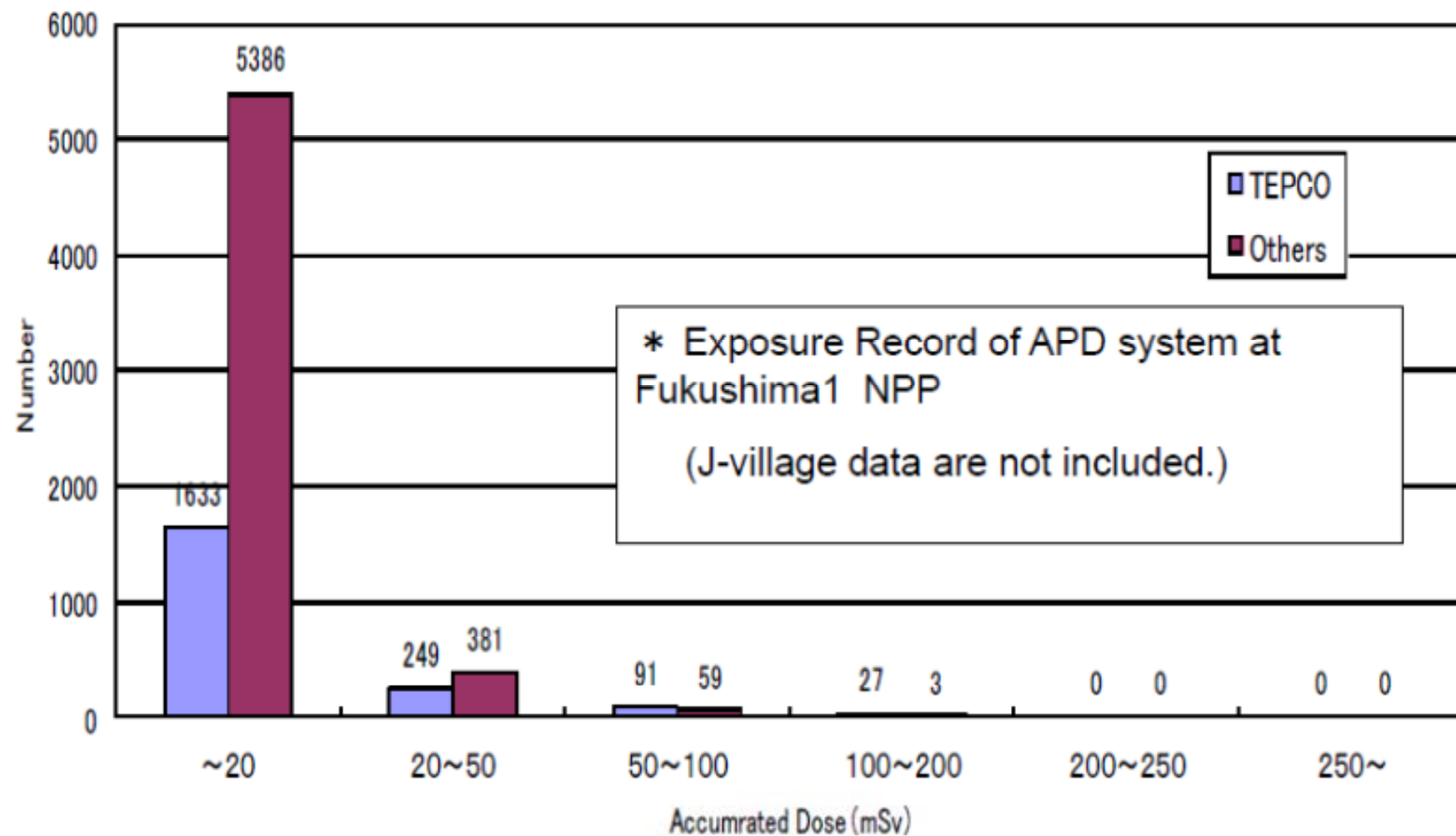
Internal Dose

Categories (mSv)	TEPCO employee	Workers of partner companies	Total
Over 250	6	0	6
Over 200 - 250 or less	3	0	3
Over 150 - 200 or less	7	0	7
Over 100 - 150 or less	9	4	13
Over 50 - 100 or less	89	11	100
Over 20 - 50 or less	252	69	321
Over 10 - 20 or less	255	114	369
10 or less	788	760	1548
Total	1409	958	2367

Combined External & Internal Dose

Categories (mSv)	TEPCO employee	Workers of partner companies	Total
Over 250	8	0	8
Over 200 - 250 or less	4	2	6
Over 150 - 200 or less	19	2	21
Over 100 - 150 or less	59	8	67
Over 50 - 100 or less	179	36	215
Over 20 - 50 or less	271	146	417
Over 10 - 20 or less	232	160	392
10 or less	637	604	1241
Total	1409	958	2367

External Exposure at Fukushima I NPP (11.Mar.~23.May)



Summary of workers doses

- **March 24** – 2 workers - equivalent doses of their skin, it is estimated to less than 2 to 3 Sv.
- **April 27**- female employee had been exposed to more than 5 mSv over a period of 3 months (above the limit)
- **May 31**- Self-Defense Forces working within 30 km of Fukushima Dai-ichi NPS- All below the relevant limits.
- **May 31** - Fire fighting teams working within 20 km of Fukushima Dai-ichi NPS – All below the relevant limits
- **May 30 – Iodine intake –**
 - Worker A: 678mSv (external exposure 88mSv, internal exposure 590mSv)
 - Worker B: 643mSv (external exposure 103mSv, internal exposure 540mSv)

Workers

Situation

Number of People	Radiation Exposure	
Total 7800 (as of May 23)	Average	7.7mSv
30		> 100mSv
A certain number of people		> 250mSv
2		< 2~3Sv (equivalent doses of the skin)

Future

- The government decided to create a database capable of tracking exposure dose over the long-term for all the workers engaged in emergency work on 17 May.

Residents

Situation

Actions	Results
Screening Survey	Most of the 195,354 people checked as of May31 were under the 100,000cpm limit.
Survey for thyroid exposure	Among the 1,080 children from 0 to 15 years old surveyed, there were no children who exceeded the screening criteria of 0.2 μ Sv/h

Future

- Fukushima Prefecture will estimate and evaluate the radiation dose for 2 million residents in cooperation with related government offices and the National Institute of Radiological Sciences (NIRS).

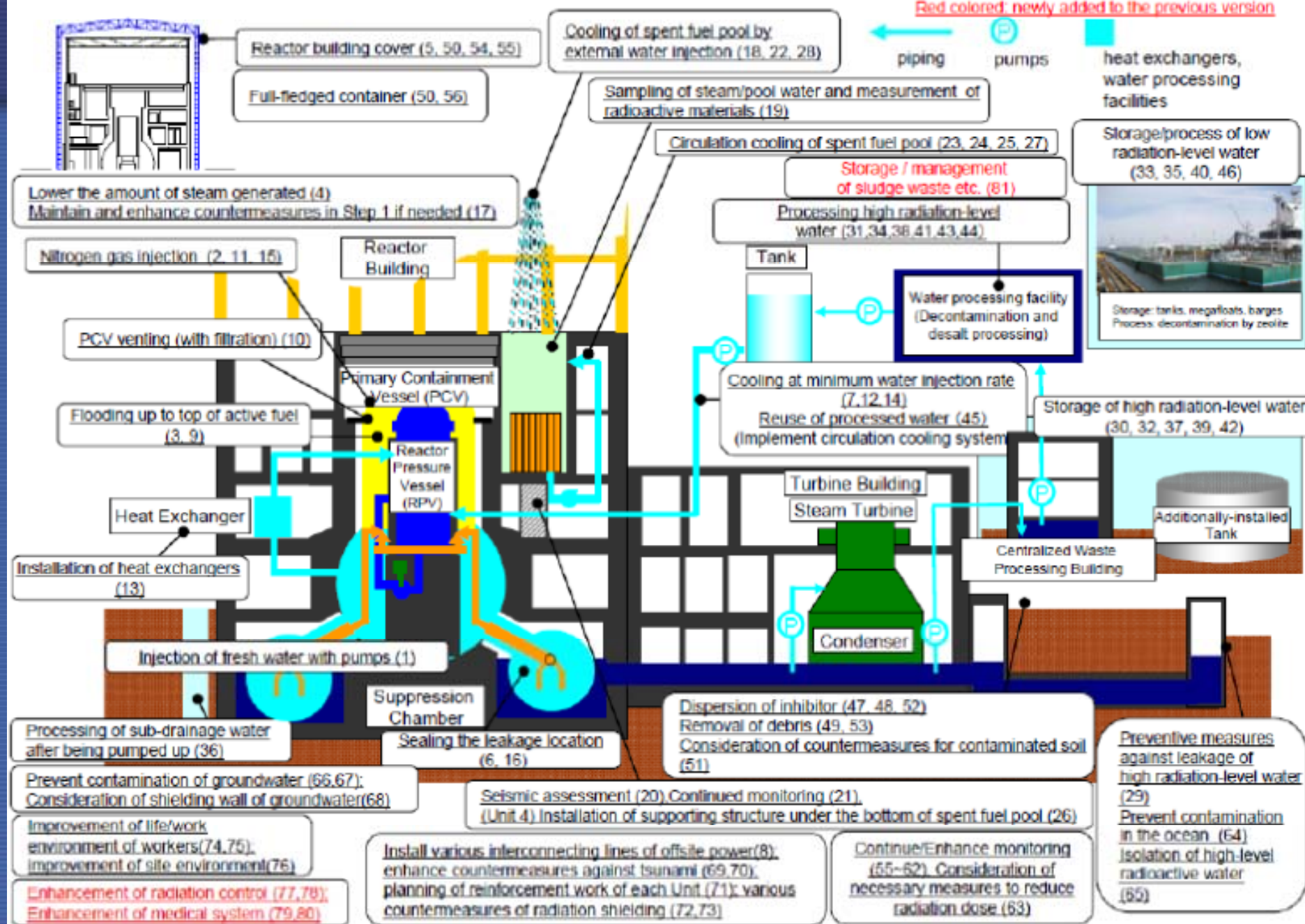
Efforts to restore the Accident

Red colored: newly added to the previous version. Blue colored: modified from the previous version

Issues	As of April 17	Step 1 (around 3 months) Current status (as of June 17)	Step 2 (around 3 to 6 months after achieving Step 1)	Mid-term issues
I. Cooling	(-) Reactor	Fresh water injection Cooling by minimum injection rate (injection cooling) Consideration and preparation of reuse of accumulated water Nitrogen gas injection Consideration and implementation of sealing measure at leaking points of PCV Improvement of work environment	Stable cooling Circulating Injection Cooling (start) Cold shutdown condition PCV flooding Securing heat exchange function	Protection against corrosion cracking of structural materials *to be partially implemented ahead of schedule
	(-) Spent Fuel Pool	Fresh water injection Reliability improvement in injection operation / remote-control operation *ahead of schedule Circulation cooling system (installation of heat exchanger) *partially ahead of schedule	Stable cooling Remote-controlled injection operation Consideration / installation of heat exchanging function	Removal of fuels
II. Mitigation	(-) Accumulated Water	Transferring water with high radiation level Storing water with low radiation level Installation of storage / processing facilities Installation of storage facilities / decontamination processing	Secure storage place Expansion of storage / processing facilities Decontamination / Desalt processing (reuse), etc. Storage / management of sludge waste etc. Mitigation of contamination in the ocean	Reduction of total amount of contaminated water Installation of full-fledged water processing facilities Completion of processing of accumulated water in buildings Processing of sludge waste etc. Mitigation of contamination in the ocean (continued)
	(-) Ground water	Mitigation of contamination of groundwater	(Sub-drainage management with expansion of storage / processing facilities) Consideration of shielding wall of groundwater	Mitigate ocean contamination (continued) Solidification of contaminated soil, etc. Establishment of shielding wall of groundwater
	(-) Atmosphere / Soil	Dispersion of inhibitor Removal of debris	Mitigate scattering Installing reactor building cover (with ventilation system) Consideration of reactor building container	Mitigate scattering (continued)
				Installation of reactor building container

Overview of Major Countermeasures in the Power Station as of June 17

Red colored: newly added to the previous version



MINISTERIAL CONFERENCE ON NUCLEAR SAFETY

- Preliminary Assessment of the Fukushima Accident and Actions for Safety Improvements
- Emergency Preparedness and Response
- The Global Nuclear Safety Framework

Topics discussed

- Strengthening the IAEA Safety Standards
- Safety Reviews & International Peer Reviews
- Role of Organizations in Nuclear Safety
- Receiving and Disseminating Information
- International Emergency Preparedness and Response Framework.
- National and Regional Emergency Preparedness and Response
- Inter-agency Emergency Preparedness and Response



Topics discussed

- Regulatory Independence
- Newcomer Countries
- Safety research on fuel performance and accident progression
- Operating Experience
- Remediation of contaminated land areas
- Transparency in dealing with safety related issues is an important component in building public confidence

Declaration

IAEA Ministerial Conference on Nuclear Safety

- Request DG to report - detailed action plan covering all the relevant aspects relating to:
 - Nuclear safety,
 - Emergency preparedness and response and,
 - Radiation protection of people and the environment,
 - International legal framework



Thank you !

