

The information sharing for nuclear emergency in Japan

November 19 - 23, 2007

EPR Regional Workshop on Early Reporting of Events and
Information Sharing for Event and Exercise Management

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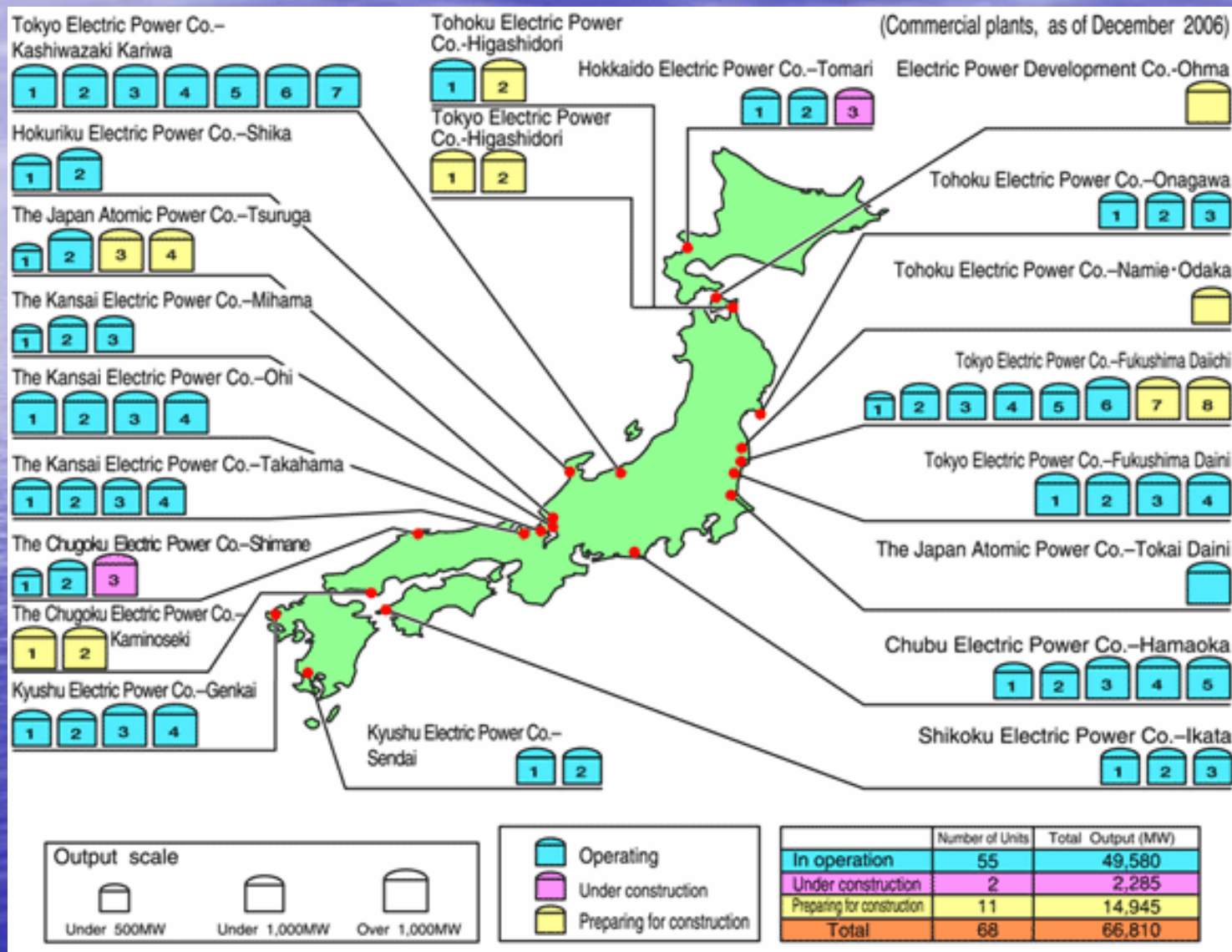
These sheets are prepared for the use in the EPR Regional Workshop only.

Presentation Outline

- Nuclear Facilities in Japan
- Lessons learned from accident
- Current state of response system and equipments
- Summary

Nuclear Facilities in Japan

Nuclear Power Plants in Japan



Nuclear Cycle Facilities in Japan

JNFL : Japan Nuclear Fuel Limited

JAEA : Japan Atomic Energy Agency

MNF : Mitsubishi Nuclear Fuel Co.,Ltd.

NFI : Nuclear Fuel Industries, Ltd.

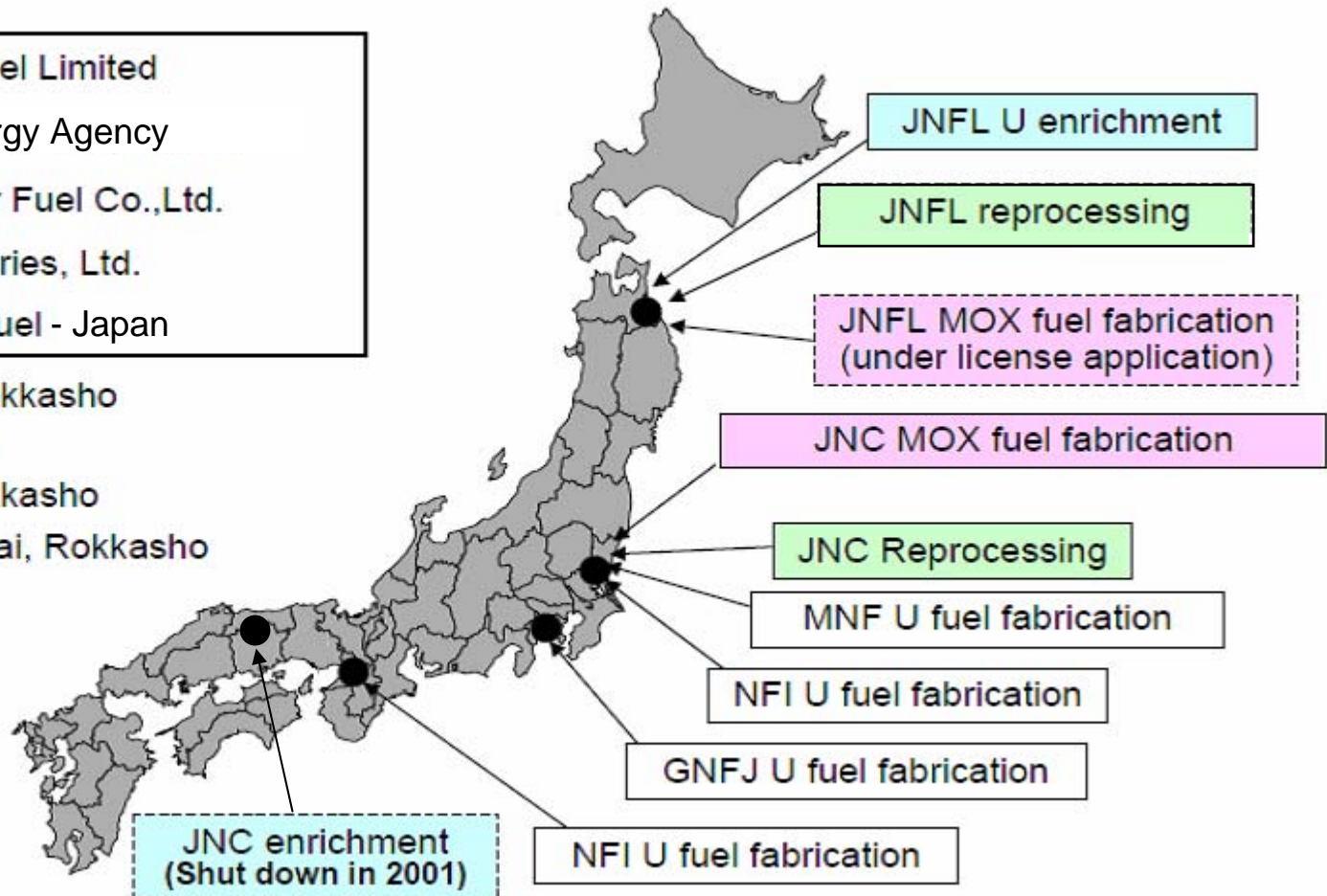
GNFJ : Global Nuclear Fuel - Japan

U enrichment: Ningyo, Rokkasho

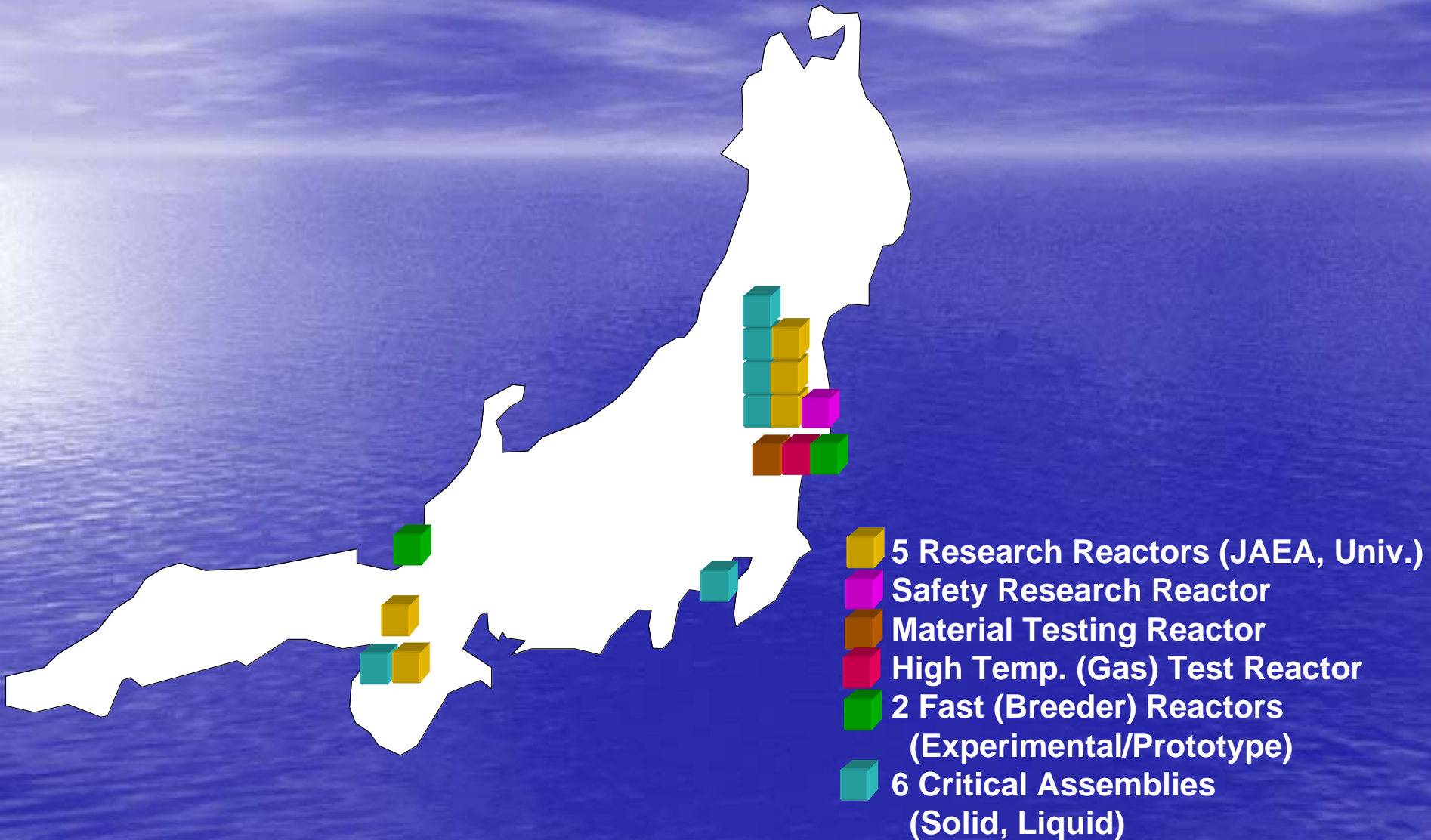
U fuel fabrication: 4 sites

Reprocessing: Tokai, Rokkasho

MOX fuel fabrication: Tokai, Rokkasho



Research and Test Reactors in Japan



Lessons learned from accident

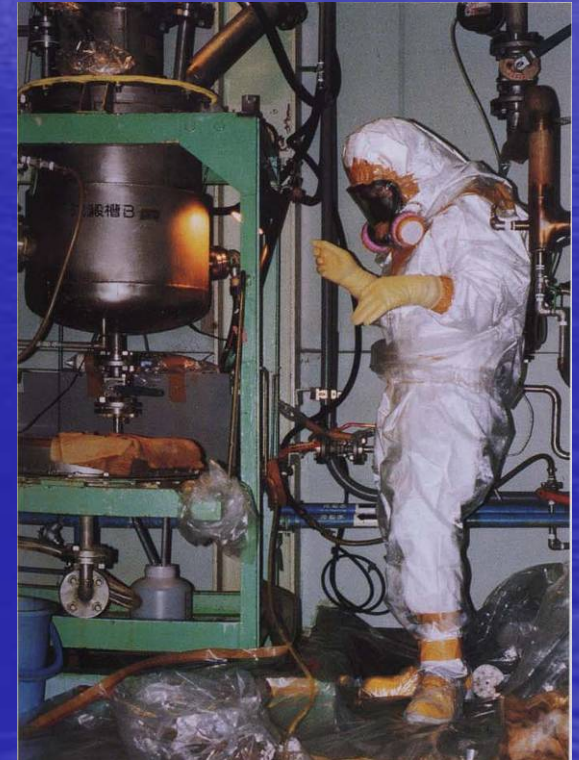
The Criticality Accident at the Uranium Conversion Facility, JCO.



IAEA: Report on the Preliminary Fact Finding Mission Following the Accident at the Nuclear Fuel Processing Facility in Tokaimura, Japan (1999)

The Criticality Accident at the Uranium Conversion Facility, JCO Co.Ltd.

- The accident occurred at 10:35 on September 30, 1999 in JCO Co. Ltd., Tokai-mura (Village), Ibaraki Prefecture. The criticality continued intermittently for about 20 hours.
- This was the first criticality accident in Japan, exposing three workers to high radiation levels and causing exposure to 207 of the general public adjacent to the plant.
- The cause of this accident appears to have been the use of illegal procedures. When the volume of solution in the precipitation tank reached about 40 liters, containing about 16 kg-U, a critical mass was reached.



Lessons learned from the JCO Criticality Accident

Problem related with information sharing (1)

- Delay and maldistribution of information
 - The accident occurred at 10:35 a.m. on September 30.
 - Nuclear safety regulatory agency, STA was notified at around 11: 19 by JCO. The local municipality of Tokai-mura and Ibaraki Prefecture was notified at around 11:22 by JCO. It was about 45 minutes later from the beginning of the accident.
 - At around 12:00, a report was made to the Chief Secretary of the Cabinet, and then to the Nuclear Safety Committee at around 14:00. It was about three and half hours later from the beginning of the accident.
 - The local municipality of Tokai-mura made sure the opinions of Ibaraki Prefecture and STA about the initiation of the evacuation of residents living within 350 m of the facility, due to a request of JCO staff.
 - The views of Ibaraki Prefecture and STA were that sheltering is enough to protect rather than evacuation. Because they thought the accidents were almost over.
 - Tokai-mura decided evacuation at 15:00. It was about 4 and half hours later from the beginning of the criticality.

Lessons learned from the JCO Criticality Accident

Problem related with information sharing (2)

- Inaccurate notification
 - Local emergency services (Fire department) were notified by JCO staff at 10:43, “Three workers tumbled at the ‘Tenkan-tou’ (conversion building) “.
 - The emergency service staff understood it that workers tumbled with ‘Tenkan’ (epilepsy).
 - Three emergency service staffs rushed to JCO, not knowing the nature of the accident and without dosimeters. They received a radiation dose 5-10 mSv from the accident.

Lessons learned from the JCO Criticality Accident

Problem related with information sharing (3)

- Problems of technical communication
 - In relatively early phase, some scientists of the JAERI suspected the criticality was continuing, because high gamma dose rate was continuing in an area around the facility.
 - The experts in Local Countermeasures Headquarters of the Government could not get the information of the configuration and detailed data on the precipitation tank and the details of the work soon.
 - At around 17:05, the first dose rates of neutrons (max. around 4 mSv/h) were measured by JNC at the JCO site boundaries and these indicated that criticality was continuing.
 - The information of the results of environmental neutron survey was transmitted to the STA and Tokai-mura soon, while to the Ibaraki Prefecture at around 18:30.

Summary of Lessons

- Conditions at the time of beginning of an accident and the information of the facility/equipment should be reported in detail from the licensee/operator immediately to the related organizations of the national government and local governments. [New law]
- Establishment of detailed database on the information of the facilities/equipments is recommended to emergency response organizations. [Off-site center]
- Communication of technical information between a scene and specialists is a key for mitigation of the accident and protection of public. [Off-site center]
- Training of accurate notification is important. [New law]
- Training of communication between emergency response organizations is also indispensable. [New law]

Current state of response system and equipments

- Regulatory framework and Off-site centers
- SPEEDI system
- ERSS system
- ECHO system and shared information

Reformation of Regulation to enhance the safety

- Amend

- The Law for the Regulation on Nuclear Source Material, Nuclear Fuel Material and Reactors (Regulation Law for Atomic Reactors etc.)
- Basic Law on Emergency Preparedness

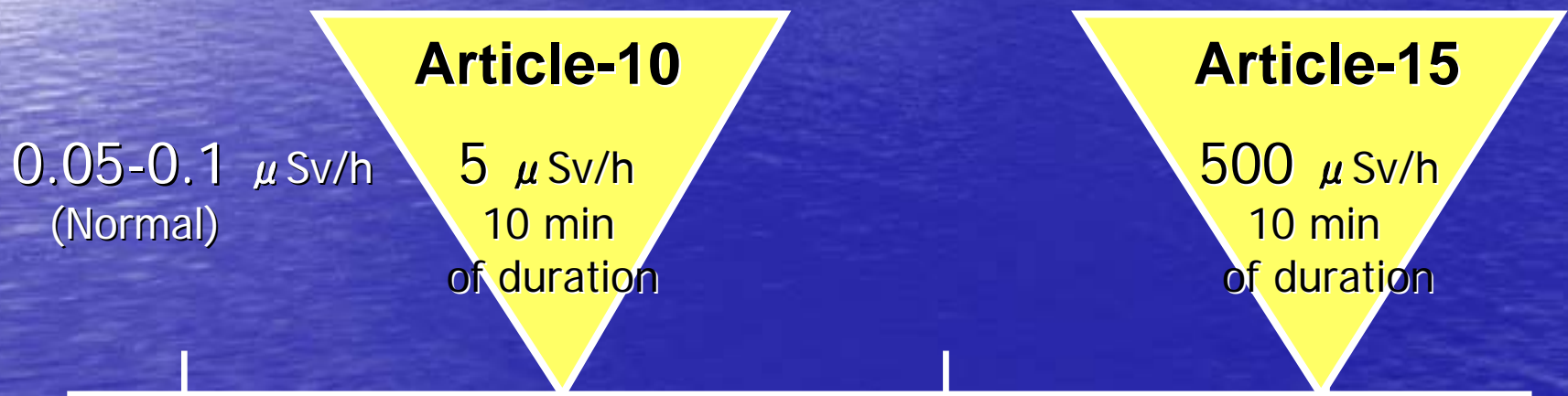
- Establish

- The Special Law of Emergency Preparedness for Nuclear Disaster (Special Law for Nuclear Emergency)

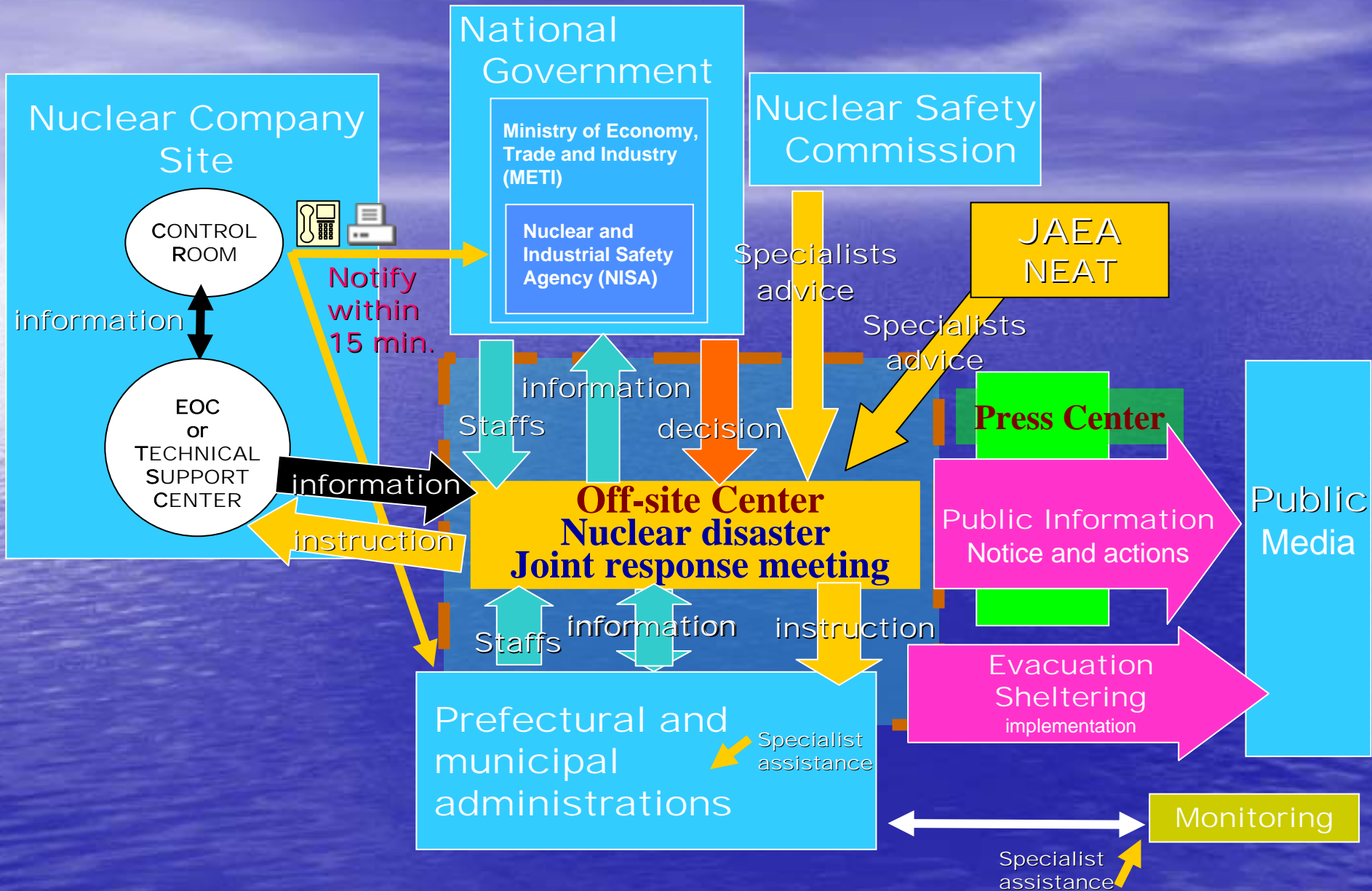
Actions defined by the Special Law

Article-10: Disaster prevention manager shall inform the defined incidents to the competent minister, governor and local authority.

Article-15: In case of nuclear disaster the competent minister shall report the situations to Prime Minister who shall declare a disaster.



Information Flow in Nuclear Emergency



EOC / TSC of Nuclear Company Site (1)

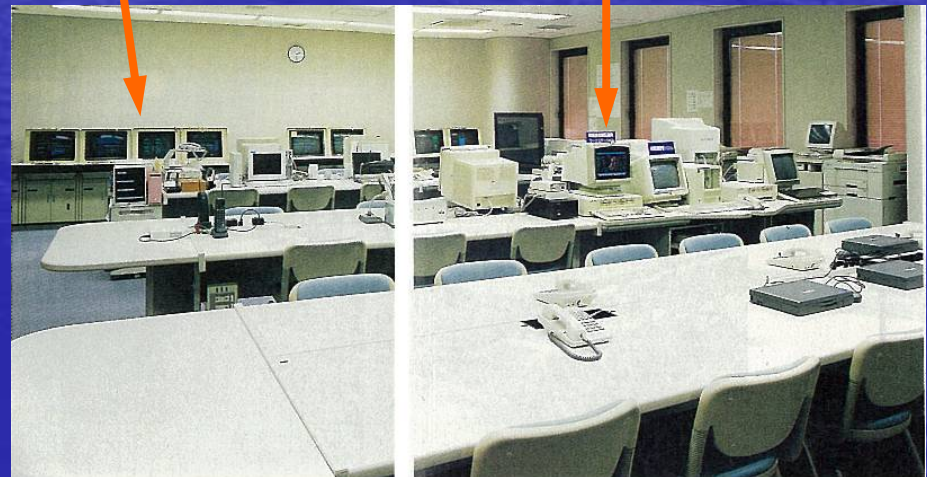
ex. TECHNICAL SUPPORT CENTER of the
Kashiwazaki-Kariwa Nuclear Power Plant

Safety Parameter Display System
(SPDS)

Environment Radiation
Monitoring System



Central area and displays



Working area for engineering staffs

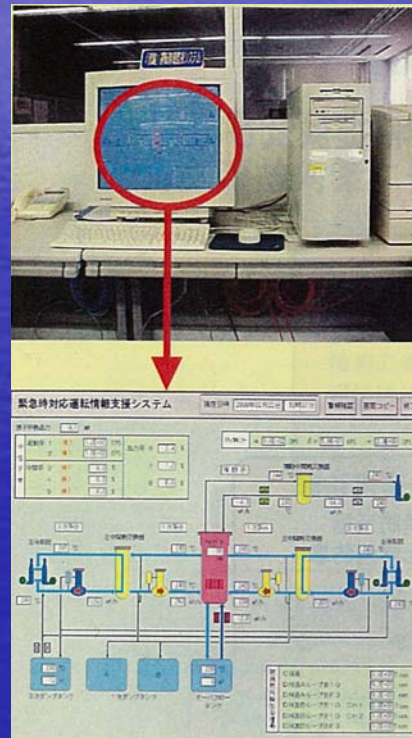
Working area for engineering staffs

EOC / TSC of Nuclear Company Site (2)

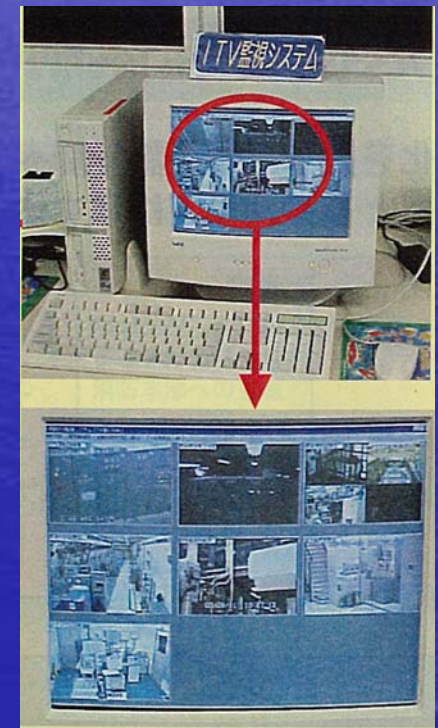
EMERGENCY OPERATION CENTER of the JAEA Oarai Research and Development Center



Command room and displays



Operation Information System of
the Experimental Fast Reactor
“JOYO”



ITV monitoring
System for Facilities

Off-site centers

- They are facilities for nuclear emergency response
 - Legal basis : Facilities provided for by Article 12 of Special Law on Nuclear Disaster Countermeasures
 - Off-site center is regional activity base for nuclear emergency response.
- When nuclear disaster occurs
 - National Government／Prefecture／Staffs of cities, towns, and villages／Staffs of Licensee
 - The organization related to other disaster prevention and the specialist, etc. collect together,
 - Information is shared
 - Protective actions are decided

Off-site center and *JAEA/NEAT*

Off-site center (22 places in Japan)

 : Nuclear Power Station site

 : Nuclear Cycle Facilities and/or Research Reactor

NEAT FUKUI Branch
(Tsuruga, FUKUI)

JAEA/NEAT
Nuclear Emergency Assistance and Training
Center (Hitachinaka, IBARAKI)



Nuclear disaster joint response conference

Nuclear disaster joint response meeting

**Policy decision conference
for emergency**



Plenary meeting



- The Prime Minister
- Prefectural Governor
- municipal heads
- OFC Manager



Video conference system

Summary group

**Public relations
group**

**Plant
group**

**Radiation
group**

**Medical
group**

**Resident safety
group**

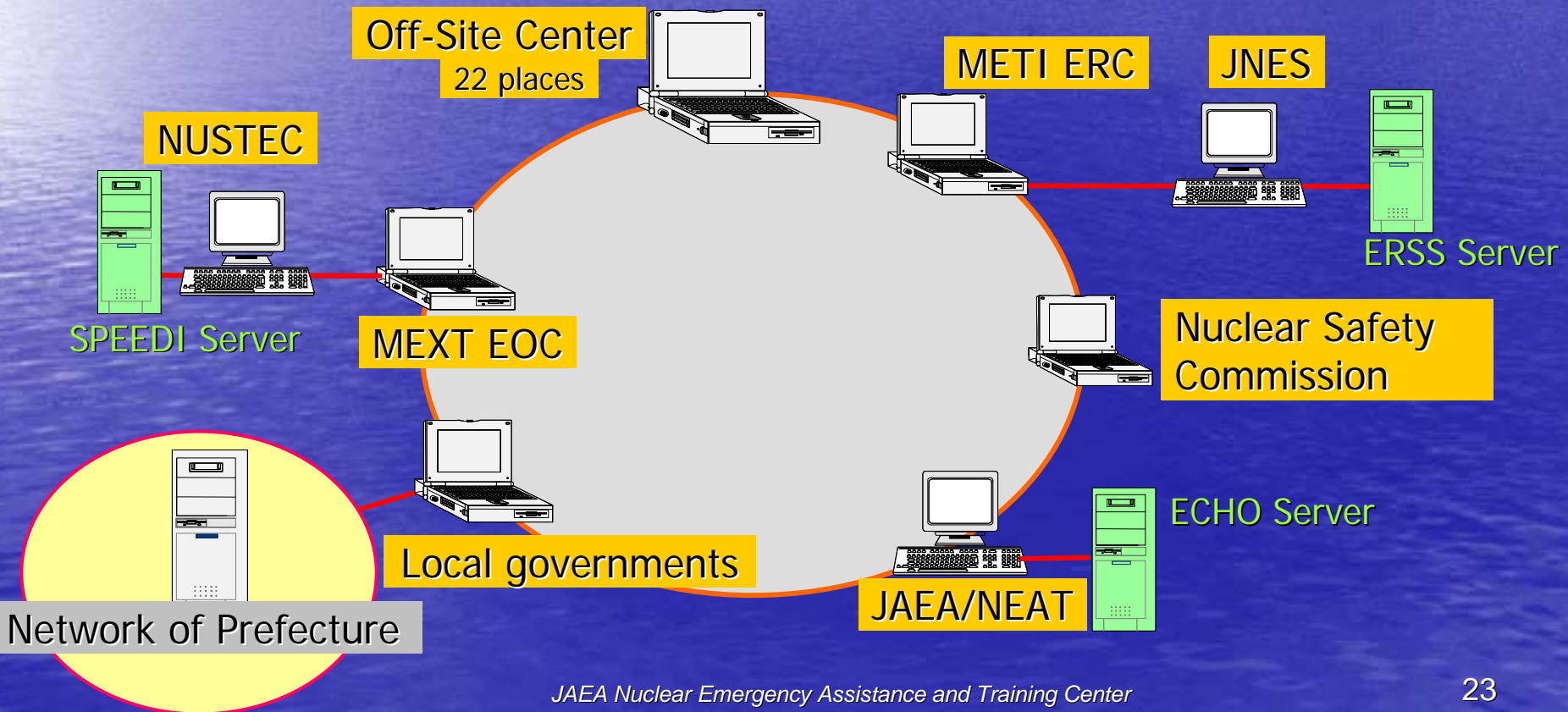
**Logistic
support group**

The main equipment of off-site center for communication in emergency

- Telephone & Facsimile (Primary communication equipments)
- Video conference system
- Dedicated Network for Nuclear Emergency Response
- Telemetry system for environmental radiation monitoring
- ERSS (Emergency Response Support System)
- SPEEDI
(System for Prediction of Environmental Emergency Dose Information)
- ECHO (Emergency information ClearingHouse)

Dedicated Network for Nuclear Emergency Response

- Japanese government established Dedicated Network for Nuclear Emergency Response.



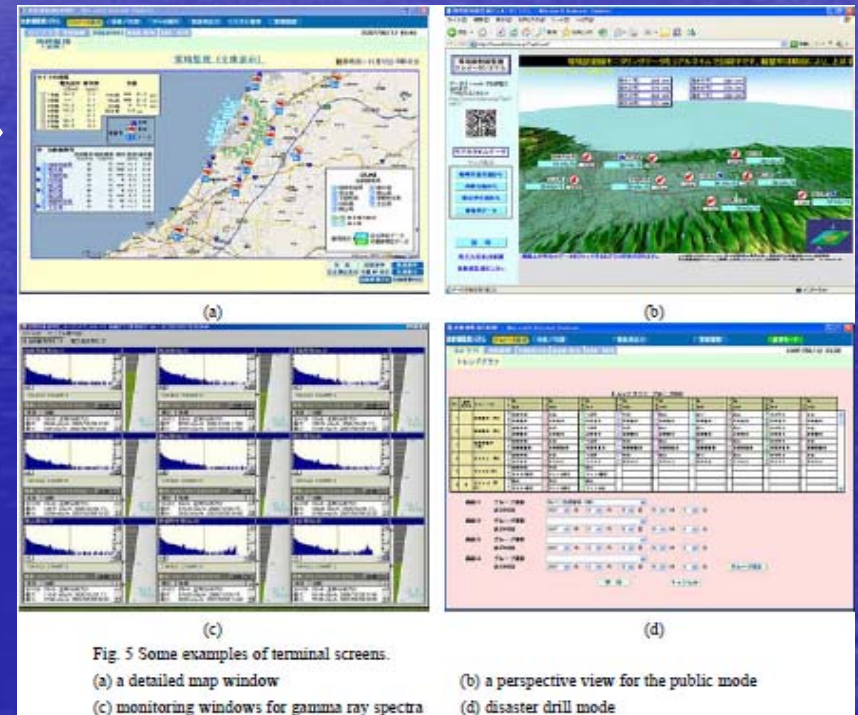
Telemetry system for environmental radiation monitoring

- Environmental Radiation Monitoring Center collects and provides data to Off-site Center and Local Governments , using this system.

Environmental Radiation Monitoring Center of each prefecture



Collected data indicated with GIS at Off-site Center / Local Government



Monitoring Data Collection



Monitoring Station/Post for environmental radiation

ERSS

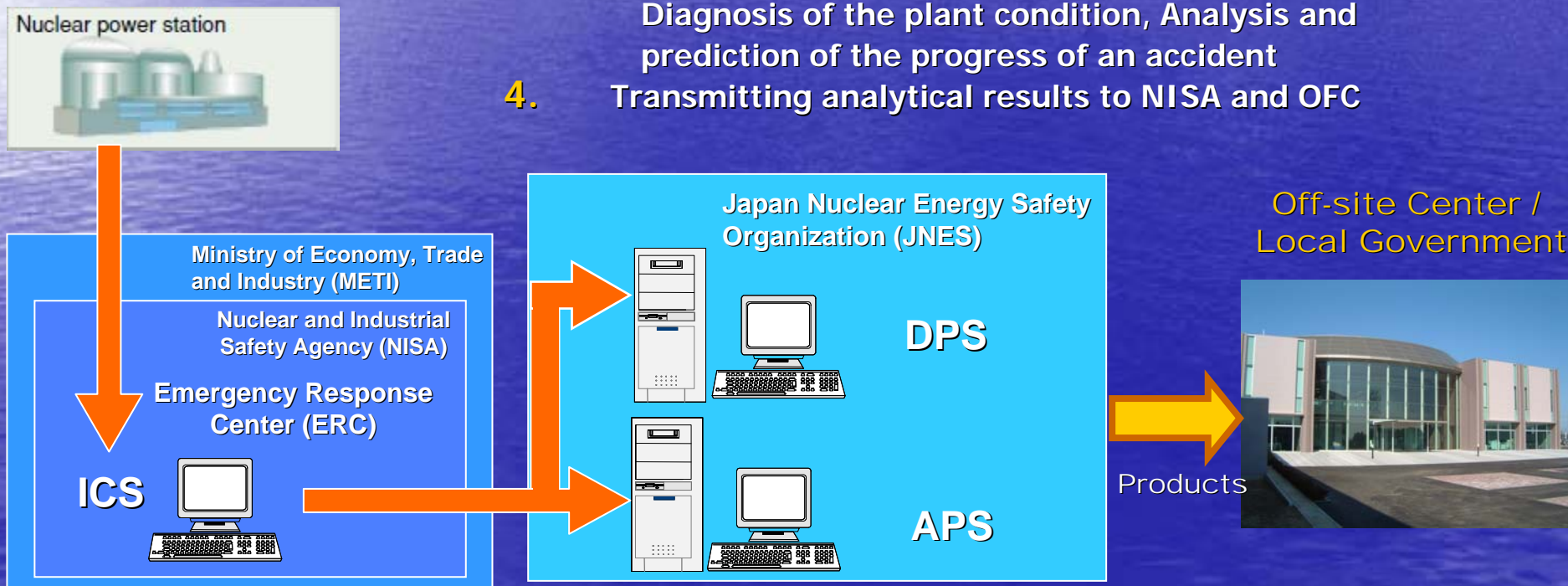
Emergency Response Support System

ERSS

- Japan Nuclear Energy Safety Organization(JNES) developed Emergency Response Support System (ERSS).
- ERSS is a Computer-aided facility to grasp the status and predict the progress of accident for all of commercial Nuclear Power Plants (55) in Japan.

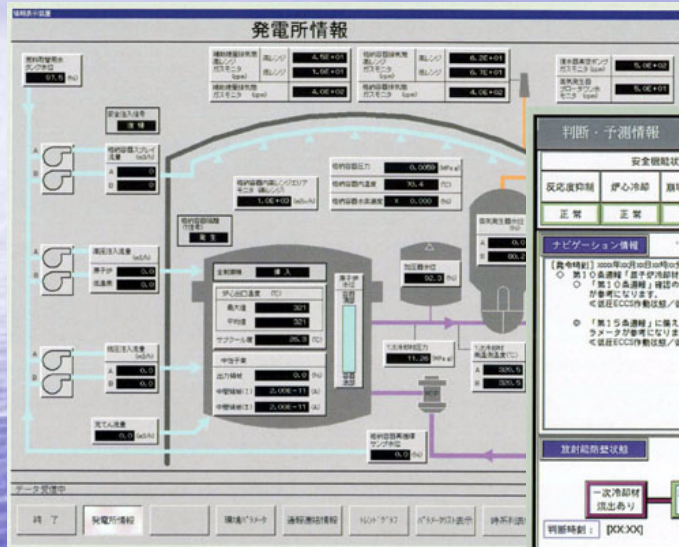
Constituents of the ERSS

1. Information Collection System (ICS) of NISA
Collection of the plant information from a nuclear power station
2. Collected plant information transmitted to JNES
3. Diagnostic/Prognosis System (DPS) & Analysis/prediction System (APS)
Diagnosis of the plant condition, Analysis and prediction of the progress of an accident
4. Transmitting analytical results to NISA and OFC

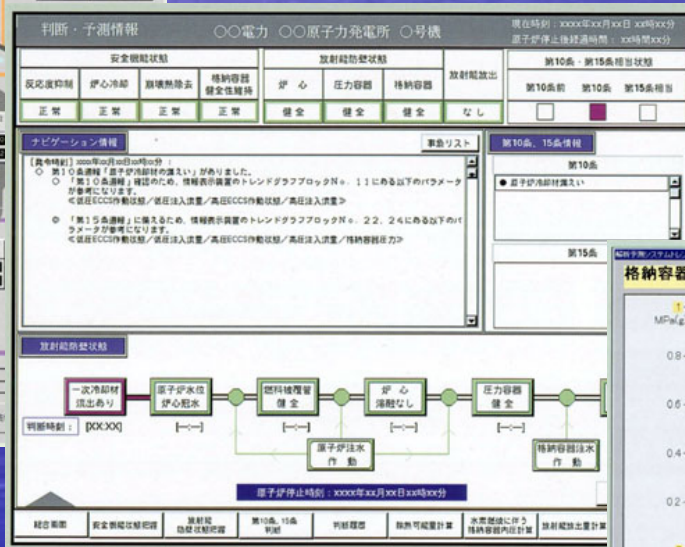


Constituents of the ERSS (2)

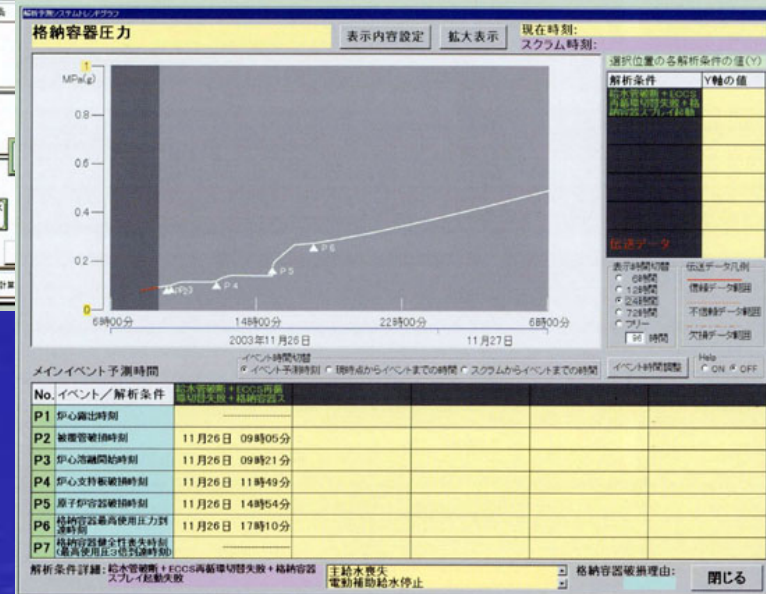
Plant State Information
from nuclear power station



Diagnosis of accident
by DPS



Prediction of the progress
of accident by APS



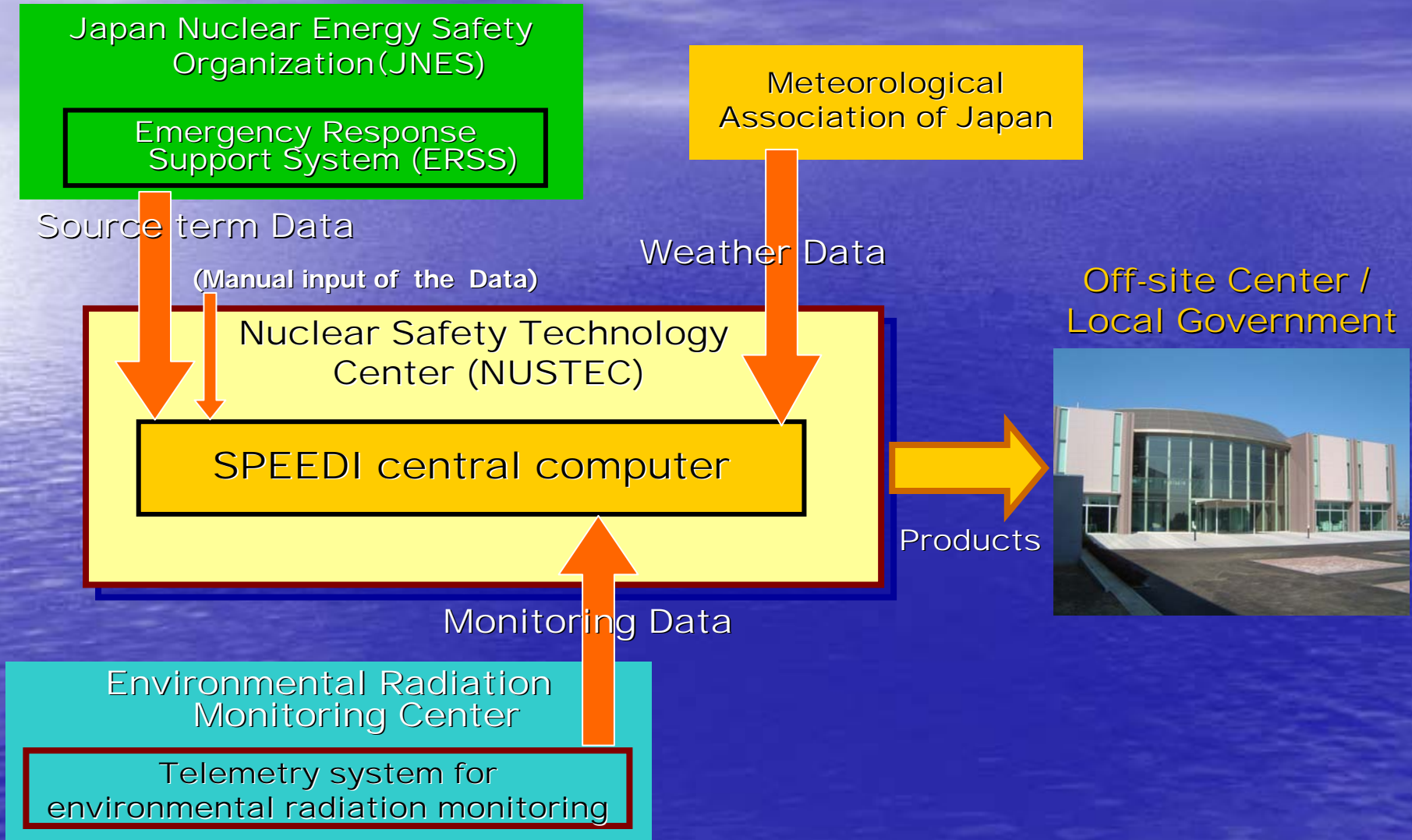
SPEEDI

System for Prediction of Environmental
Emergency Dose Information

SPEEDI

- Nuclear Safety Technology Center (NUSTEC) developed a computer network system SPEEDI that provides predictions of Environmental Emergency Dose Information.
- SPEEDI predicts rapidly radiation dosages due to the dispersion of radioactive materials in the atmosphere.
- SPEEDI has been networked nuclear power stations, research reactors and fuel processing facilities, and monitored in accordance with the arrangement of monitoring posts by the related prefectures (Telemetry system for environmental radiation monitoring).

Constituents of the SPEEDI



Products of the SPEEDI

Ground Level Time-integrated Dose based on dispersion model

Population Database on all nuclear facility sites

Evacuation

Sheltering to Concrete building

Sheltering

Predicted Area of Protective Action

[illegible]

ECHO

Emergency Information Clearinghouse
for emergency collaboration

ECHO

- JAEA developed an emergency information sharing system named ECHO.
- ECHO operates on network with a web browser base,
- and provides quick sharing of information among emergency responders, such as government, local government, and off-site center, to offset weakness of telephone, facsimile and e-mail.

Chronological Event List of ECHO (1)

- ECHO provides a chronological event list of all related organization activities.
- Each chronological event are classified by
 - Importance,
 - Event categories.

Importance

A	High
B	Medium
C	Low

事実に関係一覧 - Microsoft Internet Explorer

事実関係一覧

図表示内容を全組織で表示する (重要度: A(最重要) B(重要) C(一般))

表示内容を【全項目】で検索する

前ページ 1 2 3 4 5 6 7 8 9 10 次ページ (1/11)

[組織名称: 全組織] [並べ替え: 事実日時 降順] (件数: 310) (2006/02/01 10:48:00現在)

重要度	事実日時	組織名称 (登録日時)	事実内容&リンク情報 キーワード	添付	詳細/更新
C	03/09/30 13:30	支援・研修センター 05/07/06 15:01	NEAT支援対応終了 現場・現況情報(各機関の行動)		
B	03/09/30 13:20	OFC茨城 04/06/23 09:08	訓練終了(ヘリ写真) その他(その他)		
C	03/09/30 13:15	茨城県 那珂町 04/10/12 14:49	住民のサーベイ調査のため、資機材及びサーベイ要員を手配 助言・支援(派遣)		
B	03/09/30 13:15	茨城県 那珂町 04/07/01 11:05	町災害対策本部を解散し、事後対策本部へ移行 意思決定・広報(意思決定)		
B	03/09/30 13:15	茨城県 茨城県庁 04/07/01 11:04	第3回県災害対策本部記者会見(会見資料添付) ・各種応急対策の解除を決定 ・災害対策本部から、事後対策本部への移行について決定 意思決定・広報(プレス対応)		
C	03/09/30 13:10	支援・研修センター 05/07/06 15:34	原研の走行サーベイ結果を添付。 現場・現況情報(モニタリング)		
A	03/09/30 13:05	茨城県 那珂町 04/07/01 11:33	各種対応策の解除を決定 意思決定・広報(意思決定)		
A	03/09/30 13:05	茨城県 那珂町 04/07/01 11:08	住民相談窓口の設置を決定 http://CSISv011.neat.jp/ 意思決定・広報(意思決定)		
C	03/09/30 13:05	支援・研修センター 04/07/01 11:07	【第3回記者会見】FAX受信 意思決定・広報(プレス対応)		

閉じる

情報対象: H15.09.30 茨城県: 原子力防災訓練

防災情報共有システム

Callouts:

- Date and Time of event
- Organization name of sender
- Event details
- Attachment files
- Event categories

Chronological Event List of ECHO (2)

- A chronological event is categorized into six items.
- Each event category have several detailed items.

Event categories

1. Scene information
2. Prediction
3. Advice / Support
4. Decision making / Public information
5. Meeting
6. Etc.

Event categories pop-up window

キーワード一覧 閉じる

ジャンル及びキーワードをチェックしてください。

ジャンル	現場・現況情報
<input type="checkbox"/>	発災現場
<input type="checkbox"/>	モニタリング
<input type="checkbox"/>	各機関の行動
<input type="checkbox"/>	地域の状況
<input type="checkbox"/>	避難/防護
<input type="checkbox"/>	被ばく医療
<input type="checkbox"/>	住民問合せ
<input type="checkbox"/>	報道の質問
ジャンル	予測情報
<input type="checkbox"/>	ERSS等進展予測
<input type="checkbox"/>	SPEEDI等線量予測
<input type="checkbox"/>	気象予測
ジャンル	助言・支援
<input type="checkbox"/>	技術的助言
<input type="checkbox"/>	技術的情報
<input type="checkbox"/>	支援
<input type="checkbox"/>	派遣
ジャンル	意思決定・広報
<input type="checkbox"/>	検討内容
<input type="checkbox"/>	対策案
<input type="checkbox"/>	意思決定
<input type="checkbox"/>	指示/公示
<input type="checkbox"/>	住民広報
<input type="checkbox"/>	プレス対応
ジャンル	関連情報
<input type="checkbox"/>	会議/運営
<input type="checkbox"/>	管理情報
<input type="checkbox"/>	セキュリティ
ジャンル	その他
<input type="checkbox"/>	訓練運営
<input type="checkbox"/>	その他

03/09/30 13:05 支援・研修センター 04/07/01 11:07

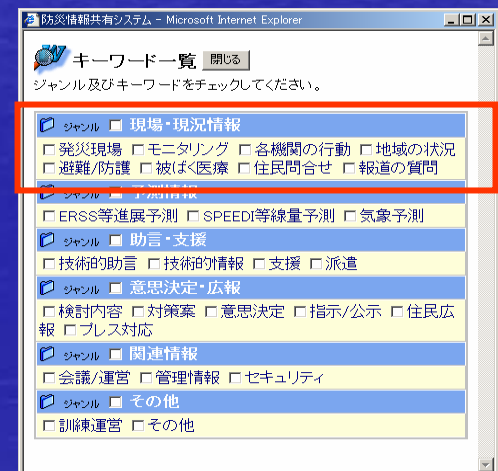
閉じる

情報対象: H15.09.30 茨城県: 原子力防災訓練

Detailed event category of Chronological Event List

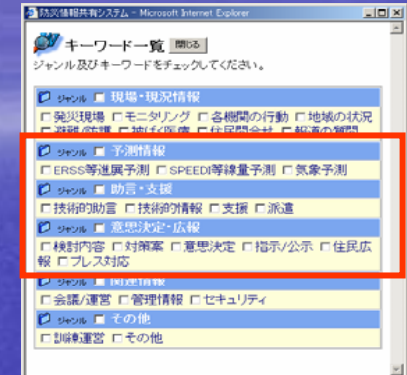
- Scene information
 - At the Scene, Environmental Monitoring of radiation,
 - State of activities of each organization and the zone,
 - State of implementations of protective actions and mitigations,
 - Emergency medical activities,
 - Inquiries from public and the news media.

◆ Most of the Scene information is required to be spread immediately over the related organization.



Detailed event category of Chronological Event List (2)

- Prediction
 - Accident progress analysis and prediction (ERSS)
 - Prediction of radiation dose (SPEEDI)
 - Weather Data
- Advice / Support
 - Technical advice/information from the Emergency Technical advisory Body of the Nuclear Safety Commission (NSC) or JAEA/NEAT
 - Information about support/dispatch
- Decision making / Public notification
 - Protection measures (proposals) and the implementation (ex. Evacuation, Sheltering)
 - Drafts of directives, official notices and press statements
 - Information about traffic control and etc.

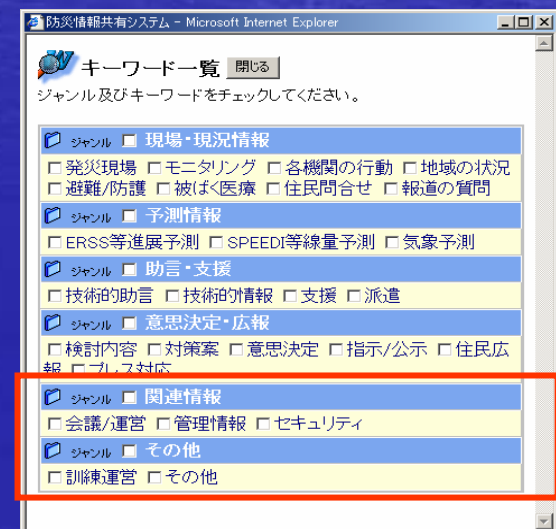


◆ Many of these event categories have to be handled cautiously.

Detailed event category of Chronological Event List (3)

- Meeting
 - Notices of meetings (ex. Schedule)
 - Security information
- Etc.
 - Notices for inside of the organization (ex. Meal, Shift Change, Lodgment)
 - Special use for exercise

◆ These event categories are private information and not necessary to inform to the outside of the organization.



Inquiring/answering Function for Chronological Event List

The screenshot shows a web application interface for a nuclear emergency response system. The interface displays a table of chronological event data. A yellow box highlights the 'Original chronological event data' column. A red dashed oval highlights the 'Inquiring' and 'Answering' columns. Arrows point from the yellow box to the red dashed oval, indicating the flow of information.

Color	Date/Time	Event Description	Inquiring/Answering
M	07/10/24 11:00	OFC六ヶ所 医療班	
L	07/10/24 11:00	OFC六ヶ所 運営支援班	
H	07/10/24 10:35	OFC六ヶ所 住民安全班	
M	07/10/24 10:35	OFC六ヶ所 総括班	
H	07/10/24 10:35	経産省原子力安全保安院 総括・運営支援班	

An original chronological event data

Inquiring

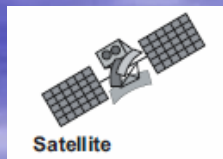
Answering

- When question has to be asked about an event data, click on the data and input the question.
- The PC terminal sent the original is event data is notified a question receiving by pop-up window.
- The answer for the question can be sent and be shared among the organizations.

Attachment Function for Chronological Event List

* GPS :Global Positioning System

Cellphone equipped Camera and GPS*



Map generated automatically on the basis of GPS data



Mail with photo and GPS* position data transmitted by cellphone from scene

Mail with photo



Visual information is powerful for understanding!

事実関係一覧			
下書きデータ 確定データ			
表示内容: 全項目			
検索: 表示する (重要度リンク) (0-1秒) (B重要) (A最重要)			
検索する AND OR 実行 詳細 初期画面			
A	05/02/02 22:09	輸送位置監視システム	1・遅延(129分) 現場・状況情報(輸送事故)
A	05/02/02 22:06	輸送位置監視システム	1・遅延(128分) 現場・状況情報(輸送事故)
A	05/02/02 22:07	輸送位置監視システム	1・遅延(127分) 現場・状況情報(輸送事故)
A	05/02/02 20:53	輸送位置監視システム	7・不正電源切断 (到着地まで5563m) 現場・状況情報(輸送事故)
A	05/02/02 20:53	輸送位置監視システム	10・不正電源切断 (到着地まで4162m) 現場・状況情報(輸送事故)
A	05/02/02 20:53	輸送位置監視システム	10・検査下限異常 温度下限異常 現場・状況情報(輸送事故)
C		水害・研修センター	MAILからの情報(詳細は添付ファイル参照)
C			
C			
A			
C	05/02/02 17:09	件名 出発	MAIL



Summary

- Based on lessons learned from the past accidents, Japan established new system for response and preparedness against nuclear disaster.
 - quick initial response
 - close coordinated cooperation between national government and local governments
 - strengthening of the national emergency preparedness
 - clarification of license holder's responsibilities
- Communication of technical information between a scene and specialists is a key for mitigation of the accident and protection of public.
- Tools for communication and technical information exchange are extremely effective.
- Training of communication between emergency response organizations is indispensable.

REFERENCE

- Nuclear Safety Commission; Report of the accident investigation committee on a criticality accident in uranium fuel fabrication plant, December 24, 1999 (in Japanese), Summary of the Report (in English)
- IAEA; Report on the preliminary fact finding mission following the accident at the nuclear fuel processing facility in Tokaimura, Japan
- Government of Japan; Convention on Nuclear Safety National Report of Japan for the Third review Meeting, August, 2004
- Nuclear Safety Technology Center (NUSTEC) ; System for Prediction of Environmental Emergency Dose Information SPEEDI (in Japanese),
http://www.bousai.ne.jp/visual/gen_taisei/speedi/speedi1_1.html
- Japan Nuclear Energy Safety Organization (JNES); Emergency Response Support System ERSS (in English),
http://www.jnes.go.jp/kouhou/jnes/jnes-e/pdf/jnes_e_09-10.pdf
- Watanabe; Improvements of the Emergency Information Clearinghouse ECHO for nuclear emergency management, to be published in the 2nd Joint Emergency Preparedness and Response & Robotics and Remote Systems Topical Meeting, Albuquerque, NM, March 9-12, 2008.



Thank you for your attention!

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The Precipitation Tank

