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IT Business Continuity Plans (IT-BCP) in Japan

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Table of Contents

1. Introduction and Overview

1.1 Location of Tohoku EPCO and J-Power

1.2 Concept of IT-BCP Measures

1.3 Prerequisites of IT-BCP Measures

2. Cases

2.1 Tohoku EPCO

2.1.1 Maximum Acceleration Rates observed at the Computer Center during the Great East Japan Earthquake

2.1.2 Results of Reassessment of Preparedness against Main Threats to Computer Center After 3.11

2.1.3 Results of Verification of Vertical Vibration Reduction Effect

2.2 J-Power

2.2.1 Reinforcement of Capabilities to deal with the Wide-area Spread and Prolongation of the Effects of Disasters

2.2.2 Reinforcement of Human Response

3. Conclusion

1.1 Location of Tohoku EPCO and J-power



The epicenter of Great East Japan Earthquake (11 March 2011)



Tohoku EPCO



J-Power



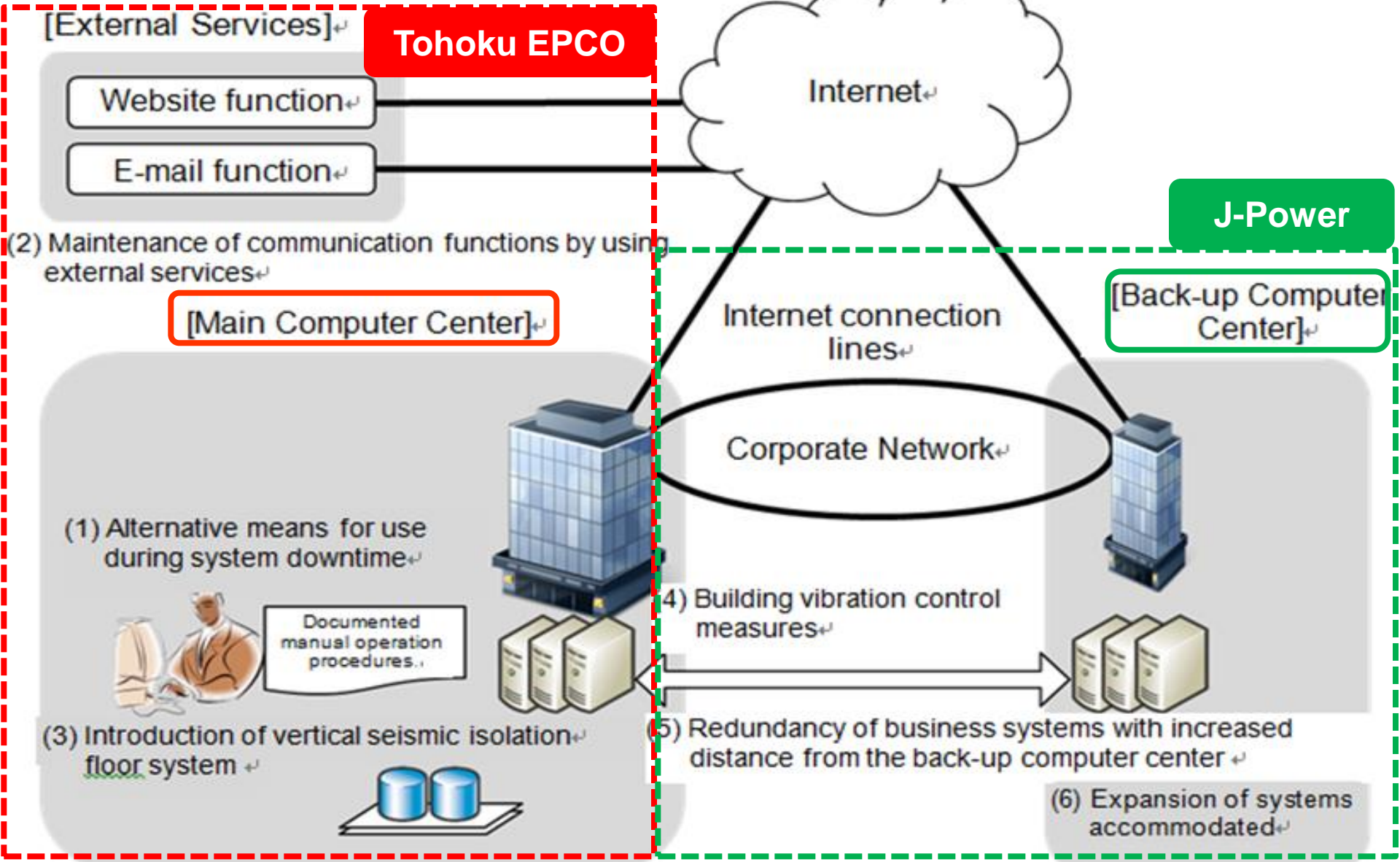
The near-field earthquake in the Tokyo metropolitan area (70% probability of a magnitude 7 earthquake within the next 30 years)



Reference: Corporate Data

	Tohoku EPCO	J-Power
Date of Incorporation	May. 1, 1951	Sept. 16, 1952
Capital : Million JPY	251,400 (As of 2005)	180,502 (As of 2015)
Employees (Unconsolidated)	12,731 (As of 2014)	2,366 (As of 2015)
Power Generation Facilities	17,770,000kW	16,384,200kW
Transmission Lines	15,181km	2,411km
Distribution Facilities	580,893km	-
Substations	Number 624	Number 4

1.2 Concept of IT-BCP Measures



1.3 Prerequisites of IT-BCP Measures

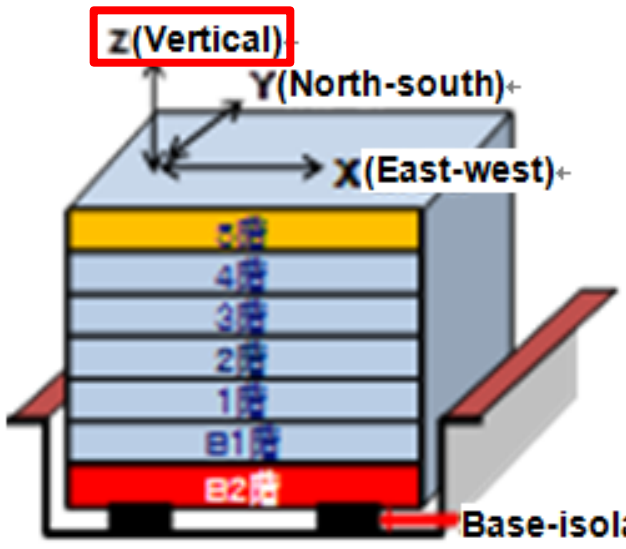
■ The reason for the difference

		Tohoku EPCO	※2	J-Power	※2
Envisaged earthquake		The level of Great East Japan Earthquake		The near-field earthquake in the Tokyo metropolitan area	
Experience in envisaged earthquake		Experienced		Inexperienced	
System stoppage		Enabling uninterrupted IT service even in the case of 3.11		On the assumption of Prolongation (max: up to some months)	
Main DC	Disasters	Continued utilization		Expecting planning for extended use of backup computer center	
	Measures※1	Vertical seismic isolation floor system	(3)	Building vibration control	(4)
Other measures※1		<ul style="list-style-type: none"> Alternative means for use during system downtime and so on 	(1) (2)	Expansion of systems accommodated and so on	(5) (6)

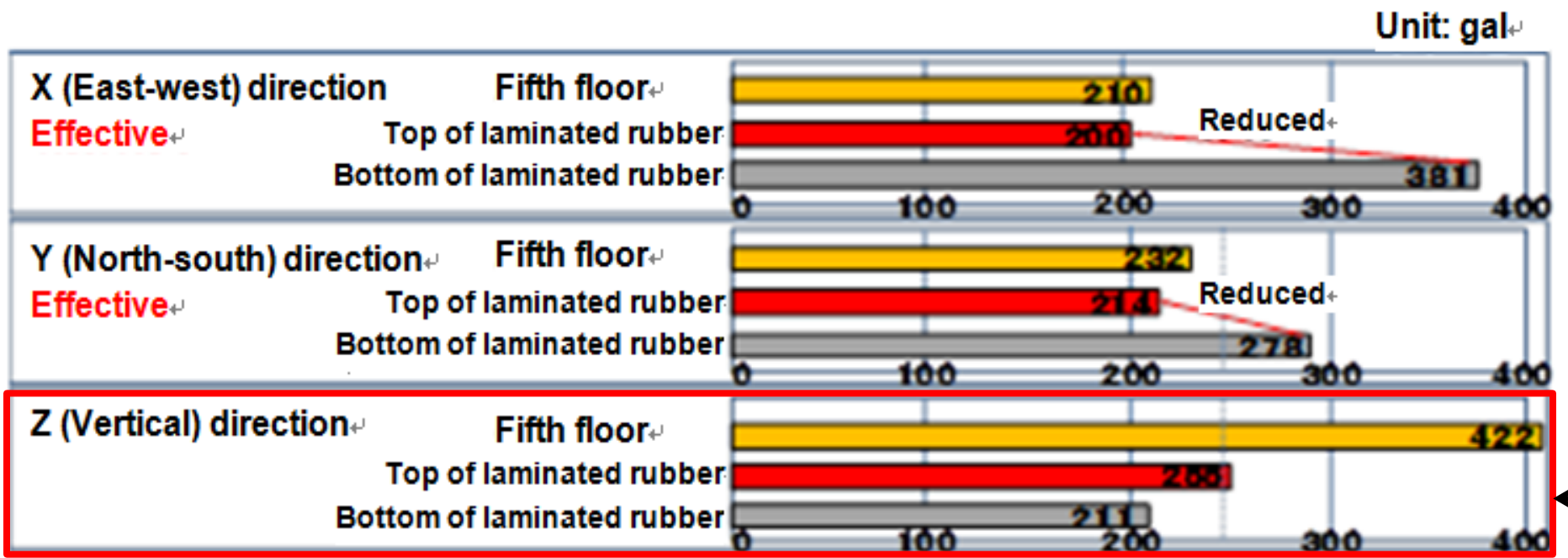
※1: measures after 3.11 ※2: the number in previous page

【Tohoku EPCO】

2.1.1 Maximum Acceleration Rates observed at the Computer Center during the Great East Japan Earthquake



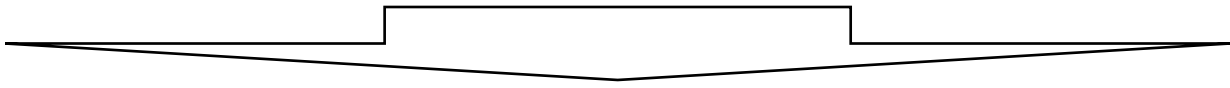
<Verification after 3.11>
The base-isolated layer (laminated rubber) of the computer center building was unable to reduce vertical seismic motion



【Tohoku EPCO】

2.1.2 Results of Reassessment of Preparedness against Main Threats to Computer Center After 3.11 p7

There is the possibility of damage to information equipment by a near-field earthquake accompanied by characteristic vertical vibration



Envisaged Threats		Risks	Preparedness Measures	Results
Fire		<ul style="list-style-type: none"> • Spread of fire in the building • Spread of fire to computer equipment 	<ul style="list-style-type: none"> • Halon fire-extinguishing systems • Fireproof walls 	○
Intrusion by suspicious persons		<ul style="list-style-type: none"> • Destruction of buildings and computer equipment • Theft of information 	<ul style="list-style-type: none"> • Control of access to buildings and rooms • Regular patrols 	○
Pandemics		<ul style="list-style-type: none"> • Reduction in the number of operators 	<ul style="list-style-type: none"> • Stockpiling protection kits • Formulation of operational procedures and plans for dealing with pandemics 	○
Earth- quakes	Trench- type	<ul style="list-style-type: none"> • Damage to the computer center building • Damage to computer equipment • Power outages 	<ul style="list-style-type: none"> • Seismic isolation system • CVCF and emergency generators 	○
	Near-field		<ul style="list-style-type: none"> • Confirmation of absence of potential disaster risks using hazard maps prepared by the local government • Robust buildings 	△
Natural disasters other than earthquakes				○

○: The current measures ensure adequate preparedness.
 △: The current measures alone may not be sufficient to ensure adequate preparedness, presenting the risk of damage to computer equipment.

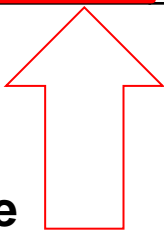
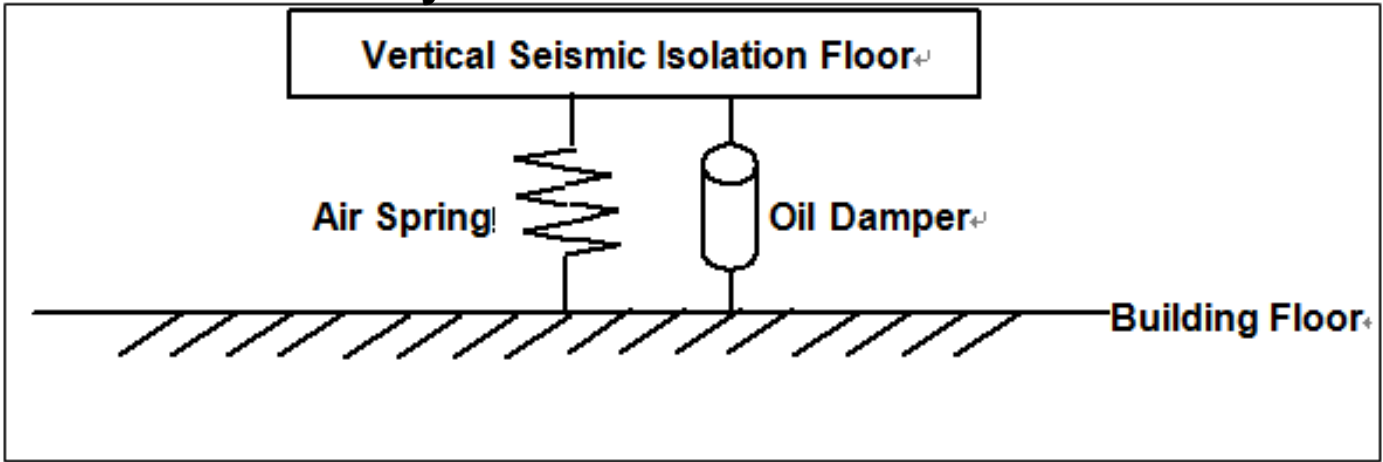
2.1.3 Results of Verification of Vertical Vibration Reduction Effect

Results of Verification of Vertical Vibration Reduction Effect

Maximum Acceleration Rate on the Building Floor	Maximum Acceleration Rate On the Vertical Seismic Isolation Floor		[Reference] Value Observed on the Bottom of the Laminated Rubber at the Computer Center during 3.11
	Response Analysis	Test Model	
1,806	93	125	< 211

Overview of Vertical Seismic Isolation

Floor System Structure



■ Establishment of Business Continuity Measures, etc.

a. Formulation of Operation Procedures

Documented manual operation procedures have been formulated for the 54 systems that need to continue operating even during system downtime.

b. Use of External Services

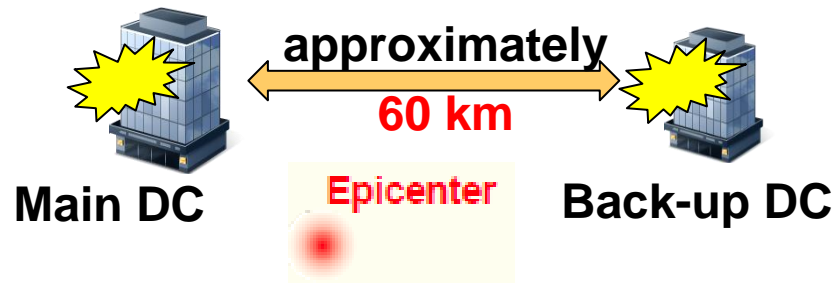
“Communication functions that cannot be replaced by alternative manual operation procedures shall be maintained by making use of external services.”

2.2.1 Reinforcement of Capabilities to deal with the Wide-area Spread and Prolongation of the Effects of Disasters

【Problem1】

More or less the same effects from the earthquake

Before

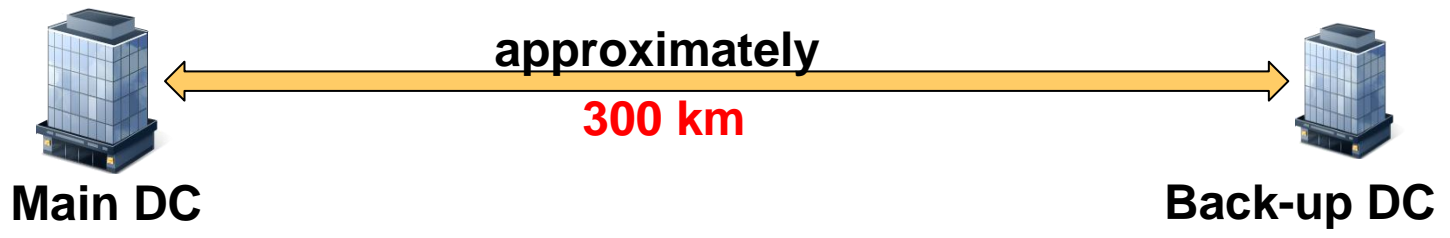


3.11

【Measure】

Expansion of the distance

After



2.2.1 Reinforcement of Capabilities to deal with the Wide-area Spread and Prolongation of the Effects of Disasters

【Problem2】

The effects of the disaster continued for as long as approximately one month, longer than anticipated



【Measure】

Increasing the number of systems In a new back-up DC

	Previous	New
Number	Approximately 10	Approximately 100
Types of System	<ul style="list-style-type: none"> • Systems for communication such as e-mail • Accounting systems 	<ul style="list-style-type: none"> • Systems for communication such as e-mail • Accounting systems • Systems for procurement of fuel for power plants • Labor welfare systems • Systems for support of the work of technology departments, etc.

Before

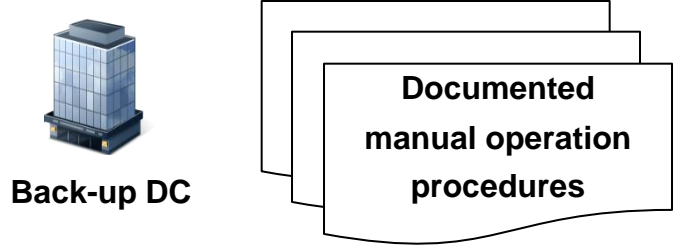
3.11

After

2.2.2 Reinforcement of Human Response

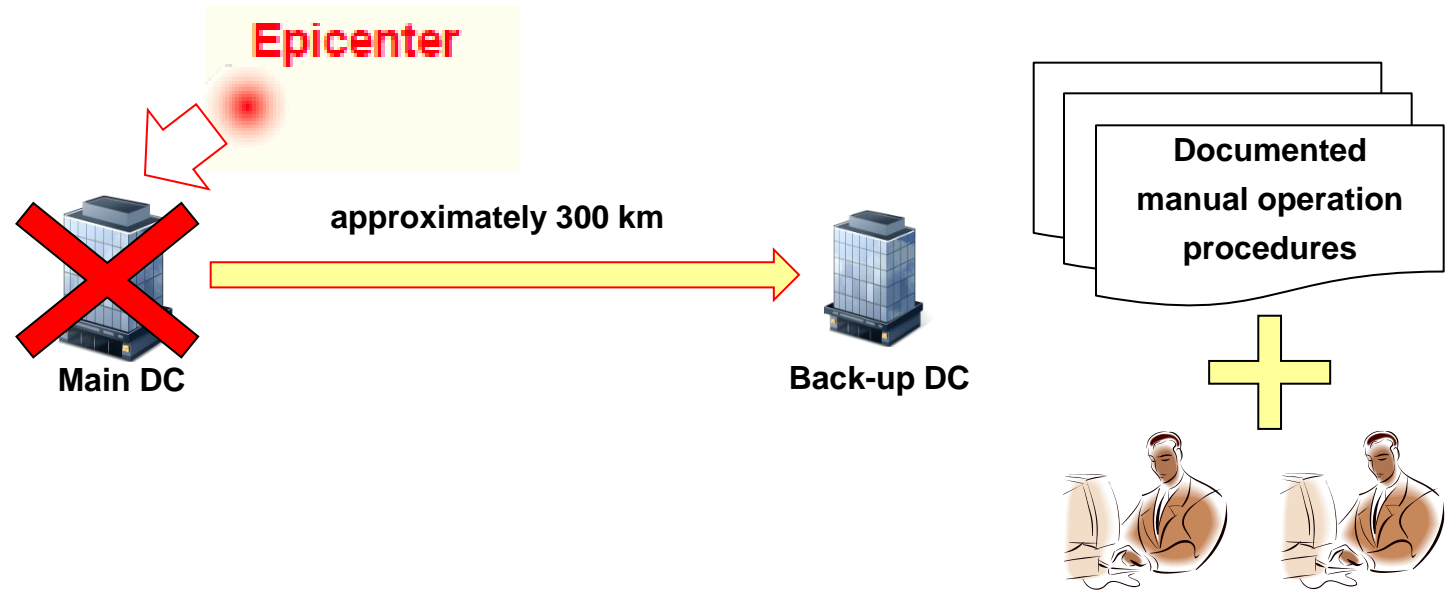
【Preparation】

■ documented procedures have been prepared to start up the 100 systems



【Training】

■ twice a year to provide practice in using the back-up computer system



a small number of staff or staff who are not specialized engineers

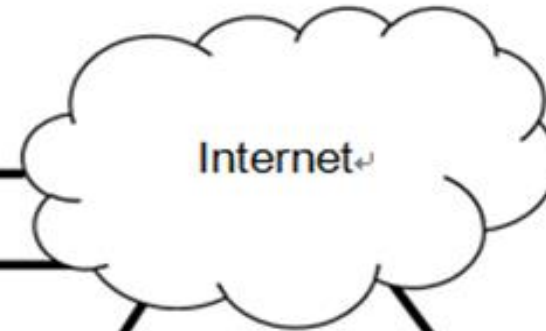
3. Conclusion

[External Services]

Tohoku EPCO

Website function

E-mail function



J-Power

[Back-up Computer Center]

(2) Maintenance of communication functions by using external services

[Main Computer Center]

Internet connection lines

Corporate Network

(1) Alternative means for use during system downtime



Documented manual operation procedures

(3) Introduction of vertical seismic isolation floor system



(4) Building vibration control measures

(5) Redundancy of business systems with increased distance from the back-up computer center

(6) Expansion of systems accommodated

Thank you !

Next:

Answers to the Special Report Questions

Q2-6. Have the authors faced any issues while using cloud-services as contingency for their e-mail and website systems? Any interruption of service has been detected where the service provider was responsible?

<Answer>

There is no stoppage of our business in cloud-services so far.

To select a service provider Tohoku EPCO made a RFP*₁ in which there were some requirements. One of requirements is that the facilities of the service provider must be 300km away from Tohoku EPCO's data center. Moreover, service providers must have both a main center and a sub center to achieve a High availability of their service.

*₁:Request for proposal

Q2-7. The company has decided to reinforce its main computer center. What about the backup center? Was it not affected by the earthquake? If so, why is that?

<Answer>

As of this moment, the Tohoku EPCO's backup center does not serve as a substitute for the main center, because the backup center is mostly used for the storage of the data needed for business continuity in the case of an emergency. However, Tohoku EPCO is considering the option of letting its backup center have the same function as its main center as a measure of IT-BCP.

Q2-8. J-Power has decided, depending on the computer system, to adopt redundancies with hot, warm or cold standby. Could the author detail more the criteria to choose which systems would be destined to which redundancy scheme?

<Answer>

There are three criteria as follows;

	Type	Covered system	Allowed service stoppage time
1	Hot standby	5	within 2 hours
2	Warm standby	10	within 72 hours
3	Cold standby	100	within 7 days or 14 days

The systems to communicate inside and outside the company like e-mail and our homepage are classified as hot-standby systems. In the warm-standby systems there is a fuel procurement systems and an electricity transaction system. The systems which are not in need of an immediate countermeasure in case of emergency, such as a numerical analysis system are categorized as cold-standby systems.

Q2-9. ALL: Do benefits brought by cloud-services compensate potential risks caused by cyber threats? What is the opinion of other EPU's? Could you share some of your experience?

<Answer>

In general, both companies are not using “cloud-services” because they are still using their existing “on-premise” systems.

However, because of the aging population of Japan and the increasing difficulty securing new human resources, we are looking at outsourcing these systems as “cloud-services”, if such systems can guarantee an appropriate level of CIA with regards to cyber security and information leakage.

*1 : Confidentiality, Integrity, Availability

Q2-10. ALL: Virtualization is a solution that allows companies to have less servers to provide the same services. Although it has been largely used for corporate systems, have companies adopted this technology for SCADA systems as well? Please, share some of your experience.

<Answer>

Some SCADA systems using virtualization are introduced in some IT vendors' technical reports. We would also like to use those, as well as "cloud services", in the future, provided that they meet our CIA requirements.

Thank you again !