



Lessons Learned from Fukushima - Applied to EP in Taiwan

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Outline

Introduction

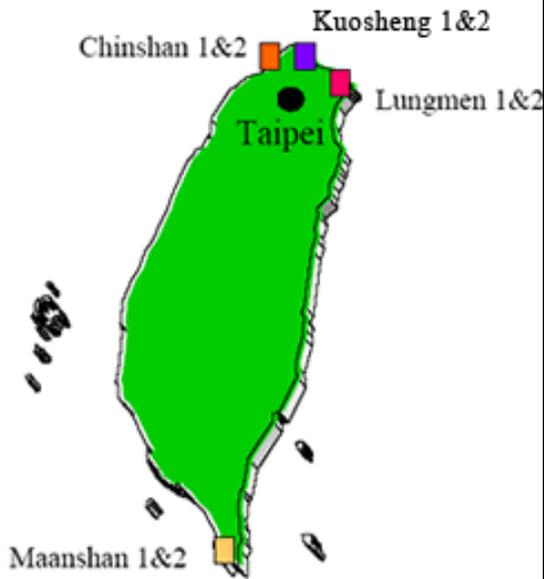
Regulations & Mechanisms

Cross-Border and International

Preparedness

Conclusions

Nuclear Power Plants in Taiwan



Plant	Capacity/Type	Operating License
 <p>Chinshan</p>	<p>1804 MWt/unit GE BWR4 X 2</p>	<p>Unit 1:1978.12.06 Unit 2:1979.07.16</p>
 <p>Kuosheng</p>	<p>2943 MWt/unit GE BWR6 X2</p>	<p>Unit 1:1981.12.28 Unit 2:1983.03.15</p>
 <p>Maanshan</p>	<p>2822 MWt/unit WH PWR X2</p>	<p>Unit 1:1984.07.27 Unit 2:1985.05.18</p>
 <p>Lungmen</p>	<p>3926 MWt/unit GE ABWR X2</p>	<p>Deferred</p>

Post-Fukushima Re-examination

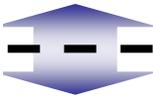


To cope with extreme natural disasters, including earthquake, tsunami, flooding



- Nuclear Safety
- Radiation Protection
- Emergency Preparedness

• Beyond Design-Basis



Re-examination to meet design-basis safety standard



AEC issued “The Near-Term Overall Safety Assessment Report for Nuclear Power Plants in Taiwan in response to the Lessons Learned from Fukushima Daiichi Accident”

October 2011

AEC issued “The Overall Safety Assessment Report for Nuclear Power Plants in Taiwan in Response to the Lessons Learned from Fukushima Daiichi Accident”

August 2012



Missing Puzzles

- Lessons Learned from Fukushima



- **Humility in the face of natural disasters**
- Bring into EP program
- Disaster prevention and management system

Victim's Viewpoint

- **Risk awareness of residents**
- Notification
- Evacuation Plan



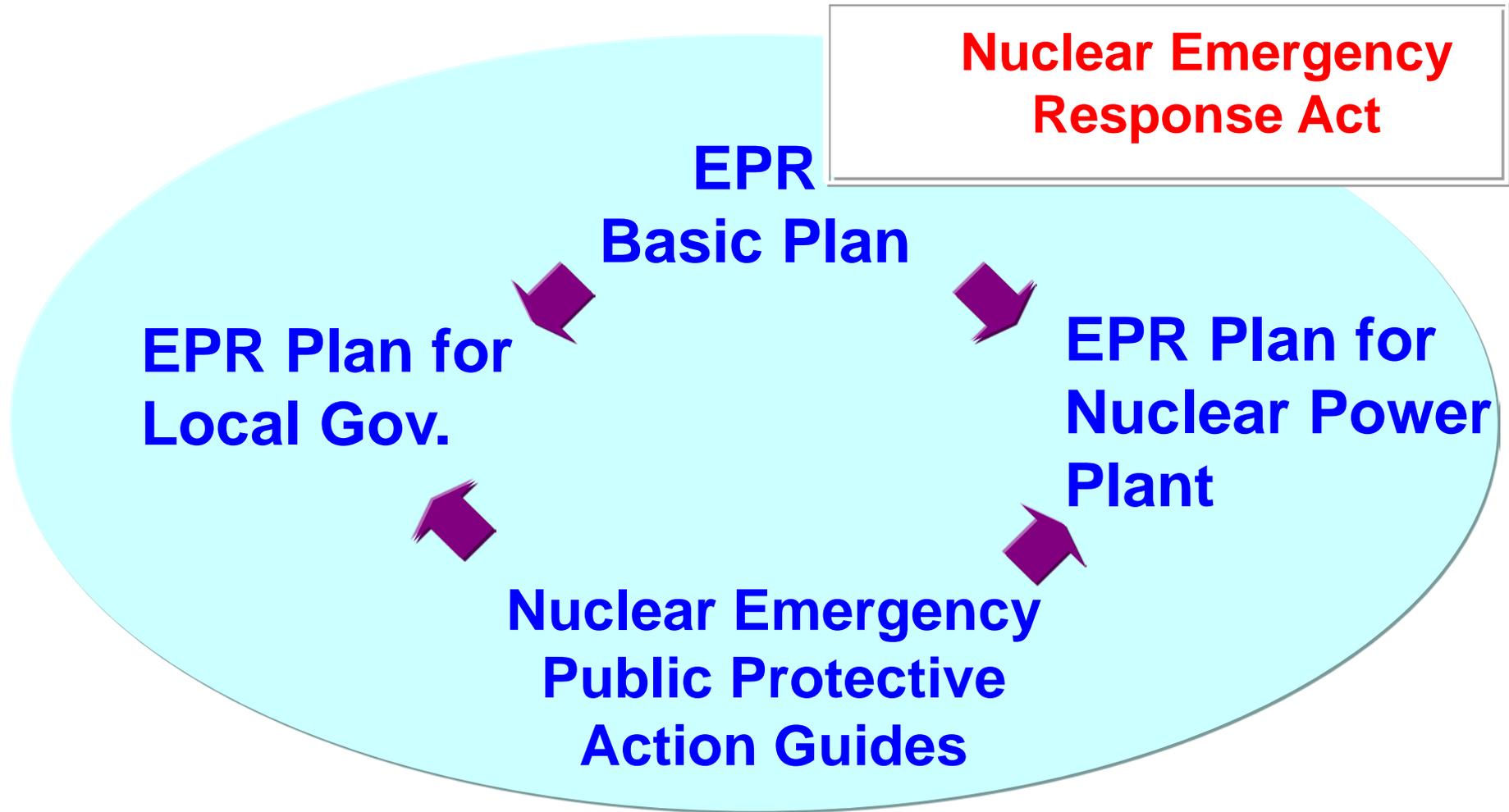
- New evidences
- New technology
- Bring into policy and strategy

Disaster Prevention

- Fukushima experience
- Utility disaster prevention strategy
- **Onsite and offsite emergency response plan**

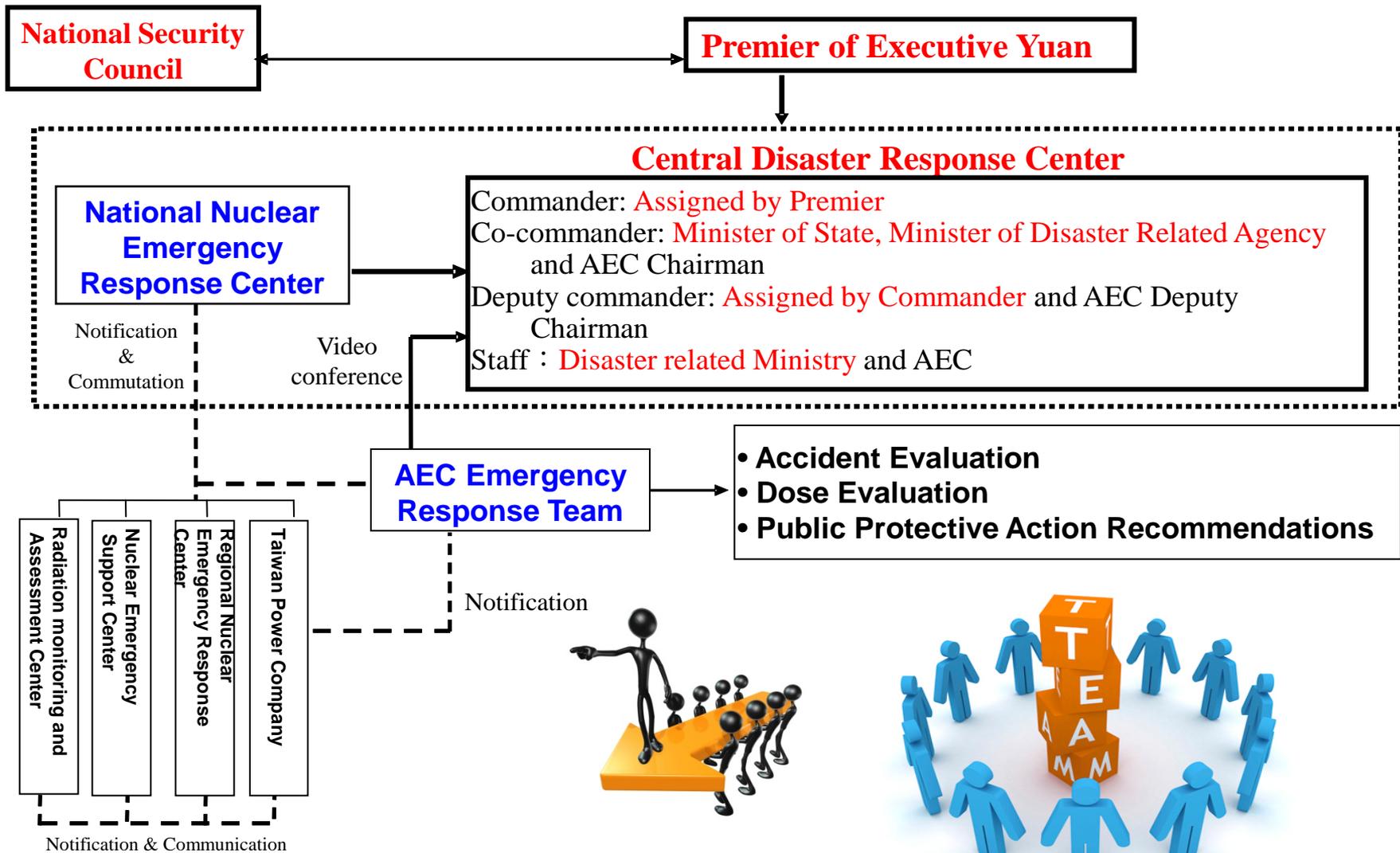


- **Trust between government and citizens**
- Transparency and openness
- **Public Communications**



EPR: Emergency Preparedness and Response

Complex Disasters Response





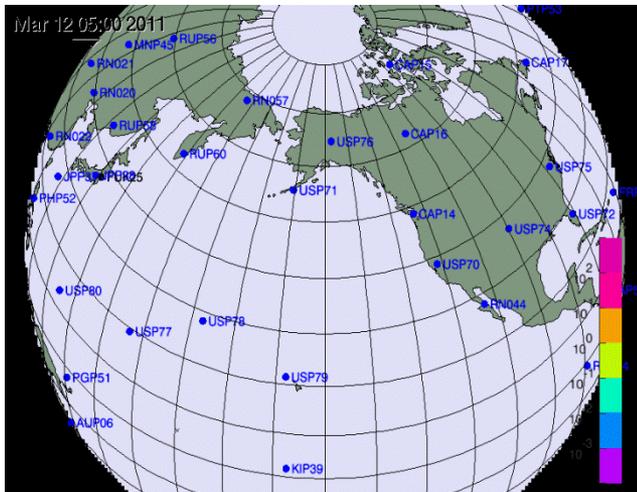
- **Cross-Strait Nuclear Power Safety Cooperation Agreement (Date Signed: Oct. 20, 2011)**
- **Statement of Intent between TECRO (AEC) and AIT (DOE/NNSA) regarding nuclear and radiological incident response and emergency management capabilities (Date Signed: May 26, 2011)**



Cross-Border Nuclear Incident



- Response Guidelines for the Cross-Border Nuclear/Radiological Incidents
- Enhancing dose evaluation analysis capacity through atmospheric dispersion model



最近核電廠 離台184公里

李文鐘／綜合報導

大陸核電廠目前已有六種從事業運轉；興建中有七座，其中離台最近的是福建福清核電廠新首座一、四號機。大陸核電廠包含許多隱憂。首先，多數核電站建在東南沿海人口稠密區，一旦出事，破壞力巨大。其次，多採河水或江水為冷卻水，發生事恐汙染水源；此外，核電資訊透明度不足。大陸民用核工業運作十六年來雖未傳出重大意外，但深圳中大亞灣核電廠於二〇〇五年發生燃料棒漏射微量外洩事件。由於位置相接近香港，引發港方高度關注。但中方卻說沒有發生漏射洩洩。中港說詞互異，顯示大陸核安資訊透明度有待強化。嚴謹的核電廠安全、開發管理的(核電)管理條例，至今還在大陸國家能源局、國際原子能署(IAEA)核設廠安全官員坦承，大陸核電廠安全官員坦承，但更關心的是，有無足夠訓練的安檢人員，可以應付急遽增建核電廠。

二〇一〇年核電容量可達四九〇萬千瓦，核電機容量可達四九〇萬千瓦。

責任編輯／曹海龍

Cross-Border Nuclear Incident



- Establish aerial and maritime radiation detection and monitoring capability



Preparedness



- **NPPs EP Enhancements**
- **Alert and Notification System**
- **Radiation Monitoring Stations**
- **Iodine Tablet Arrangement**
- **Emergency Response Information System**
- **Evacuation**
- **Public Outreach/Communication**
- **Nuclear Emergency Exercise**

NPPs EP Enhancements



- Licensees is required to fulfill the NRC NTTF Recommendations about Staffing and Communications
- Developed the Ultimate Response Guidelines (URG) to inject seawater when necessary
- Earthquake Resistant Building for Emergency Response



Alert and Notification System



- More Alert Stations Established (expanded EPZ)
 - CS NPP(4→30), KS NPP(7→36), MS NPP(6→27)
- To make sure all residents (100% coverage) within EPZ be notified within 45 minutes during a nuclear accident
- By all means:



Alarm Stations /
Village Broadcast
system



TV



Radios



Local Phones



Text Message

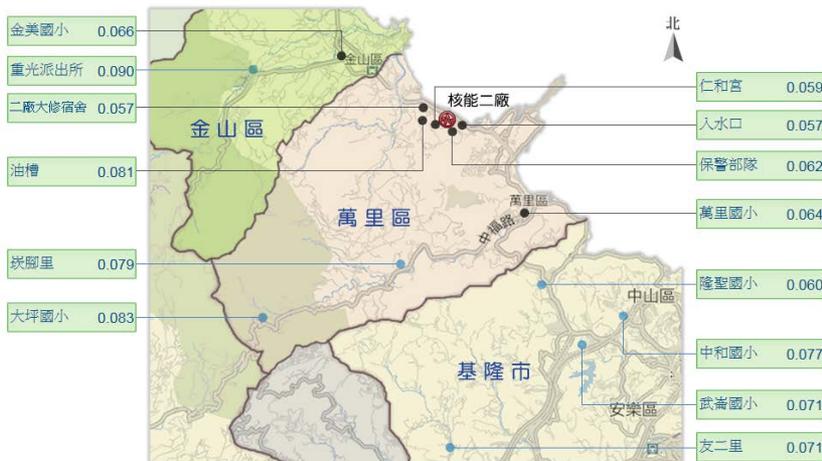


Vehicles
Broadcast

Radiation Monitoring Stations



- More Radiation Monitoring Stations Established
 - CS NPP(5→12), KS NPP(5→14), MS NPP(5→12)
- 40 more Mobile Environmental Radiation Monitoring Detectors with wireless connection
- Establishing the Integrated Environmental Radiation Information System for Protective Action Guides



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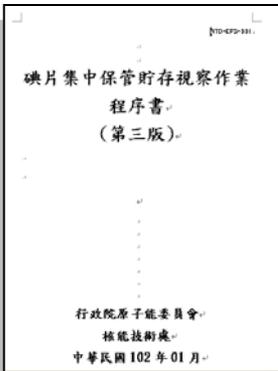


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Iodine Tablet Arrangement



- Three Layers: Pre-distribution, Local Stockpiles, National Stockpiles
 - Pre-distribution to residents, schools, hospitals, etc. within EPZ (8 km)
 - Established Local Stockpiles at Local Government.
 - Established two National Stockpiles (800 thousands tablets) for extra need in case of a nuclear accident.



「核」家平安服用碘片篇(30秒國語版)



Emergency Response Information System



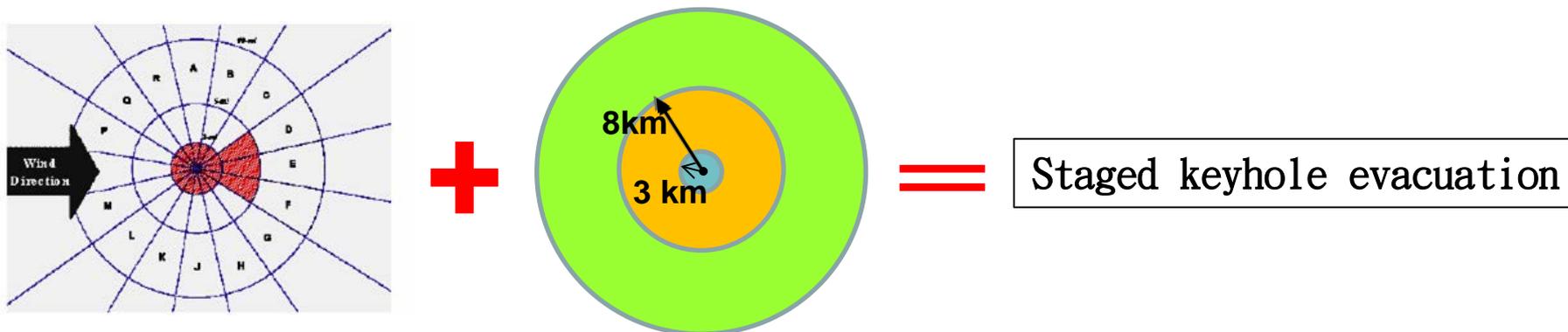
- A database providing graphical, real-time information to responders.
- Cross-platform communication and information-sharing among response units such as Central Gov. and Local Gov., Support Center by Army, TSC by NPP, and Center of Radiation Monitoring and Dose Assessment



Evacuation



- **Precautionary Evacuation**
 - Priority: Schools, Nursing homes, Hospitals within EPZ (8 km)
 - Residents within 3 km
- **Evacuation**
 - Downwind side Residents within 3~8 km
 - Residents within 3~8 km
- **Transportation Needs Survey to each household within EPZ**



Schools within EPZ



- Conducts the schools evacuation drill annually.
- Annual survey for transportation needs
- Enacting school emergency response plan
- Making emergency information cards for parents
- Precautionary evacuation management



Public Outreach/Communication



EPZ Residents Survey



Community Meeting
before Exercise



Focus Groups



Seminar at Schools



Public Meeting with
EPZ Residents



Disaster Preparedness
Fairs

Nuclear Emergency Exercise



- The Nuclear Emergency Response Act
 - ✓ Each nuclear power plant is required to conduct an onsite EP exercise once per year
 - ✓ Annually, a full participation exercise is conducted together with an onsite EP exercise

Tabletop Exercises



Onsite EP Exercise



Full Participation Exercise



Full Participation Exercise



Conclusions

- Be humble in face of nature
- Improving capabilities of emergency preparedness and response to reduce risk and mitigate consequence
- Earn trust of residents through transparency and communications



**Thank You for Your
Attention!**