Lungmen Nuclear Power Plant
Status and Future Prospects

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Introduction to Lungmen Project

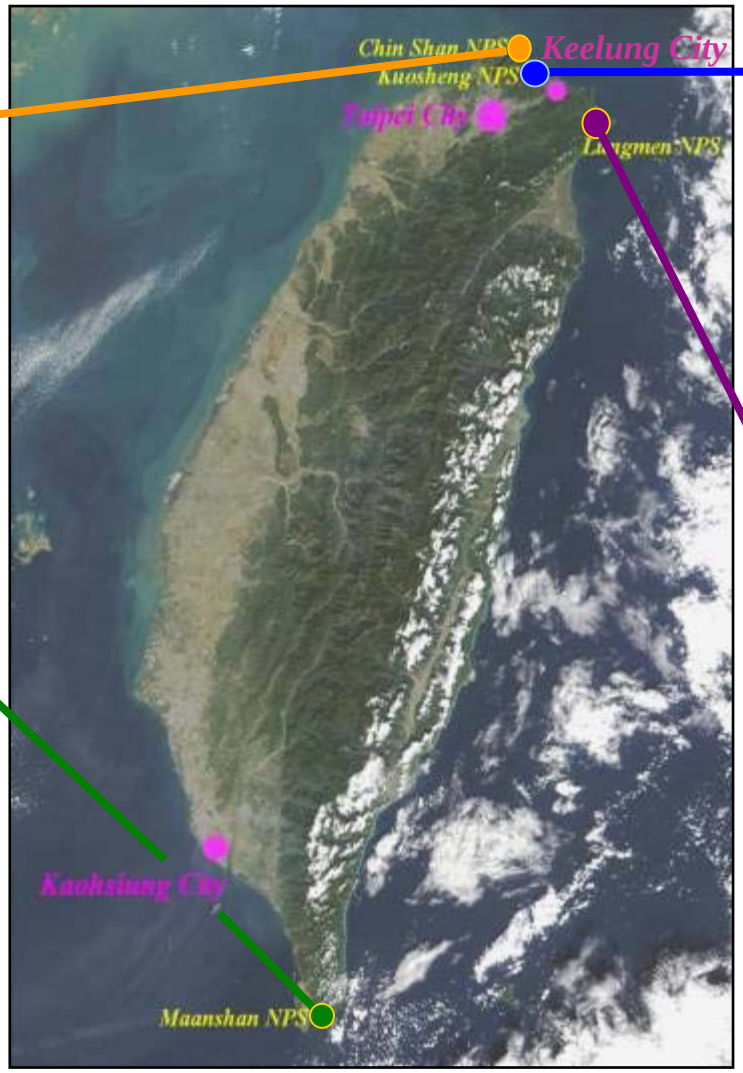
NUCLEAR ENERGY IN TAIWAN

Chinshan NPS

GE BWR-4 636 MWe x2
Commercial Dec-1978 Unit1
Jul-1979 Unit2

Maanshan NPS

Westinghouse PWR
951 MWe x2
Commercial Jul-1984 Unit1
May-1985 Unit2



Kuosheng NPS

GE BWR-6 985 MWe x2
Commercial Dec-1981 Unit1
Mar-1983 Unit2

Lungmen NPS

GE ABWR
approximately 1,350 MWe x2
Under Construction

Project Summary

MAIN TOPIC	DESCRIPTION
Site Area	480 Hectares
Capacity / No. of Units	1350 MWe */ Two units
Type of Reactor	Advanced Boiling Water Reactor
Average Fuel Consumption per Year	~60 tons
Investments	9.7 Billion US$ (283.8 Billion NT$))
Nuclear Reactor Manufacturer	General Electric-Hitachi（GEH）
Steam Turbine Generator Manufacturer	Mitsubishi (MHI)
Radwaste & Related System, Equipment	Hitachi

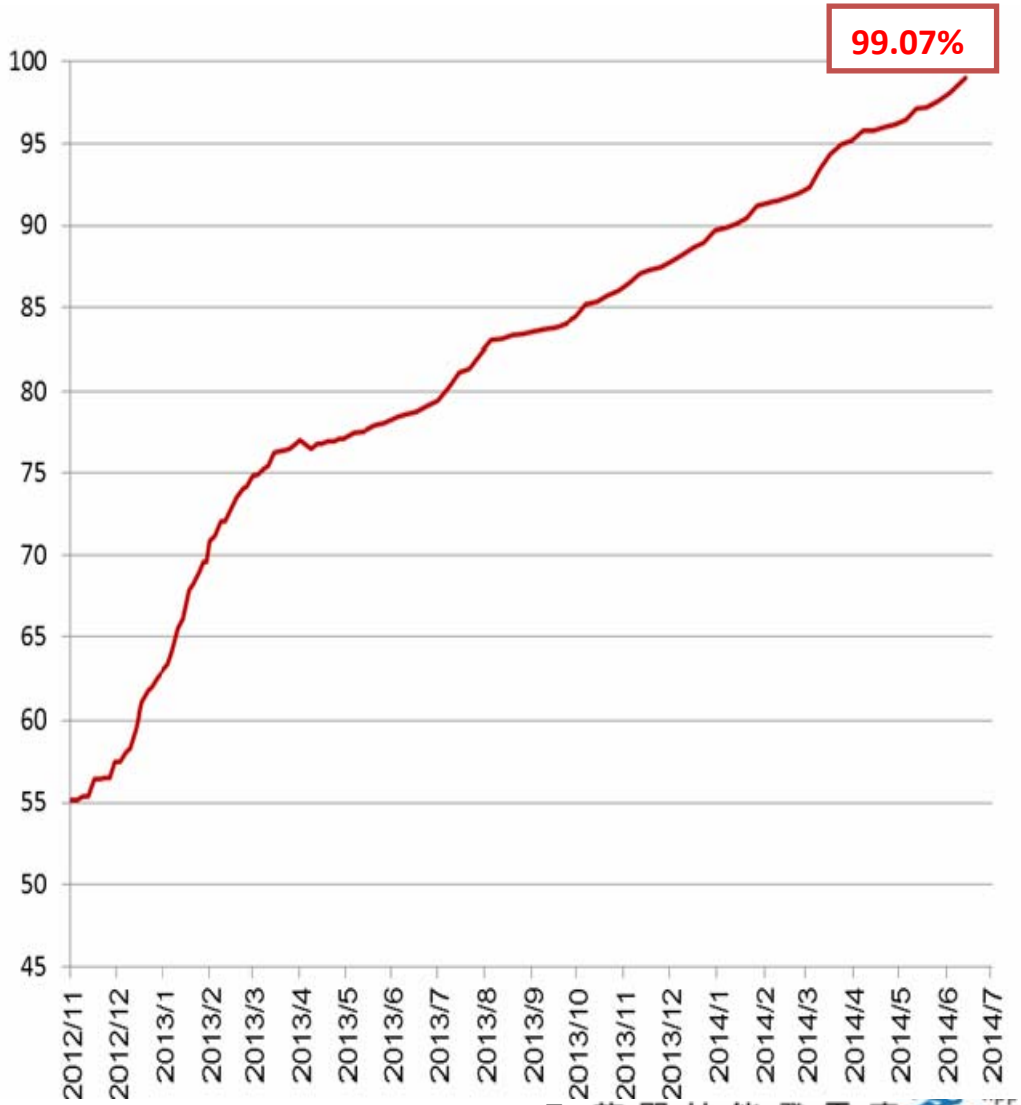
*** The emission of carbon dioxide will decrease 16.2 million Tons Per year.**

Pre-op Testing and System Re-verification Status

Pre-op Test Status

2014.06.24

- **Lungmen Nuclear Power Plant Unit 1 Pre-op Test Status**
  - 308 pre-op procedures should be completed before Fuel Loading.
  - 297 pre-op procedures have been completed.



Testing Status

Remaining Completed

Generator
2013 Feb
Gen. Hydrogen fill and leak test

SIT
2014 Mar 6

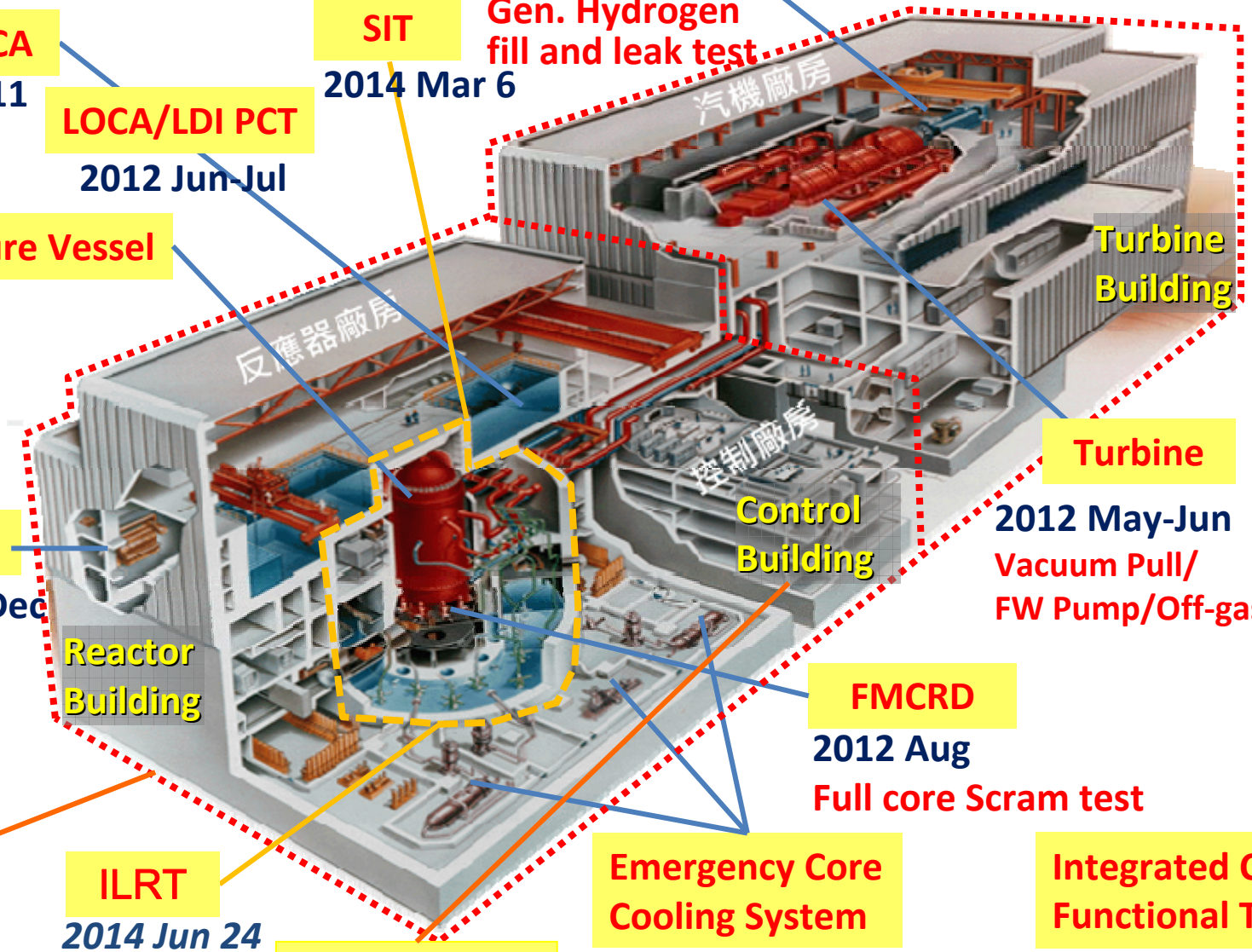
LOOP/LOCA
2014 Jun 11

LOCA/LDI PCT
2012 Jun-Jul

Reactor Pressure Vessel
2008
RPV Hydro test
2013 Jan-Feb
RPV Leak test

Emergency DG
2013 Sep/Nov/Dec
EDG-A/B/C Test
2014 Mar 8
SDG Test

RB Leak Test
2014 May 29



Turbine
2012 May-Jun
Vacuum Pull/
FW Pump/Off-gas test

FMCRD
2012 Aug
Full core Scram test

ILRT
2014 Jun 24

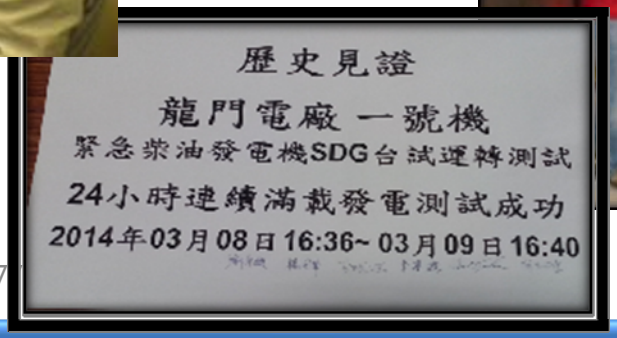
CB Leak Test
2013 Dec 28

Emergency Core Cooling System
2013 Jul RCIC/RHR
2014 Jun HPCF

Integrated Cold Functional Test
2014 May 29

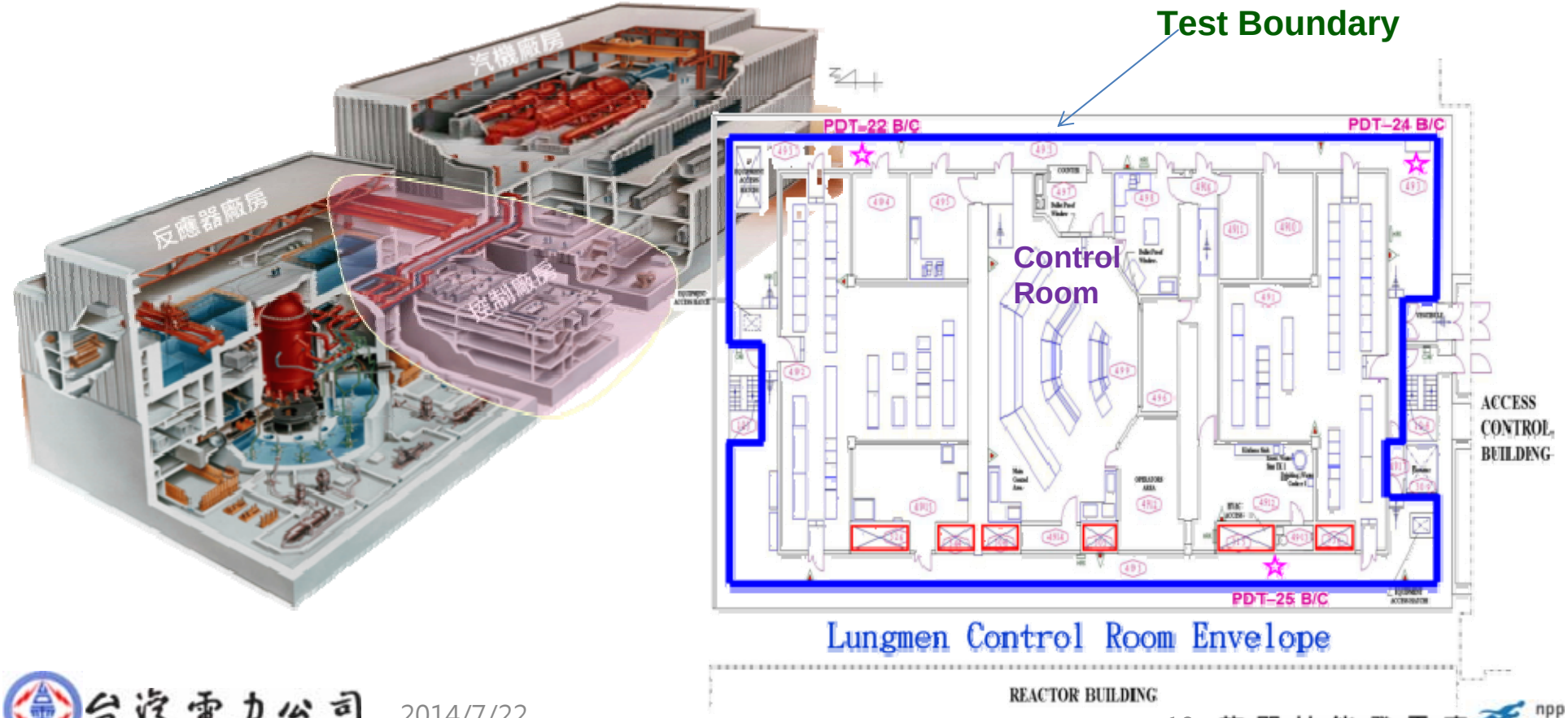
Four Emergency Diesel Generator (A/B/C/S) Pre-op Test Completed

- In the event of outside power loss (LOOP) and coolant water loss (LOCA) , the Emergency Diesel Generator (EDG) will start up and supply power to bring the plant to safety shutdown.
- Four EDGs (A/B/C/S) pre-op tests are completed and meet design specification and safety function on March 8 , 2014.



Control Building Leak Test Completed

- To verify the ability to maintain positive pressure in the control room, and
- To ensure the protection of operators from toxic gases, chemical materials, and radiation.

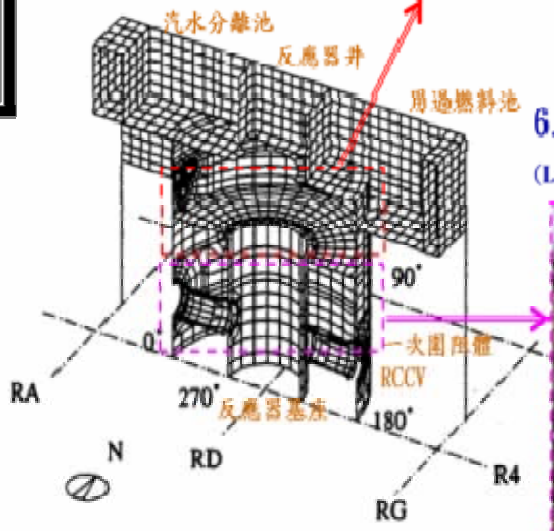


LOOP/LOCA Test

- We have successfully completed all LOOP/LOCA tests on 6/11/2014.
- 16 Systems were actuated simultaneously with more than 60 engineers involved.

Structure Integral Test (SIT)

- We completed SIT to verify that reinforced concrete containment vessel (RCCV) structure can meet the design requirement.



2000mm厚之鋼筋混凝土
負責抵抗變形

6.4mm厚之鋼襯鈑
(Liner Plate)維持氣密

Integrated Leak Rate Test (ILRT)

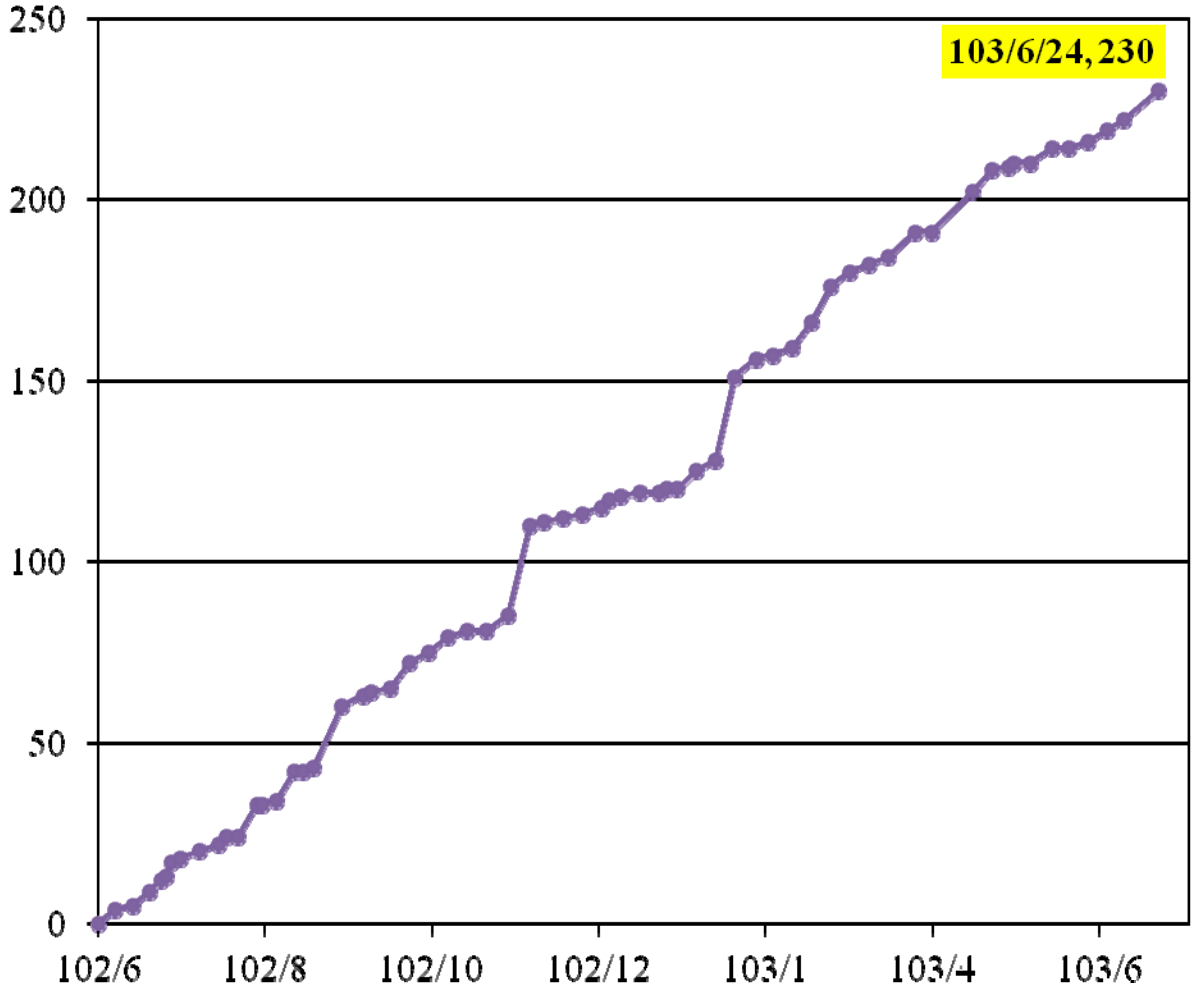
- We spent more than 3 months preparing prerequisite work and the test was completed successfully on June 24, 2014.
- Integrated leak Rate 0.147%/day is much less than acceptance criteria 0.375%/day.

Independent Test Group (ITG)

- The Independent Test Group (ITG) was organized in April, 2013 to address public concerns. It consists of 12 foreign consultants and 45 senior engineers from other nuclear power plants. Group members are experts in their field with 20 plus years of experience.
- During System Re-verification processes, ITG members reviewed 126 system turnover packages and re-test Pre-op tests to verify that the system specifications were met.

Pre-op Re-test

- 231 pre-op test procedures should be reviewed, retested by ITG.
- 230 procedures were completed on Jun 24, 2014.
- It is estimated that the whole re-tests can be completed before 7/31.



Future Prospects for LMNPP

Lungmen Project Chronicle of Events

2014 Jul 31 (estimated)
Complete POTP and safety inspections

2014 (Jun 24) ILRT Test Complete

2014 (May 29)
Integrated Cold Functional Test
2014 (Jun 11) LOOP/LOCA (Jun 11)

2014 (Apr 28)
Premier Jiang Yi-Huah announced : unit 1 of the LMNPP construction suspended and preservation will be conducted once safety inspections are completed. Construction of unit 2, meanwhile, will be suspended immediately.

2014 SIT (Mar 6)
EDG (Mar 8)

2013 (Feb 26)
Legislative Yuan made a resolution:
No extra budget, No fuel loading before Referendum

2013 RPV L/T
EDG Test

2012 Vacuum Pull/FW Pump/Off-gas test
Full Core Scram Test

2011 Control Rod Test

2010 ECCS Injection
Fuel Received

2009 345kV Energized
Pre-op Test Started

2008 Unit 1 RPV Hydro Test

2007 161kV Energized

2006 Unit 2 RPV Lifting

2005 Unit 1 RPV Lifting

2001 Government
Announced Restart
LNPP Founded

2000 Government Announced Suspension

台灣電力

1996 NI Tender Awarding

1999 Construction Permit

Future Prospects for LMNPP

- The Fukushima disaster has resulted in an increase of opposition towards nuclear energy. People have demonstrated that they are doubtful and fearful. The Legislative Yuan made a resolution on Feb. 26, 2013 that there will be no extra budget, and no fuel loading before the referendum. Except for those under contract and safety inspections at Unit 1, all constructions will be suspended.
- According to the international press held by Executive Yuan on Apr. 28, 2014 , “the government of Taiwan has announced that unit 1 of the Lungmen nuclear power plant construction would be suspended and preservation will be conducted once pre-operational safety inspections are completed. Construction of unit 2, meanwhile, will be suspended immediately.”

Future Prospects for LMNPP

- Taipower conducted a comprehensive nuclear safety assessment and made further sustained efforts to promote nuclear safety reinforcement tasks to upgrade the safety protection capability of nuclear power plants after Fukushima accident.
- Unit 1 Pre-operational tests are over 99% complete. The completion of POTP and safety inspections are scheduled at the end of July based on the current status. The expected documents submission date to AEC is before the end of September.

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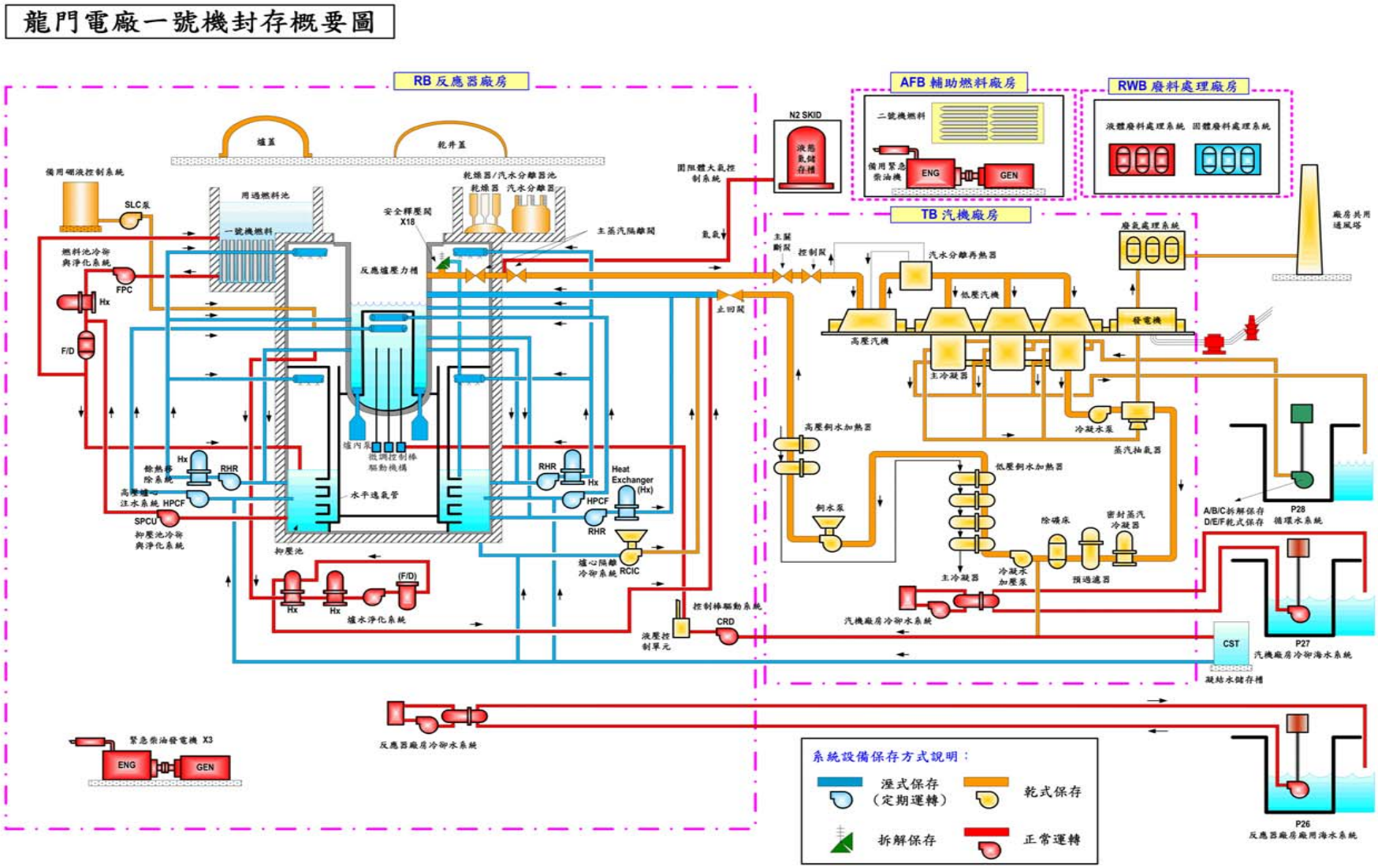
Future Prospects for LMNPP

- In order to assure that all systems, equipment and spare parts will be easily operable again after the preservation, we are now having close discussions with manufacturers and consultants to set forth Layup plans.
- It is our and the government's obligation to ease the uncertainty and boost the confidence of the public in nuclear operational safety. Only when we win the trust of the public again can we see the possibility of public support of the upcoming referendum. We need this support to allow Lungmen Nuclear Power Plant to go into fuel loading.

Lungmen Layup Program

(in the process of making up)

The preservation plan is now being made up.



Layup Plan

- Two groups are assigned to visit similar nuclear power plants in Japan and in the U.S respectively. One group visited Shimane-3 Nuclear Power Plant from June 4th to June 7th and the other group will visit Watts Bar in early July.
- POTP and safety inspections are undergoing and can be completed by the end of July. TPC expects to submit the layup plan to ROC AEC by the end of August and starts the layup preparation work once we are granted ROC AEC's approval.

Layup Conception

Systems to maintain proper environment shall be operated and maintained

1. **Air conditioning**

   HVAC should be kept in operation to preserve plant facilities under proper controlled air-conditioning.

   The following systems should be in-service with HVAC operation.

   NCW, ECW, RBCW, RBSW, TBCW, TBSW, AUXB, ASS, MW, IAIR, etc.

2. **Drain water systems**

   RW systems should be kept in-service for a drain water treatment.

3. **Other supporting systems**

   The following systems should be kept in-service.

   - SAIR for site works
   - DG for a back up system in case of bus power failure

Layup Conception

Systems to support the above systems operation and monitoring the operating conditions

1. **Network controller**

   Network controller should be kept in power distributed condition.

2. **Instruments**

   Instruments are recommended to be kept in power distributed condition considering a deterioration by a power disruption and necessary aging process at a power recovery.

3. **Other supporting systems**

   Emergency Diesel Engine (EDG) for bus failure support
   Lubricating pump should be operated to supply lube oil

Conclusion

Conclusion

- The pre-operational tests and systems re-verification will be completed successfully by July 31, 2014. We are now working on the preparation for the documents of testing and the submission to AEC, which is scheduled by September 30 2014.
- For unit 2, the civil work and installation of piping, mechanical, electrical equipment are almost completed. But cables have not been pulled yet and most of the tests have not been performed.
- It is a political issue that makes future uncertain and postpone the rest of the schedules. Unit 1 and 2 will be suspended and preserved in the near future, which will cause a great impact on the economy and future energy policy in Taiwan.


Born and raised here, we are
responsible for our homeland.


Lungmen Nuclear Power Plant can exist
only when the safety of public life and
property can be secured.

The End

Thank you for your attention