

[http://www.tepco.co.jp/en/press/corp-com/release/betu11\\_e/images/110515e10.pdf](http://www.tepco.co.jp/en/press/corp-com/release/betu11_e/images/110515e10.pdf)

# Reactor Core Status of Fukushima Daiichi Nuclear Power Station Unit 1

May 15<sup>th</sup>, 2011

Tokyo Electric Power Company



# Provisional Analysis Result

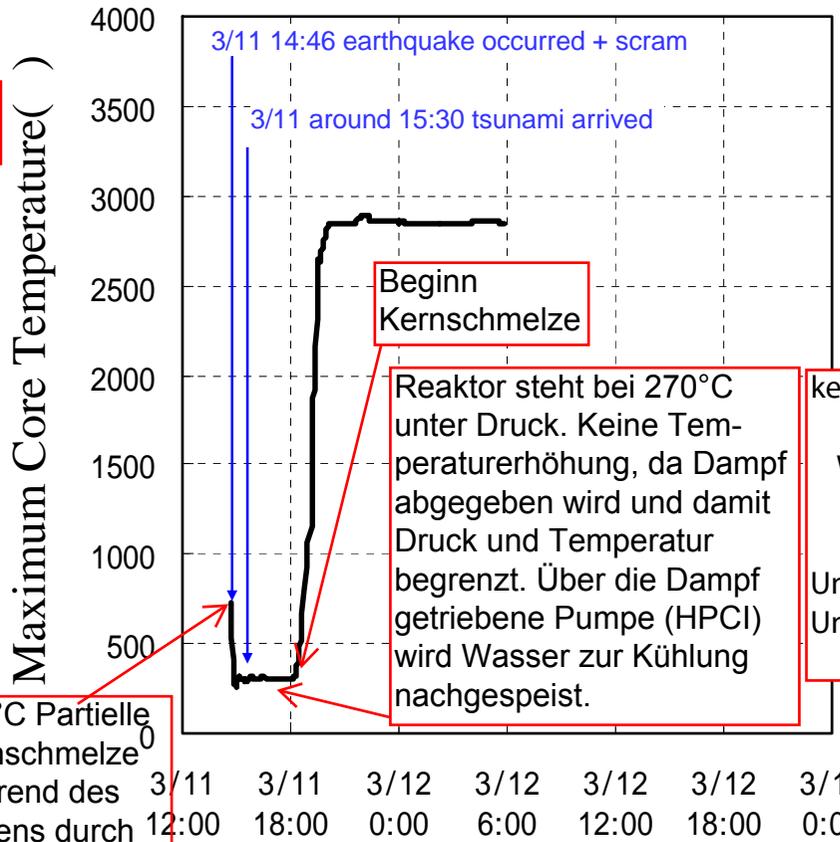
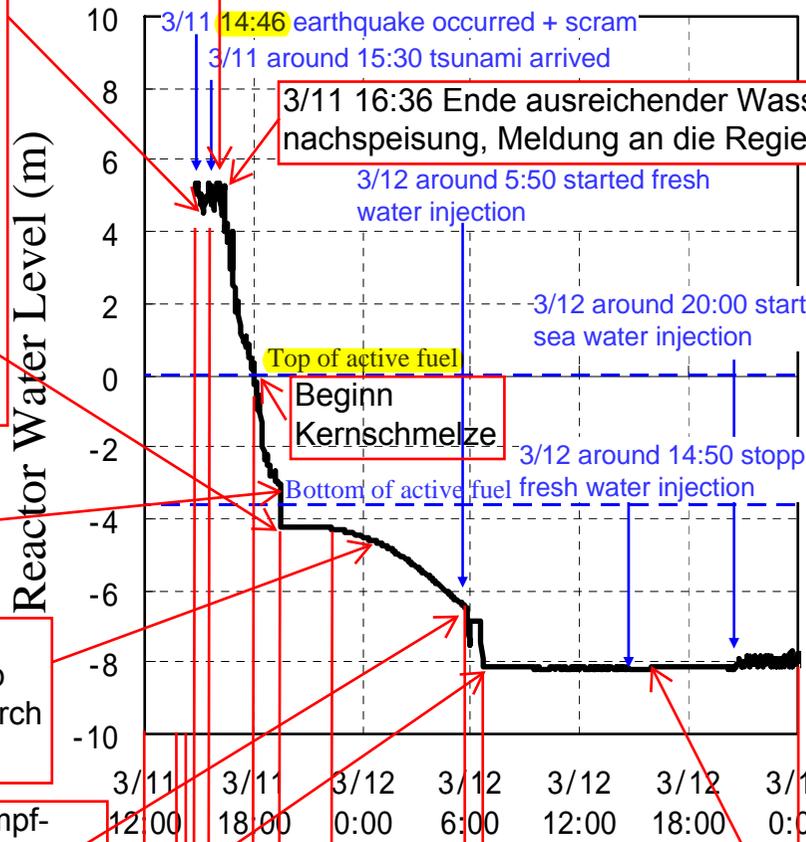
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- As a result of calibration of the reactor water level gauge of Unit 1, we realized the actual water level has been lower than its indication.
- On the other hand, as the temperature of the RPV of Unit 1 is in the range of 100 - 120 , stable cooling is being achieved.
- Results of the provisional analysis show that the fuel pellets of Unit 1 were melted and fell down to the bottom of RPV at a relatively early stage after the tsunami reached the plant.
- However, since the reactor has been continuously cooled by the subsequent water injection, event progression leading to large-scale release of radioactive materials is unlikely.
- This analysis result is provisional, and further details will be investigated.

# Fukushima-Daiichi Unit 1: Reactor Water Level, Maximum Core Temperature (Analysis Result)

3/11 15:37 Verlust des Wechselstromes  
3/11 15:42 Meldung an die Regierung

Key assumption: IC lost its function after the tsunami arrived at around 15:30



- reached top of active fuel in 3 hours (around 18:00) after the **scram**  
- reached bottom of active fuel in 4 and a half hours (around 19:30) after the **scram**

The **core temperature** started increasing when the reactor water level became **lower than top of active fuel**, then reached the core melting temperature.

20min ungestoppter sofortiger Wasserverlust trotz laufender Dieselaggregate und verfügbarem Wechselstrom durch einen Riss Ebene - 4m 3/11 14:46

3/11 19:30 Ende der Wassernachspeisung

Wasserpegel sinkt unterhalb des Risses durch Verdampfen

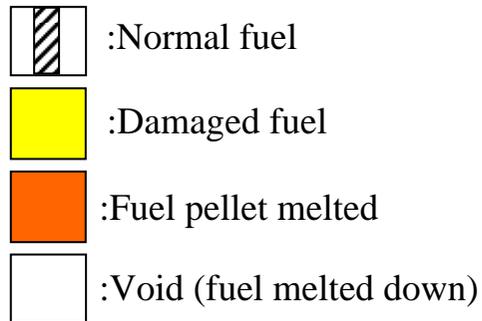
3/12 05:50 Dampfexplosion im RDB verursacht durch "fresh water injection", Absprengen RDB-Boden, vollständiges Auslaufen des RDB

TEPCO  
Phasen 1-7

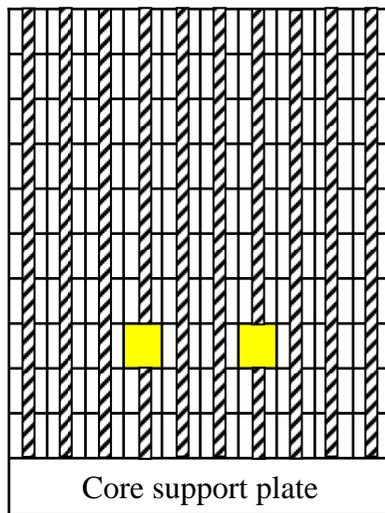
1 2 3 4 5 6 7a 7b 7c 7d 7e

# Unit 1: Transition of Core Status (analysis result)

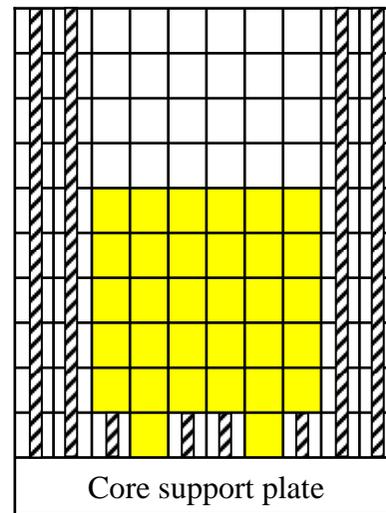
## Degree of fuel damage



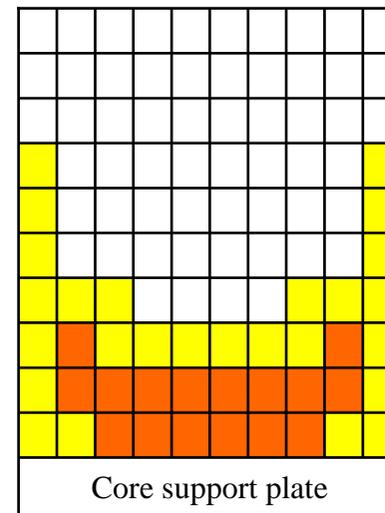
- Melting starts from the central part of the core.
- In 16 hours after scram (around March 12th 6:50), most part of the core fell down to the RPV bottom.
- Although RPV is damaged in this provisional analysis, the actual damage of RPV is considered to be limited according to the temperatures presently measured around the RPV.



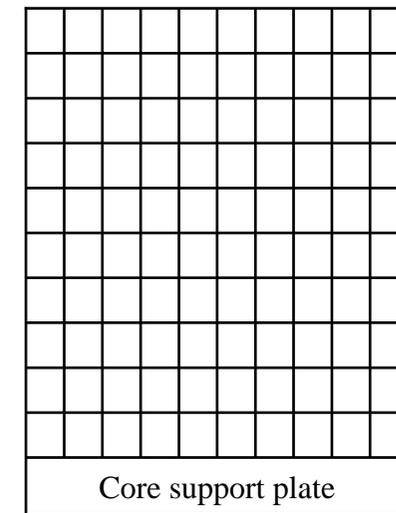
4.8 hours after scram  
(around March 11th 19:30)



5.1 hours after scram  
( around March 11th 19:50 )



15.1 hours after scram  
( around March 12th 6:00 )



**16.0** hours after **scram**  
( around March 12th 6:50 )

# Estimate based on the Actual Temperatures around RPV

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- **The temperatures around RPV are being measured by differently-located instruments and the indications of operable instruments show a similar trend or temperatures.**
- **Most part of heat generating materials (fuels) are considered to be submerged in the bottom of RPV and some part exposed.**
  - Fuel pellets melted in the early stages but water injection was subsequently performed into the reactor and each part of the temperature has been steadily decreased after March 23th when measurement was started.
  - Since the pressures of RPV and PCV fluctuate in accordance with water injection rate into the reactor, the core exists in the reactor and this is the influence of the generated steam therein.
  - RPV temperature is around 100 ~120 and the core is stably cooled.
  - Feedwater nozzle temperature is relatively high and this is considered to be the influence of the generated superheated steam from where some part of fuels are exposed in RPV.
- **Leak of cooling water from RPV is likely, but **significant damage to the RPV bottom is not likely.****
  - Significant increase of reactor water level is not confirmed although water injection has been continued.
  - Temperatures of upper and lower part of CRD housing and also RPV bottom can be measured and they are showing a similar tend of temperature.
- **Therefore, considering the above, the fuels are considered to be sufficiently cooled inside the RPV.**

# Unit 1: Temperatures around RPV (actual measurement value)

