

## FOUR MAJOR TECHNICAL ISSUES

Spent fuel cooling pond risk was underestimated

Tsunami risk was underestimated

Everything got flooded by the tsunami, so the cooling systems didn't work

There should have been a hydrogen flaring/ignition system

Emergency batteries had too small capacity

There was no 'last-ditch' source of cooling water.

There has to be diversity as well as redundancy

The instrumentation of the reactors and PCVs did not function

Policy on evacuation was changed during the accident

**KEY:-** WHITE – PRIOR RISK ESTIMATION  
ORANGE – ACCIDENT RESPONSE  
PALE BLUE – ENGINEERING DESIGN  
RED – OFF-SITE RESPONSE

Risk assessment is subject to uncertainty

Accident management measures hadn't been thought through

# Key lessons learned

(from Japanese Government report, June 2011)

The system for measuring radioactive discharges didn't work

Failures of the contaminated ventilation systems impaired recovery operations

The response teams were having to cope with multiple nuclear accidents at Fukushima

The main control room was temporarily made uninhabitable by rising radiation levels

Monitoring dose uptake became difficult because the equipment was damaged by seawater

Strong safety culture is essential

There was inadequate emergency training

The spent fuel ponds were located high up and were leaking contaminated water onto the recovery teams

Off-site infrastructure damage impeded accident response

Lack of clear responsibilities for public safety and poor legal structures

Communications, off-site support, and coordination were poor