

Fukushima accident

3 March 2016

1. Could an accident like the one at Japan's Fukushima NPP happen in Europe?

Located on the Eastern coast of Japan, the six nuclear power reactors at Fukushima Daiichi were hit by a massive earthquake (magnitude: 9.0 Mw) on 11 March followed by a large tsunami (10 to 15 meters) that washed over the reactor. After the earthquake, the reactors were automatically shut down as planned, but the tsunami was the main cause of the accident. European nuclear plant designs include consideration of significant natural events such as floods, storms, and earthquakes. It is important not to extrapolate earthquake and tsunami data from one location of the world to another when evaluating these potential external events. These events are very region and location-specific, based on the location of tectonic and geological fault lines. Existing seismic design criteria for European installations provide adequate protection given the identified seismic risks in Europe and the probability that an accident similar to the Fukushima one happens in Europe is very remote. Furthermore, the resilience of nuclear plants to this type of accidents has been rapidly improved since Fukushima by implementing the recommendations of the so-called "stress tests". For instance mobile equipment has been installed in order to compensate for the potential loss of destroyed equipment.

2. Are nuclear power plants prepared to face a blackout or the loss of the ultimate heat sink?

Nuclear power plants are designed to cope with a station blackout (loss of offsite power and loss of onsite emergency AC power) and plant operators are trained to ensure that the plant will achieve and maintain safe shutdown. They have operating procedures that guide them on the actions to be taken in responding to such a scenario. The training includes regular classroom work, as well as plant-specific simulator exercises. Each plant must have an ultimate heat sink capable of removing heat from the primary containment and other vital systems necessary to mitigate a worst case scenario. Usually, the ultimate heat sink is a large body of water such as a river, a lake or the sea. The safety of NPPs requires that certain features are redundant to avoid a complete loss of cooling system. The capacity of the sink should also be sufficient to provide cooling both for the period of time necessary to evaluate the situation and for the period of time needed to take corrective action.

3. How many reactors similar to Fukushima units are in operation in Europe?

Units 1 to 6 of Fukushima Daiichi NPP are boiling water reactors (BWRs) that came into operation between 1971 and 1979. The BWR is a type of light water reactor

used for the generation of electrical power. It is the second most common type of electricity-generating nuclear reactor after the pressurized water reactor (PWR), also a type of light water reactor. There are currently fourteen BWR reactors operating in Europe, but most of them do not have exactly the same design and/or containment structure as the Fukushima units.

4. Are European nuclear operators and public authorities prepared to face a similar natural disaster and simultaneously several nuclear accidents?

Nuclear operators are prepared to face any emergency situation under the supervision of the national regulatory body. To limit the impact of a nuclear accident, electric utilities, regional and national authorities and regulators have emergency response plans for every nuclear site, whatever the number of units. The operator must prepare an emergency response plan in order to bring the accident under control and limit its consequences, protect the nuclear workers and the local population, and inform the responsible authorities.

5. What has been the impact of the Fukushima accident on nuclear new build and license renewals in Europe?

The accident at the Fukushima Daiichi nuclear power plant was, unquestionably, a catastrophe that impacted upon the European nuclear industry. Fukushima triggered considerable [political reaction in certain European countries](#). Germany, for example, decided to phase-out its nuclear operations by 2022. In Italy, a referendum reversed the government's decision to revisit the nuclear option. The Swiss government submitted a Proposal to the Parliament not to replace its nuclear fleet once it comes to the end of its operational duration. The Parliament's final decision might be delayed until after the general elections in spring 2016.

However, in spite of these developments the momentum for nuclear new build has not been lost. Indeed, on-going new build projects in Finland, France and Slovakia have not been significantly affected. A total of 4 reactors are currently under construction. A further twenty three are planned including those, for example, in the UK, Finland, Romania, Bulgaria, Hungary, Czech Republic and Poland. In summary, the above announcements indicate that 14 EU Member States consider nuclear power to be a key component of their national energy mix and will still be operating nuclear power plants in the long-term.

Whilst Fukushima led to temporarily decreased public confidence in some countries and probably to extra short-term costs and some delays in nuclear new build programmes, none of these factors is considered to be decisive in terms of nuclear's contribution in the long-term except in two European countries, Germany and Italy. The inescapable benefits of nuclear power are expected to prevail when it comes to future energy choices.

6. What is your position regarding the risk and safety assessments ("stress tests") carried out at EU level?

The European nuclear industry supported the initiative launched by the European Commission (EC) and approved by the Council to introduce the safety assessments ("stress tests") in order to reassess the safety of operating NPPs. It took part on a voluntary basis in those tests. European nuclear operators carried out safety evaluations at each NPP and national safety authorities produced reports based on

those evaluations that went through a peer review process. Not a single nuclear power plant in Europe was recommended for closure as a result of this process, which testified to the high overall level of safety at Europe's nuclear installations. National regulators published national action plans (NACp) in order to implement the recommendations of the safety assessments including the addition of equipment to compensate for the loss of all electrical power and the loss of the ultimate heat sink for cooling, the installation or improvement of on-site seismic instruments and the availability of a backup emergency control room. The action plans were peer-reviewed by [ENSREG](#) (European Nuclear Safety Regulators' Group) and every country is obliged to update its original NACp to reflect developments since its issue and the current status of the measures and their implementation. "Stress tests" were also made outside of Europe in the US, Japan and in neighbouring countries: Armenia, Belarus, Croatia, Russia, Switzerland, Turkey and Ukraine.

7. Is this accident as serious as Chernobyl?

The events at Fukushima Daiichi NPP were rated by the Japanese authorities Level 7 and the events at Fukushima Daini Level 3 on the International Nuclear and Radiological Event Scale (INES). INES defines Level 3 as a "Serious Incident" and Level 7 is the most serious level on INES and is used to describe an event comprised of "A major release of radioactive material with widespread health and environmental effects requiring implementation of planned and extended countermeasures".

[The French IRSN](#) (Institute of Radioprotection and Nuclear Safety), in a report published in March 2012, estimated that the "radiological equivalent" of the radiation released by the Fukushima accident is "about 10% of the corresponding equivalent of Chernobyl". As far as the contaminated area is concerned, the IRSN concludes that the total area that has been contaminated by Fukushima corresponds to about 5% of the area contaminated after Chernobyl. In addition, there were no confirmed casualties due to radiation exposure resulting from the Fukushima accident, while the total deaths reliably attributable to the radiation produced by the Chernobyl accident stands at 62 according to the United Nations Scientific Committee on the Effects of Atomic Radiation ([UNSCEAR](#)) 2008 report.

8. What is the potential health impact of the Fukushima accident?

According to [the UNSCEAR report](#) published in 2014, the doses to the general public, both those incurred during the first year and estimated for their lifetimes, are generally low or very low. No discernible increased incidence of radiation-related health effects are expected among exposed members of the public or their descendants. The most important health effect is on mental and social well-being, related to the enormous impact of the earthquake, tsunami and nuclear accident, and the fear and stigma related to the perceived risk of exposure to ionizing radiation.

9. What impact has the Fukushima accident had on public opinion in Europe?

The Fukushima accident has had an impact on public opinion. However, though it is very difficult to assess this impact in the long-term, it can already be said that the results of opinion polls carried out throughout Europe after the event show that it is very country specific. In some countries, like Germany and Switzerland, opposition to nuclear has risen sharply, while in others where new build plans are under way, like

the United Kingdom (UK) or France, a majority of the population still backs the use of nuclear power. The opinion poll carried out by Ipsos MORI in May 2011 shows that in nine (Belgium, France, Germany, UK, Hungary, Italy, Poland, Spain and Sweden) out of the 27 Member States less than one fifth of those opposed to nuclear have been influenced by the accident. Furthermore, in a number of countries like the UK, the Netherlands, Spain, Switzerland and France, after a dip just after the accident, public acceptance of nuclear has improved.

10. What lessons can be learned from this accident by the European nuclear industry?

The European nuclear industry, the safety authorities and other expert organisations in Europe and around the world have conducted detailed reviews of the accident, and identified lessons to be learned (both in terms of plant operation and design). The nuclear industry is currently incorporating those lessons learned into the design and operation of European nuclear power plants. Yukiya Amano, Director General of the IAEA said in March 2015: *“I am pleased to note that IAEA Operational Safety Review (OSART) missions have observed significant improvements in a number of Member States in enhancing the ability of nuclear power plants to withstand severe accidents.”* [An OECD/Nuclear Energy Agency \(NEA\)](#) report published in February 2016 also stresses: *“NEA member countries (including 22 EU member states) have continued to take appropriate actions to maintain and enhance the level of safety at their nuclear facilities, and thus nuclear power plants are safer now because of actions taken since the accident.”*

11. Nuclear opponents are calling for a nuclear phase-out: what is your opinion?

Nuclear opponents' position is driven by ideology and they have exploited the accident as a pretext to promote their views by triggering people's fears. The European nuclear industry believes that nuclear energy has been, and will continue to be, a key element in meeting the EU's energy needs, CO₂ reduction targets and competitiveness objectives. [The role of nuclear power](#) must be debated in an objective and non-ideological way that engages all stakeholders.