

The 11th of March 2022

WENRA's position on the consequences of a total loss of power supply at the Chernobyl site

On 9 March 2022, the Ukrainian Nuclear Safety Authority (SNRIU) informed the IAEA of the loss of external power supplies to all the facilities in the Chernobyl exclusion zone. Given the situation, WENRA conducted an assessment of the risk resulting from a total loss of both external power supply and emergency diesel generators at the Chernobyl site. This assessment is based on the work conducted by experts from WENRA¹, HERCA² and the EC³.

As expected, with the loss of off-site power, the site's emergency diesel generators immediately provided the power supply to the safety systems, with diesel fuel supplies for 48 hours.

As a result of the technical experts work, and in the light of information currently available, WENRA considers that a total loss of power supply at the Chernobyl site would not have significant safety impact, in particular outside the facilities. It may lead to a risk of increased localised environmental contamination, but only in the vicinity of facilities and could possibly restrict access and the activities of operators.

WENRA believes that attention is needed to issues that are detrimental to safety assurance in the short and long term, such as the loss of automatic radiation monitoring and other physical parameters, and the absence of power to the installed building ventilation in the confinement structure, noting also the difficult and stressful working conditions of operators.

Noting that the nuclear facilities in the Chernobyl exclusion zone comprise the following nuclear installations:

- a nuclear power plant, with one unit (number 4) damaged in 1986, placed in a safe confinement structure and three units (number 1 to 3) being dismantled;
- a wet spent nuclear fuel storage facility (ISF-1);
- a dry spent nuclear fuel storage facility (ISF-2);
- various waste management facilities including storages and surface disposal facilities located on different sites in the exclusion zone.

¹ Western European Nuclear Regulators' Association

² Association of the Heads of the European Radiological protection Competent Authorities

³ European Commission

WENRA's conclusion is based on the following technical analysis:

1. The three units being dismantled do not contain nuclear fuel anymore. The latter was transferred more than 20 years ago to ISF-1. Since these units do not need to be cooled, there are no expected risks of release.
2. The wet spent nuclear fuel storage facility ISF-1 contains approximately 20 000 spent fuel assemblies which are to be transferred to ISF-2. As a follow-up of the accident at the Fukushima Daiichi power plant, studies conducted on the consequences of a total loss of active cooling in the pool showed a slow rise in temperature of the ISF-1 pool water up to about 60 °C.
3. The installation is ventilated to avoid the accumulation of hydrogen produced by the radiolysis of the pool water. In case of loss of active ventilation, the risk of explosion is very low, given the activity level of the aged spent fuel assemblies and the very slow kinetics of hydrogen production. Moreover, this risk can be mitigated by ventilating the building by opening the doors.
4. The dry spent fuel storage facility ISF-2, which is a modern and passively cooled facility, contains about 2 000 assemblies. This installation would not be affected by the loss of electrical power and does not present a risk since the cooling of the fuel assemblies is completely passive.
5. Reactor No. 4, which was damaged in 1986, is covered by a safe confinement, the ventilation of which is backed up by two dedicated generators. In the event of a total loss of power, the static containment of the structure would prevent any release in the environment.
6. Likewise, the static containment of the various radioactive waste facilities would prevent any radiological release.