

INFORMATION REPORT

Situation of nuclear facilities in Ukraine

Date: 01/03/2022

Note: This information report has been published in French on February 25, 2022.

Nuclear facilities in Ukraine

Ukraine has fifteen power reactors currently in operation. These are Russian-designed VVER reactors of two different technologies, of 440 and 1000 MWe respectively. VVERs are pressurized water reactors.

According to information available on the websites of the operator and the Ukrainian safety authority, some reactors are shut down, others are in production. No particular difficulty has been reported for these reactors.

The reactors at the Chernobyl site were shut down after the 1986 disaster. Reactor No. 4, which was damaged, was first covered just after the accident by a temporary sarcophagus. Uncertainties about the structural strength of this sarcophagus led to the construction of a containment arch completed in 2017 (a structure of 250 meters wide and 160 meters long, for a height of 100 meters). The temporary sarcophagus is being dismantled.

In addition, all the fuel assemblies used by the site's reactors (i.e. about 20,000 assemblies) are stored in a storing pool (ISF-1). They are in the process of being transferred to a new dry storage facility (ISF-2). To date, about 2,000 assemblies have been transferred from ISF-1 to ISF-2.

The site also includes waste storage facilities, for the waste produced during the normal operations of the reactors until 2000 and for the waste resulting from the 1986 accident. Currently, more than 20,000 m³ of solid and liquid wastes are stored on site, most of which are liquid wastes requiring further treatment. There is also a waste storage in the exclusion zone around the site.

Studies carried out after the Fukushima Daiichi accident on the consequences of a total loss of cooling of the storing pool show a slow rise in temperature of the pool water to a temperature of about 60°C but no dewatering of the assemblies.



In the event of a loss of the power grid in Ukraine, the operating reactors have backup power sources that would allow them to remain in a safe state. These back-up resources have been strengthened following the accident at the Fukushima Daiichi plant.

Radioactivity measurement networks under surveillance

As part of its duties under the Environmental Code, IRSN carries out permanent radiological monitoring of the national territory to detect any abnormal rise in radioactivity levels and to inform the authorities and the population. This monitoring is based on automatic air and water radioactivity measurement networks deployed throughout France, as well as on a network of samplers (nuclear operators, public organizations, local authorities, and associations).

Air radioactivity is monitored by the Téléray network, which has more than 440 stations deployed in metropolitan France and overseas, each transmitting a measurement of ambient dose rate every 10 minutes. Its data are accessible in real time via the website <https://teleray.irsn.fr> or the applications available on iPhone and Android.

IRSN OPERA-Air network, consisting of 50 air sampling stations in metropolitan France, allows the analysis of airborne particles at very low levels of radioactivity, of the order of a few mBq/m³ of air for ¹³⁷Cs, or even a few nBq/m³ for its very high-capacity stations.

IRSN data are also transmitted, like those of its European counterparts, to the EURDEP network (EUropean Radiological Data Exchange Platform - <https://remap.jrc.ec.europa.eu/Simple.aspx>). This network presents dose equivalent rate data in the European Union and certain non-EU countries that voluntarily transmit their data.

In addition, exchanges are taking place between the Institute and its European partners on the concentration levels of radionuclides present in the form of airborne particles.

An increase of the radiological atmosphere around the Chernobyl site was reportedly observed on the stations near the installations. The Ukrainian safety authority mentions a resuspension of contamination by the passage of military tanks. IRSN does not have any information to confirm or refute this information. It is advisable to remain very cautious about these measurements at this stage. No increase in radioactivity has been detected in the European countries with which IRSN is in contact.