

Information note n ° 3

Fires in Ukraine in the exclusion zone and around the Chernobyl power plant:

Point position

Since the release of our previous information notes on April 7 and 15, 2020, fires in Ukraine, which had been announced extinguished on April 15, 2020, have been reactivated by strong and gusty winds that have fueled previous fire embers.

This current note describes the evolution of the fires compared to the situation presented in the note of April 15, 2020 with an update of the modeling of the trajectories of the air masses contaminated by the fires and specifies some elements relating to the nuclear installations on the Chernobyl power plant site.

1 / Current situation as of April 17, 2020

Since April 15, 2020, date on which no more fires were visible on satellite images, strong winds in the region have led to reactivate smoldering fires.

The satellite images (Figure 1) of April 17, 2020 at 8:24 am (UTC¹) show:

- A very large fire cluster located approximately 70 km west of the Chernobyl power plant and which spread 25 km west. Assuming that this area is entirely under the influence of fires, it represents a total area of ca. 220 km² (22,000 ha);
- Another major source of fire in an area at about 30 km west of the Chernobyl power plant, at the edge of the exclusion zone;
- Two smaller fire places in the exclusion zone, very close to the power plant (approximately 2 km).

A few other significant fires have been identified more than a hundred kilometers west of the power plant. It should be noted that this situation is evolving rapidly. Some sources announce the extinction of the fires. According to the IRSN, the assumption of a definitive control of fires should be considered cautiously.

Several media report a very degraded air quality in Kiev due to smoke from fires, ash raised by wind to which are added soil dust resuspended by strong winds.

¹ Universal Time Coordinated

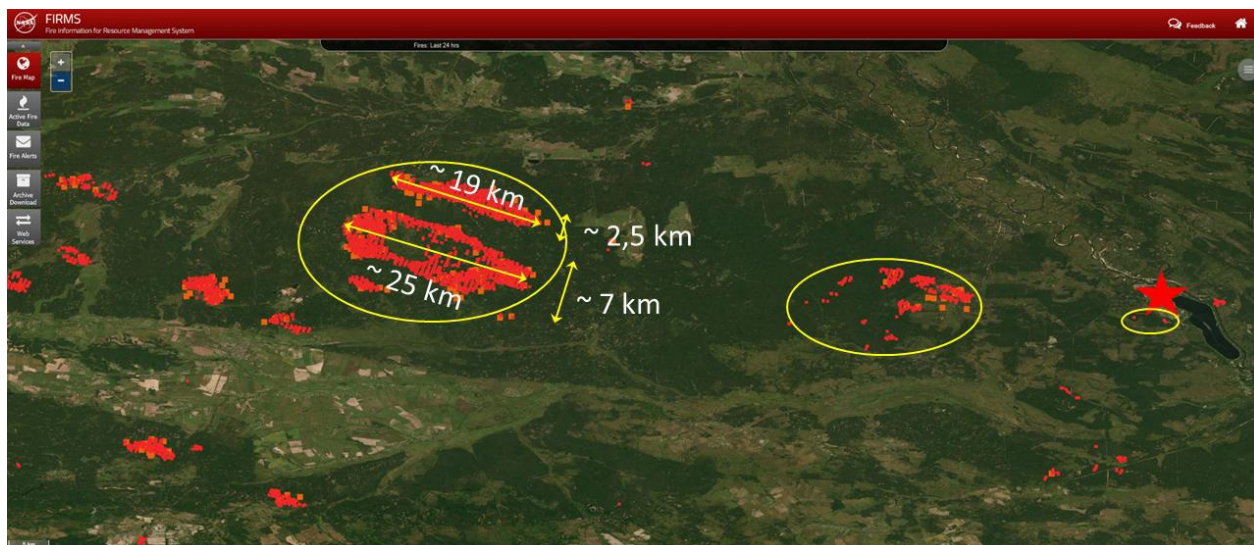


Figure 1: Map of fire spots on April 17, 2020 at 8:24 a.m. (UTC) (source: NASA / FIRMS). The Chernobyl power plant is marked with a red star.

2 / Available measurements

Some new measurements have been published by the Ukrainian authorities. They show no significant change in the radioactive marking of air masses by these fires compared to the data presented in the note of April 15, 2020.

3 / Modelling

IRSN continued to simulate the transport of air masses between April 14 and 20, 2020 (assuming that the fires would have continued and taking into account the weather forecast). This simulation was carried out on the assumption that the average radioactive releases, which occurred between April 3 and 14², continued from April 14 to 20.

The video³ of the air mass dispersion simulation between April 4 and April 20 is available on the IRSN website.

In the coming days, weather forecasts show that the air masses will be directed towards the East-South-East. This weather pattern would remain broadly stable until April 20, 2020.

4 / Dosimetric impact

The current development of these fires does not change, the order of magnitude of the dosimetric assessments made by IRSN in its previous note (April 15, 2020). Considering the studied scenarios, they remain low to extremely low whether close to the fire or in Kiev.

² Considering the available results.

³ https://www.irsn.fr/EN/newsroom/News/Pages/20200420_Fires-in-Ukraine-in-the-Exclusion-Zone-around-chernobyl.aspx

As well, the estimate of the impact resulting from the inhalation of radioactivity carried by air masses arriving in France remains unchanged and without health consequences.

5 / Risk for the storage facilities

IRSN would like to provide some details below on the risks for the Chernobyl nuclear facilities compared to its note of April 15, 2020.

First, the note erroneously indicates that the spent fuel removed from reactors 1 to 3 is stored in a new dry storage facility, ISF-2. This installation is intended to store all of the irradiated fuels present on the site in the future but has not yet been commissioned. At present and since 2016, spent fuel from reactors 1 to 3 has been stored in a centralized swimming pool on the site, called ISF-1 (put into operation in 1986). The beginning of their transfer to the ISF-2 dry storage facility is scheduled in 2020 and is expected to take several years.

From the point of view of nuclear installations vulnerability to fire risks, the following points are worth clarifying:

Globally, the actions taken to protect nuclear installations from forest fire scenarios consist first of all in the development of a deforested area around them, so as to limit direct thermal effects and not to question their safety. Provisions of this nature are *a priori* applied on the Chernobyl site.

Additionally, forest fires can generate smoke and incandescent particles which can reach facilities. The latter phenomenon is however limited to a distance greater than a few hundred meters and organizational measures are generally defined to manage such a situation, including stopping the building ventilations and monitoring the surroundings of installations (removal or protection of flammable materials, treatment of possible fire starts...).

If the aforementioned general protection provisions are applied, the main risk associated with forest fires is the loss of electrical power, for example if the power lines located outside the nuclear site are damaged.

The scenario of total loss of electrical power supplies was the subject, in 2011, of a particular analysis within the framework of "stress tests" carried out in Europe and in Ukraine⁴ after the Fukushima Daiichi. This analysis indicates that in the absence of cooling of the ISF-1 installation swimming pool, the water temperature of this installation would gradually increase up to sixty degrees Celsius. This is not likely to jeopardize the installation safety (maintenance of a sufficient volume of water and an acceptable temperature of fuels).

For other recent on-site storage facilities, for radioactive materials and the sarcophagus of Unit 4, the total losses of electrical power which could be linked, for example, to fires in progress, are part of the risks which have been taken into account by safety studies prior to their design.

There are no new elements, compared to those of the note of April 15, 2020, concerning the warehousing and storage facilities for waste located in the exclusion zone, outside the site of the Chernobyl power plant.

⁴ STATE NUCLEAR REGULATORY INSPECTORATE OF UKRAINE NATIONAL REPORT ON STRESS TEST RESULTS - <http://www.ensreg.eu/EU-Stress-Tests/Country-Specific-Reports/EU-Neighbouring-Countries/Ukraine>.