Гомельский государственный университет имени Франциска Скорины

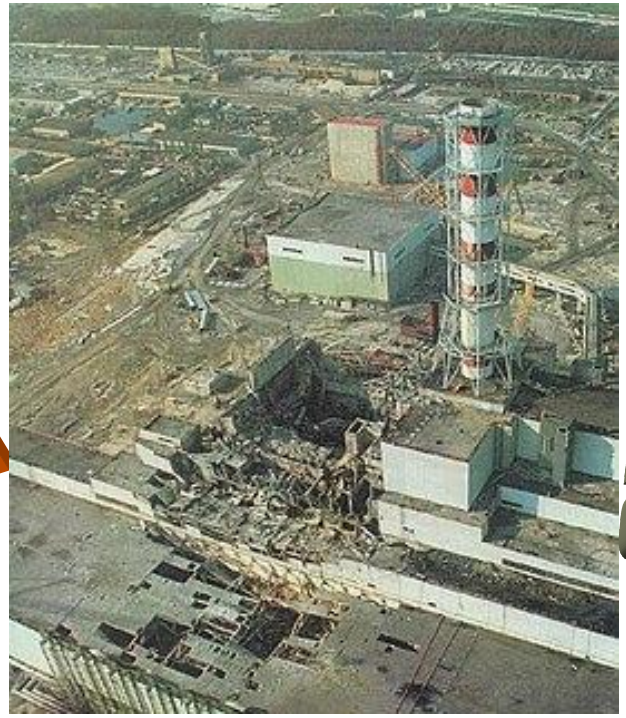
Студенческая газета кафедры межкультурных коммуникаций и международного туризма

Meridian*

№ 2 апрель - май 2021 г.

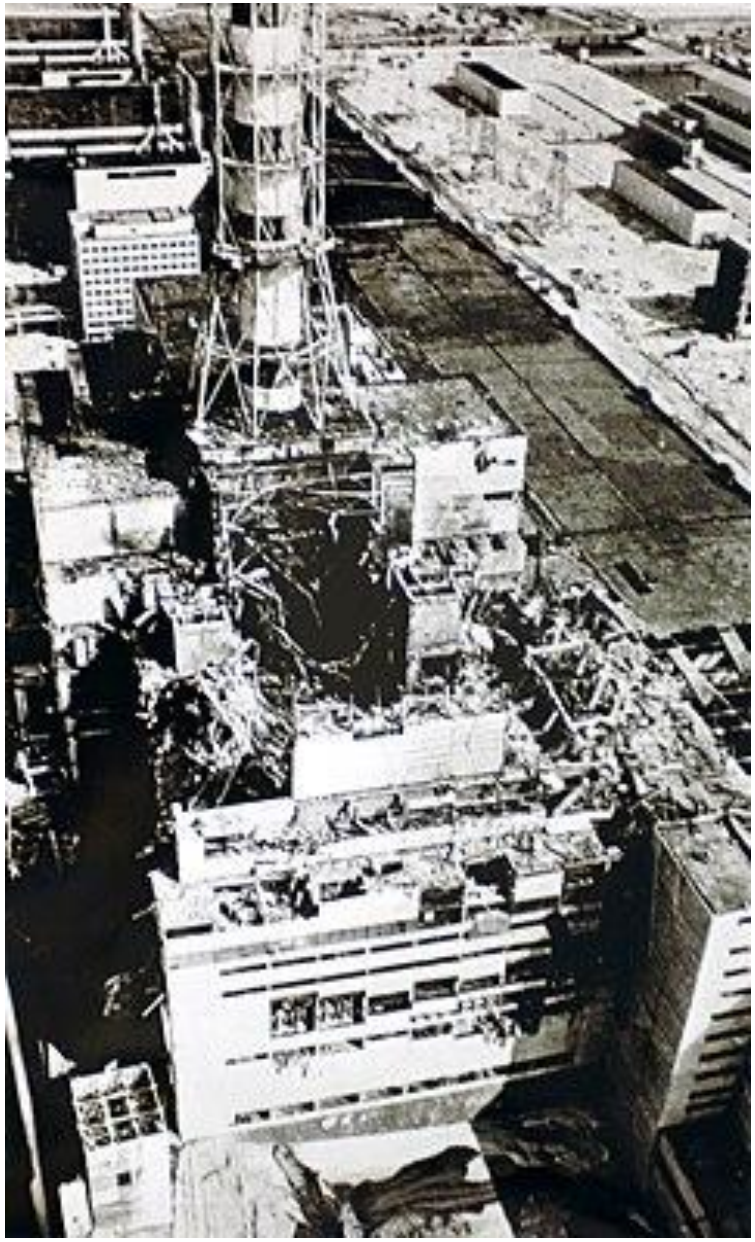
Кафедра обеспечивает преподавание дисциплины «Английский язык» на геолого-географическом факультете. Каждый выпуск студенческой газеты подготавливается преподавателями, студентами и магистрантами факультета и представляет обзор событий и новостей в сфере геологии и геоэкологии

35 лет



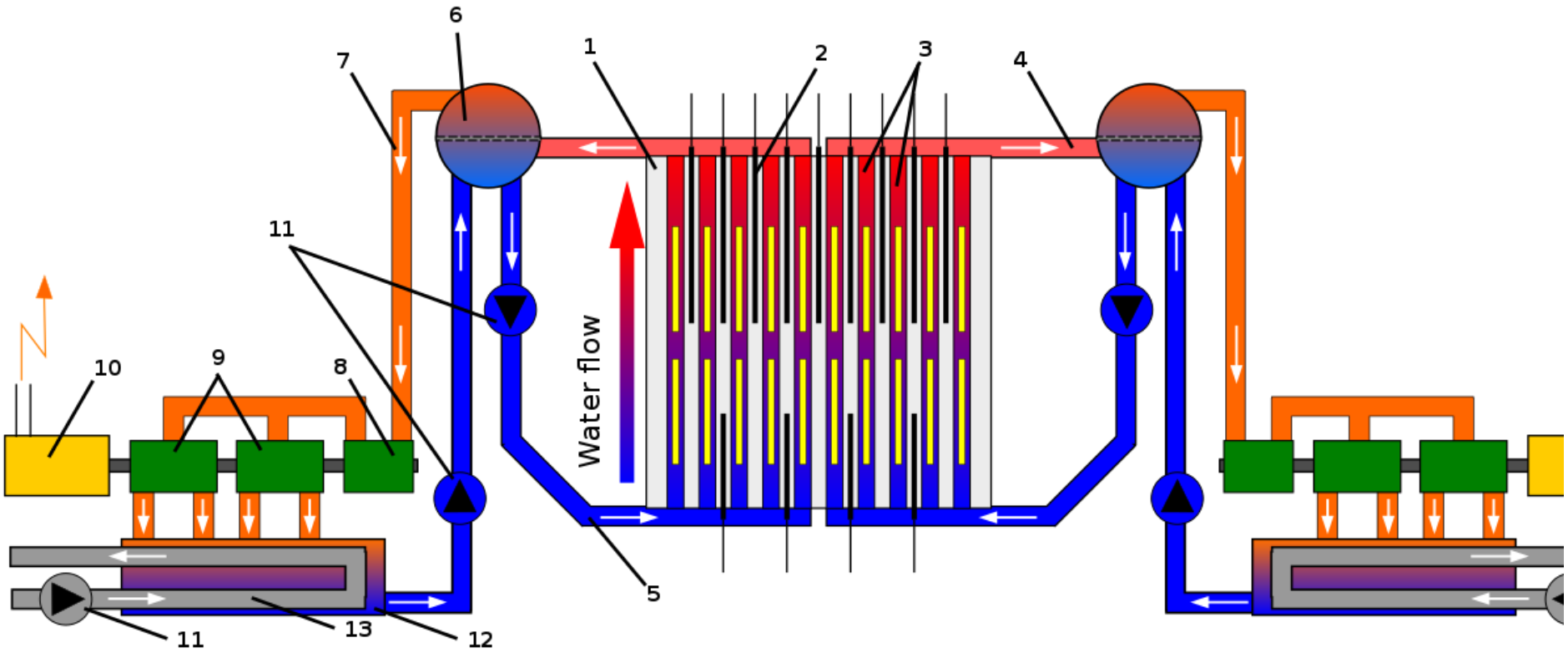
аварии на ЧАЭС

* (рус. яз.) меридиан, зенит, расцвет, полдень, высшая точка



The Chernobyl disaster was a nuclear accident that occurred on Saturday 26 April 1986, at the No. 4 reactor in the Chernobyl Nuclear Power Plant, near the city of Pripyat in the north of the Ukrainian SSR. It is considered the worst nuclear disaster in history both in terms of cost and casualties, and is one of only two nuclear energy accidents rated at seven – the maximum severity – on the International Nuclear Event Scale, the other being the 2011 Fukushima Daiichi nuclear disaster in Japan. The initial emergency response, together with later decontamination of the environment, ultimately involved more than 500,000 personnel and cost an estimated 18 billion Soviet rubles – roughly US$68 billion in 2019, adjusted for inflation.

The accident started during a safety test on an RBMK-type nuclear reactor. The test was a simulation of an electrical power outage to help create a safety procedure for maintaining reactor cooling water circulation until the back-up electrical generators could provide power. Three such tests had been conducted since 1982, but they had failed to provide a solution. On this fourth attempt, an unexpected 10-hour delay meant that an unprepared operating shift was on duty. During the planned decrease of reactor power in preparation for the electrical test, the power unexpectedly dropped to a near-zero level. The operators were able to only partially restore the specified test power, which put the reactor in an unstable condition.
This risk was not made evident in the operating instructions, so the operators proceeded with the electrical test. Upon test completion, the operators triggered a reactor shutdown, but a combination of unstable conditions and reactor design flaws caused an uncontrolled nuclear chain reaction instead.
A large amount of energy was suddenly released, and two explosions ruptured the reactor core and destroyed the reactor building. One was a highly destructive steam explosion from the vaporising superheated cooling water; the other explosion could have been another steam explosion or a small nuclear explosion, akin to a nuclear fizzle.



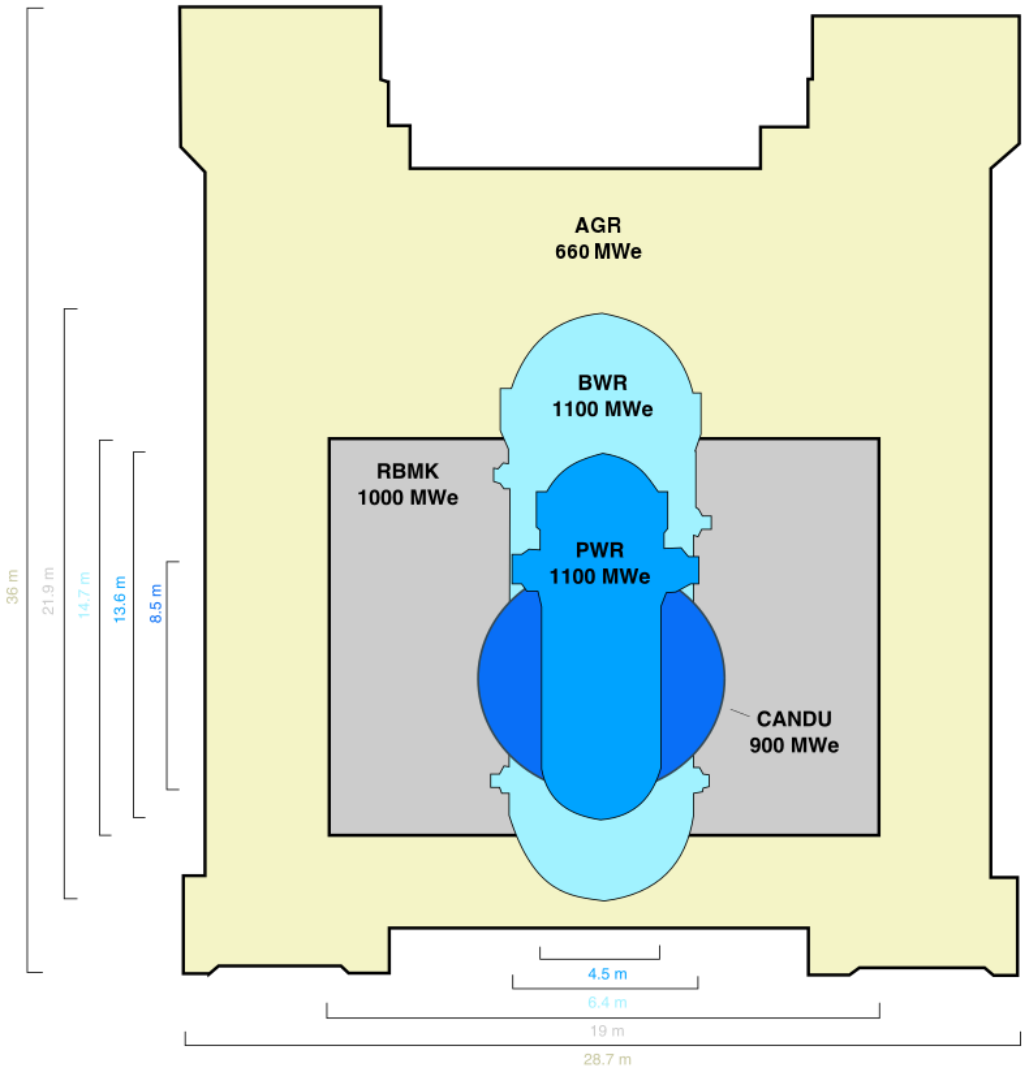
Legend :

1. Graphite moderated reactor core
2. Control rods
3. Pressure channels with fuel rods
4. Water/steam mixture
5. Water
6. Water/steam separator
7. Steam inlet
8. High-pressure steam turbine
9. Low-pressure steam turbine
10. Generator
11. Pump
12. Steam condenser
13. Cooling water (from river, sea, etc.)

Process flow diagram of the reactor

This was immediately followed by an open-air reactor core fire that released considerable airborne radioactive contamination for about nine days that precipitated onto parts of the USSR and western Europe, especially Belarus, 16 km away, where around 70% landed, before being finally contained on 4 May 1986. The fire gradually released about the same amount of contamination as the initial explosion. As a result of rising ambient radiation levels off-site, a 10-kilometre (6.2 mi) radius exclusion zone was created 36 hours after the accident. About 49,000 people were evacuated from the area, primarily from Pripyat. The exclusion zone was later increased to 30 kilometres (19 mi) radius when a further 68,000 people were evacuated from the wider area.

The reactor explosion killed two of the reactor operating staff. A massive emergency operation to put out the fire, stabilize the reactor, and cleanup the ejected nuclear core began. In the disaster and immediate response, 134 station staff and firemen were hospitalized with acute radiation syndrome due to absorbing high doses of ionizing radiation. Of these 134 people, 28 died in the days to months afterward and approximately 14 suspected radiation-induced cancer deaths followed within the next 10 years. Significant cleanup operations were taken in the exclusion zone to deal with local fallout, and the exclusion zone was made permanent.



Comparative Generation II reactor vessels size comparison, a design classification of commercial reactors built until the end of the 1990s.

Among the wider population, an excess of 15 childhood thyroid cancer deaths were documented as of 2011. The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) has, at multiple times, reviewed all the published research on the incident and found that at present, fewer than 100 documented deaths are likely to be attributable to increased exposure to radiation. Determining the total eventual number of exposure related deaths is uncertain based on the linear no-threshold model, a contested statistical model, which has also been used in estimates of low level radon and air pollution exposure. Model predictions with the greatest confidence values of the eventual total death toll in the decades ahead from Chernobyl releases vary, from 4,000 fatalities when solely assessing the three most contaminated former Soviet states, to about 9,000 to 16,000 fatalities when assessing the total continent of Europe. To reduce the spread of radioactive contamination from the wreckage and protect it from weathering, the protective Chernobyl Nuclear Power Plant sarcophagus was built by December 1986. It also provided radiological protection for the crews of the undamaged reactors at the site, which continued operating. Due to the continued deterioration of the sarcophagus, it was further enclosed in 2017 by the Chernobyl New Safe Confinement, a larger enclosure that allows the removal of both the sarcophagus and the reactor debris, while containing the radioactive hazard. Nuclear clean-up is scheduled for completion in 2065.

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