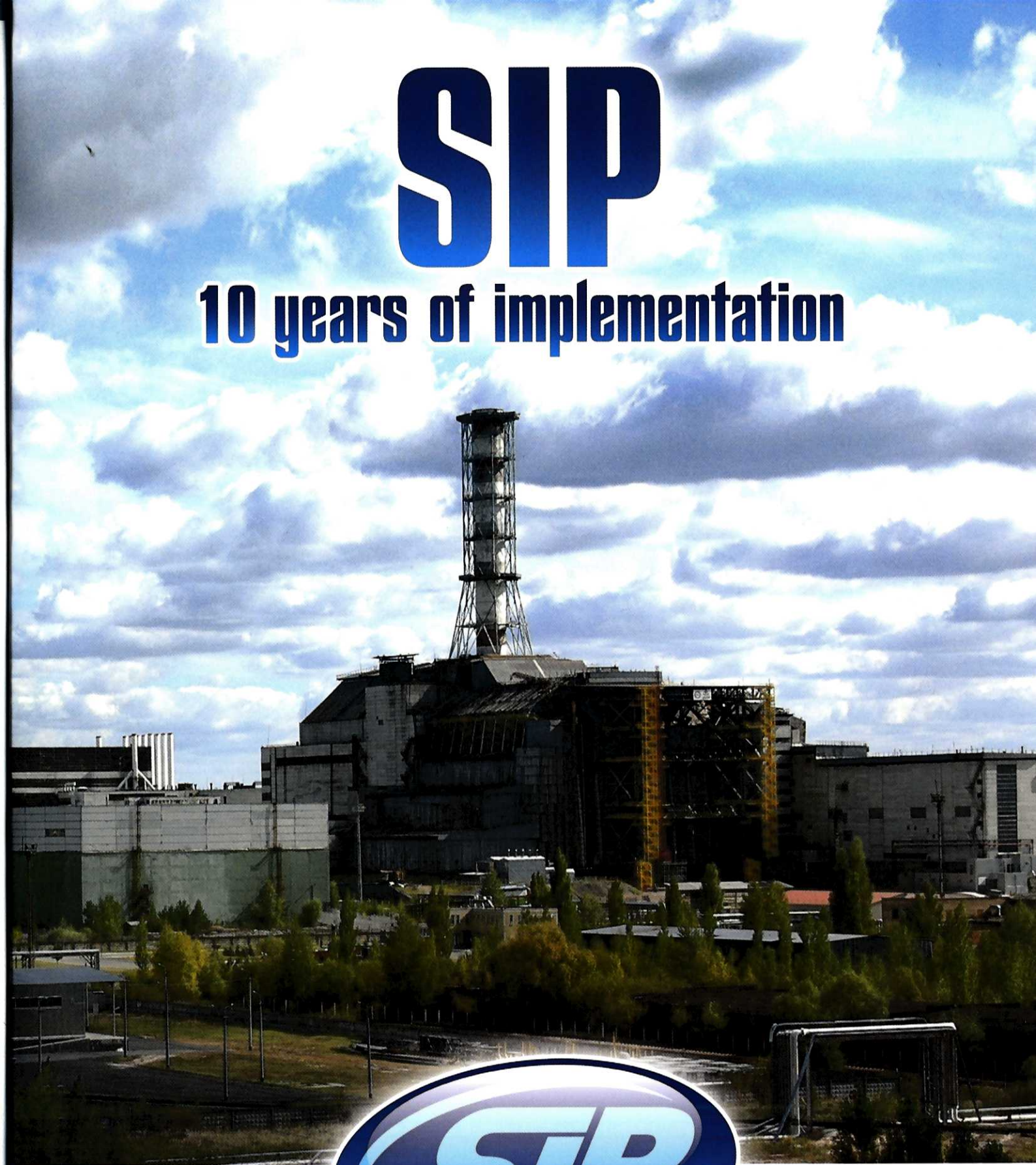
SIP

10 years of implementation



Accident at ChNPP Unit 4 and Construction of Object Shelter

On 26 April 1986 year, at 1.23.49 am Moscow time an accident occurred at the ChNPP Unit 4. The accident was the severest one in the entire history of the nuclear power industry. The reactor core and all safety barriers and systems wre completely destroyed and the majority of the core bearing structures were damaged.

The reactor immediately started releasing radiation to the environment and the adjoing territory was contaminated by active core fragments consisting of pieces of fuel rods, graphite, and contaminated structural elements. Extremely high levels of radiation releases, several million curies per day, occurred from the time of the accident until 06 May 1986. Releases then decreased greatly, by a factor of several thousand.

The first dose values measured around the destroyed Unit and throughout the ChNPP territory were startling. Close to the Unit the gamma-exposure rate, primarily a result of direct exposue from the reactor, reached 2000 R/hour. Dose rates in the reactor exceeded 5000 R/hour.

The nature of the processes going on during the destruction of Unit 4 and the severity of the accident consequences resulted in the accident being characterized as a beyond- design-basis accident, and was referred to as a level 7 (severe accident) by INES rating - international scale of nuclear events.

In the middle of May 1986 a Governmental Commission made a decision for long-term mothballing of the destroyed Unit 4. The implementation of this task was complicated by the extremely high gamma-radiation fields, the absence of reliable information about the degree of destruction of Unit 4, and the absence of international experience for the elimination of such accidents.

The design of a protective sarcophagus ("Shelter") was started on 20 May 1986. The construction of the sarcophagus began in June and continued for 206 days through November 1986. Partitions and walls were constructed to separate the destroyed Unit 4 from Unit 3. Along the Unit 4 perimeter the reinforced concrete walls, called "pioneer walls," were constructed first. These served as the original biological shielding and facilitated the subsequent construction and installation activities for Object Shelter erection

The Northern Buttress Wall was made of concrete in the form of cascades up to 12 meters in height. The cascade scaffolding was made of steel shields. Each subsequent cascade was made as close as possible to the destroyed Unit. The cascades were filled with worn and damaged metal structures and also with containers filled with high-level waste. The undamaged western wall was shielded from the outside by a wall with counterforces up to 50 meters heigh. The Central Hall was covered by 27 pipes of 1220mm diameter.

Simultaneously with the "Shelter" construction a huge scope of works on decontamination of the area around the facility and on the roof was implemented in order to greatly decrease the exposure dose rate (EDR) outside Object Shelter rooms

The number of construction workers directly involved into the construction of the Sheltr was about 90 thousand. During 1986 -1987, when the radiation exposure was the highest, the total number of people working in the Chernobyl region was about 200 thousand..

On 30 November 1986 the State Acceptance Commission accepted the mothballed Unit 4 of Chernobyl NPP for maintenance.

First days after the accident

"Sarcophagus" construction