

TO THE 30-th ANNIVERSARY OF SHELTER
CONSTRUCTION AND OPERATION

**30 YEARS OF SHELTER
YEARS OF FEAT**



State Specialized Enterprise Chornobyl NPP



By the end of 1983, the construction of ChNPP Generation II Unit 4 had been completed.



Operation...



1:23:04 – testing start...

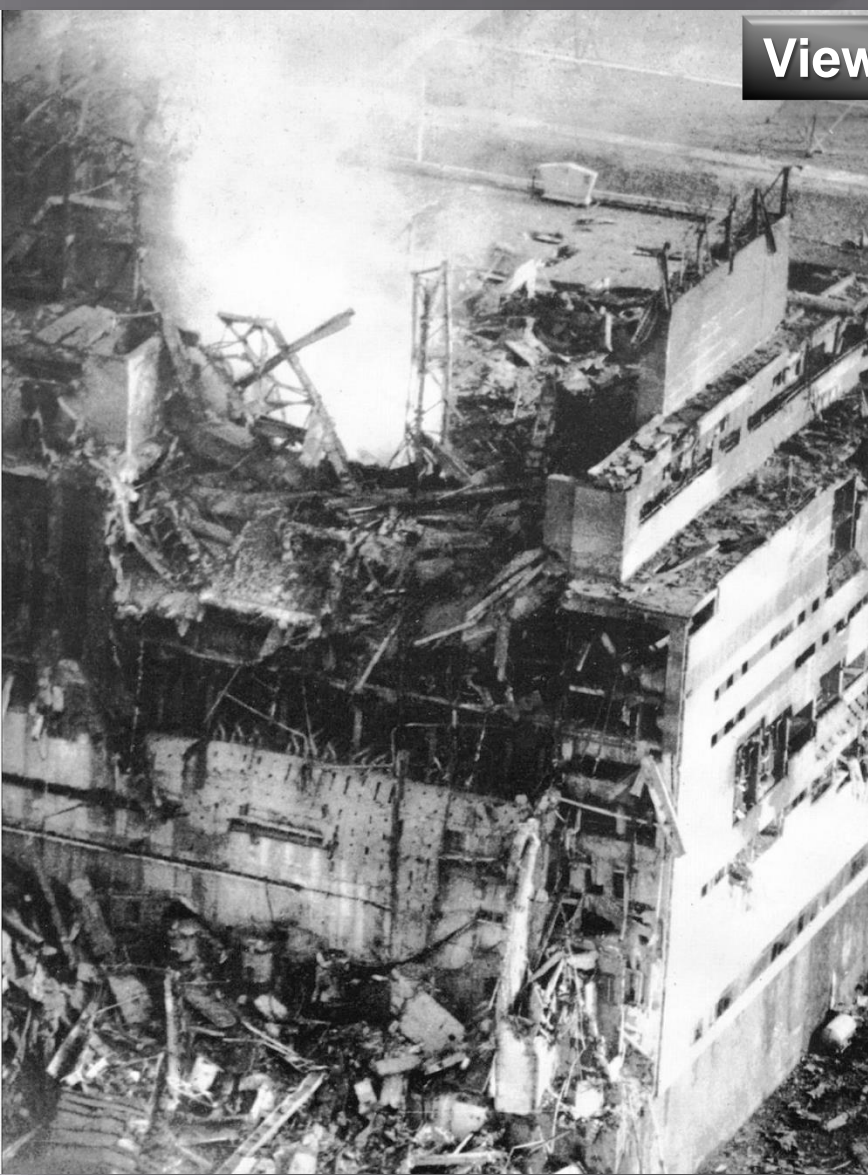


Till 1:23:47—1:23:50, the reactor was completely destroyed.

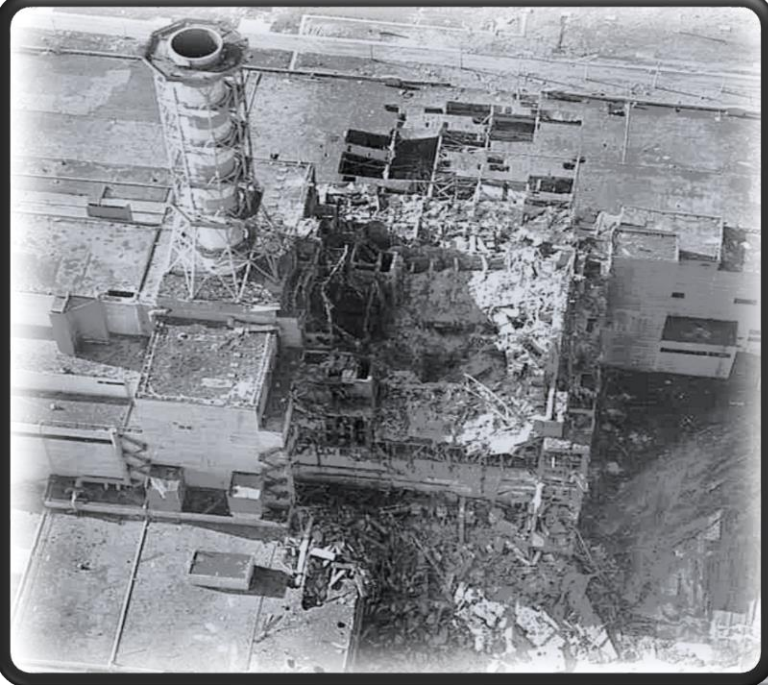
The clock in one of Unit 4 premises stopped at the instant of explosion.



View of Unit 4



The first days after the explosion. The plumes of smoke and steam from the burning remains of reactor core are clearly visible over the wreck



**Turbine Hall
(Block "Г")**

**Deaerator Stack
(Block "Д")**

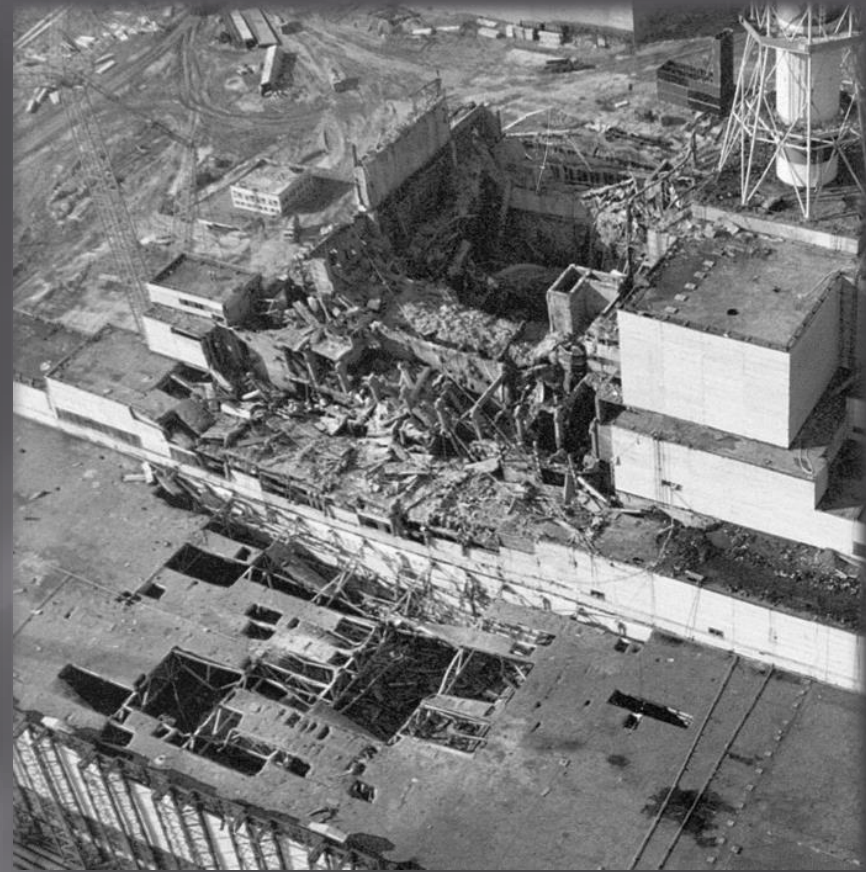
**Reactor compartment
(Unit "Б")**

Bladder type building of ECCS


Block "RCAS"



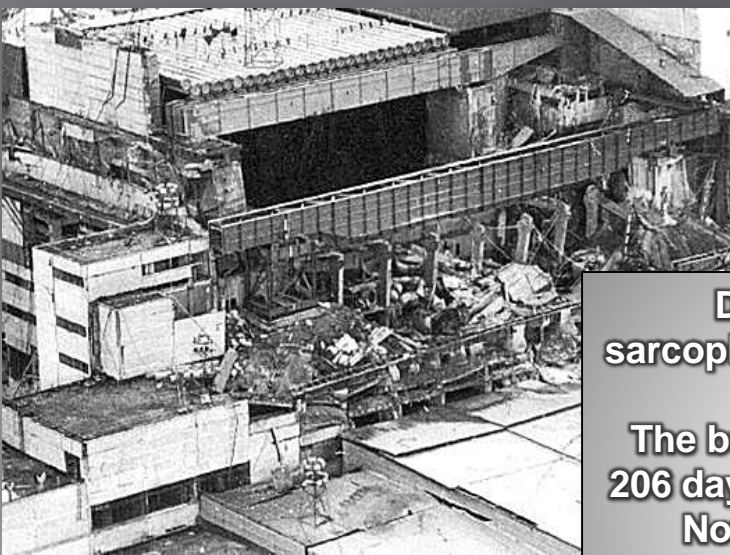
**WERE
DESTROYED**



It became necessary to isolate the destroyed power unit for a long period to reduce its environmental impact



In the middle of May 1986, Government Committee made a decision on a long-term preservation of the damaged power unit 4, in order to prevent the radionuclide emission into the environment and to reduce the exposure level within the industrial site of Chornobyl NPP



Designing a protective sarcophagus ("Shelter") started on May 20, 1986.

The building activities lasted for 206 days and nights from June till November 1986. About 90 thousand builders only were directly involved in this work; but about 200 thousand people worked in the entire Exclusion Zone .



В Правительственную Комиссию
II октября 1986г

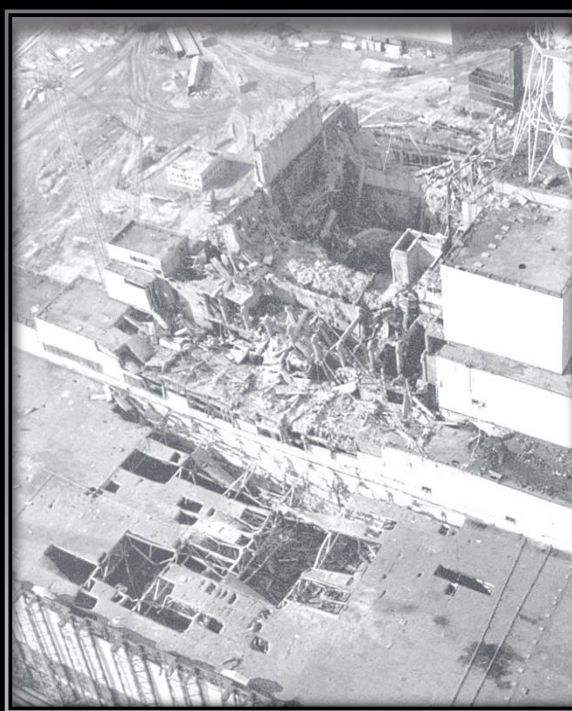
Заключение
о надежности и долговечности конструкций покрытия,
а также радиационной безопасности
реакторного отделения блока № 4 Чернобыльской АЭС

Shelter or "sarcophagus"
as it is often called in the
world

..Учитывая низкую скорость коррозии в условиях работы конструкций,
при выполненных защитных покрытиях
можно считать обеспеченным срок службы их:

- из труб 30 - 40 лет,
- из балок 30 лет.

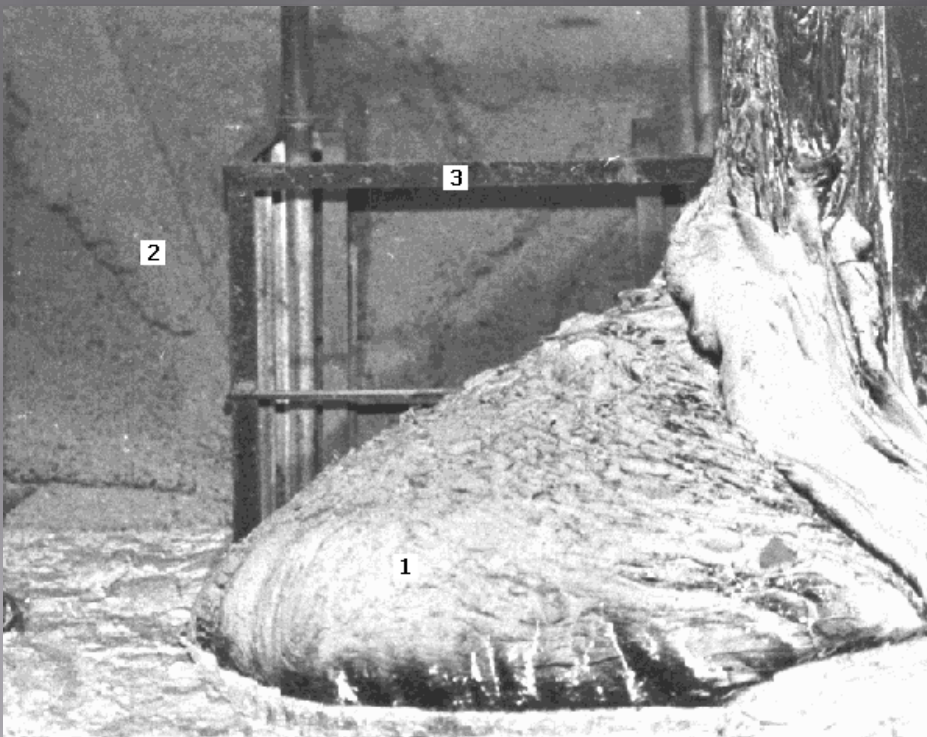
! Creation of Shelter protected the environment from radioactivity release and the people,
first of all, those who worked within the site of Chornobyl NPP , from radioactive exposure



**On November 30 , 1986,
the Government
Committee accepted for
maintenance the
preserved
power unit 4 of
Chornobyl NPP**



**This was the completion of the
first - heroic stage of ChNPP
accident mitigation.
Unprecedented in its scale man-
made source of danger was
contained**

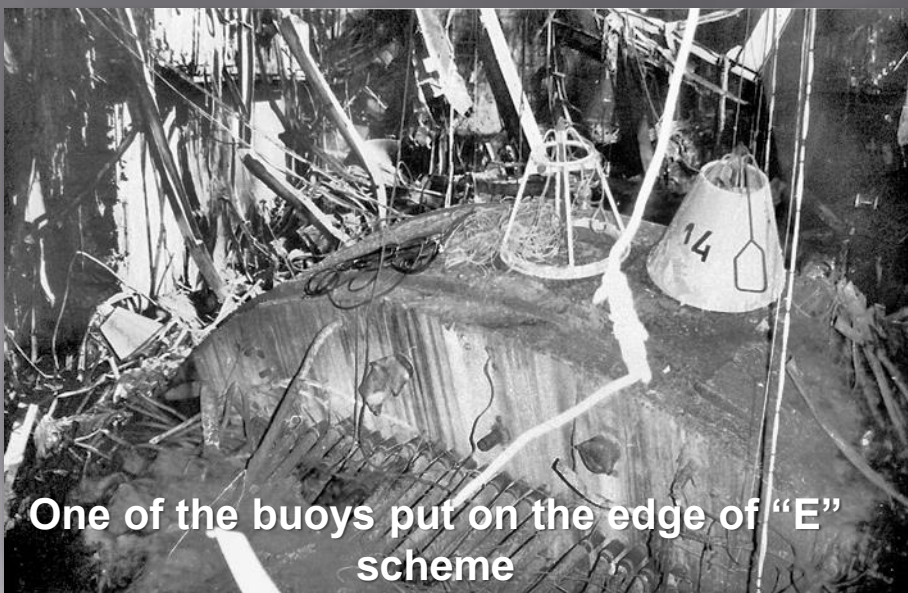


One of the first pictures of “Elephant foot”, the upper part is integral here, the surface is glass-like, shiny.

- 1 - main lapping of EF;
- 2 - a stream of “fresh” concrete of 1986;
- 3 - passage enclosure in the floor at level 3.00.



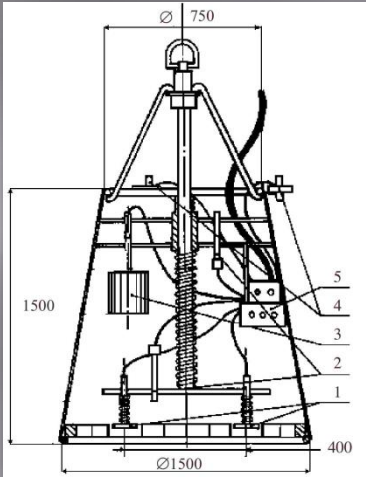
In the middle of power unit 4 Central Hall.
A graphite block from reactor stack , a piece of fuel assembly is close to it



One of the buoys put on the edge of “E” scheme

Sensors inside the buoy.
 Symbols in the picture:

- 1. Sensors of heat flux density.
- 2. Thermometers.
- 3. Sensors of gamma-radiation dose rate.
- 4. Air-flow meters.
- 5. Communication boards



Diagnostic measurements in Unit 4

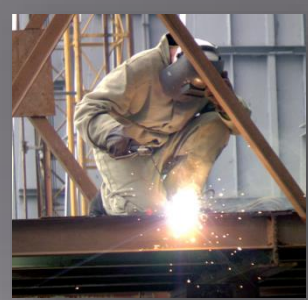
Basic aim of activities at Shelter within 30 years is providing protection for personnel, public, including the future generations, and the environment from the radiological hazards due to the presence in Shelter of radioactive materials including FCM and RAW originated from the accident

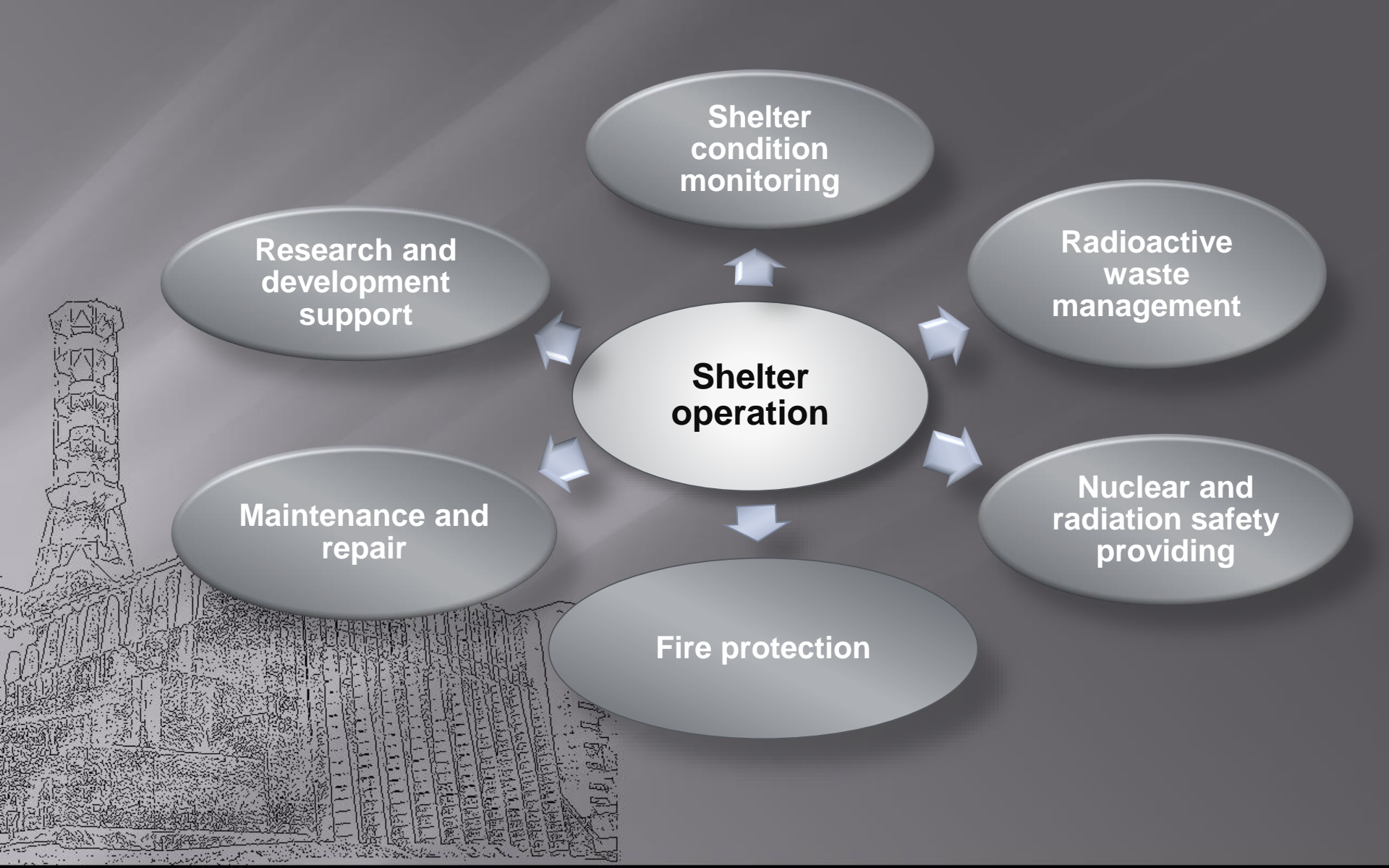
Activities at Shelter:

Shelter operating

– activity carried out in relation to the complex of buildings and systems accepted for operation including maintenance, repair, upgrading and any other associated activities

Shelter transformation into environmentally safe system



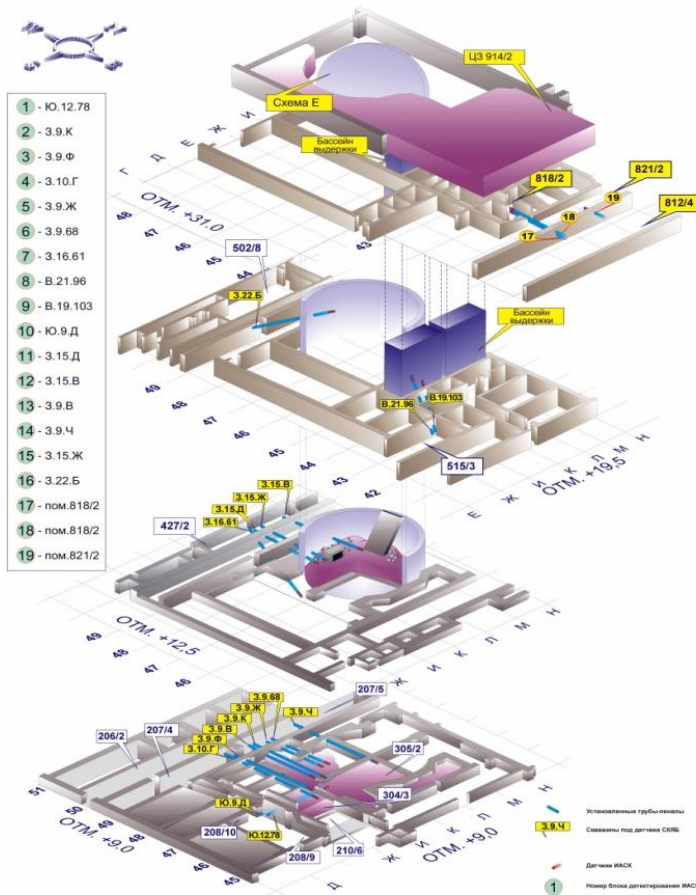


Integrated automated monitoring system (IAMS)
provides

- FCM condition monitoring;
- Radiation monitoring in the premises and area of Shelter, control of Shelter RS emissions;
- Building structures condition monitoring;
- Seismic control



Схема размещения датчиков СКЯБ



Maintenance of fuel containing materials in subcritical condition

by supply of neutron absorbing solution (NAS) to the FCM spots:

- when the established Shelter safe operation limits are exceeded
- once a year, there is a scheduled supply of NAS to the debris of Unit 4 Central Hall

Gadolinium solution feed system is intended for supply of NAS to Unit 4 Central Hall debris



Prompt feed unit for neutron absorbing solution "ЮК СОБГ-40" is intended for NAS supply to Shelter under-reactor premises

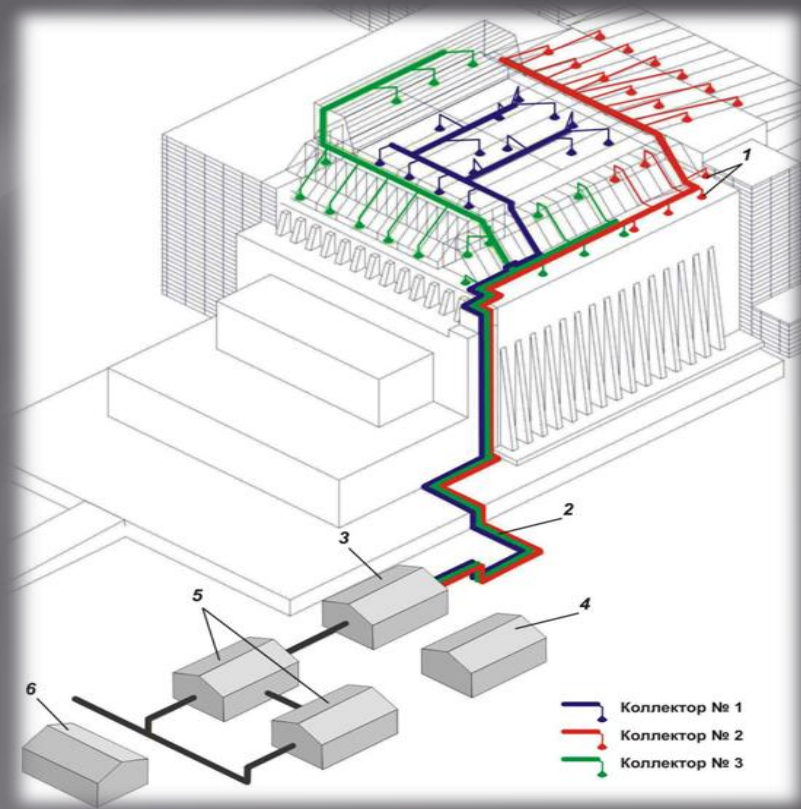


Confining the radioactive substances and ionizing radiation within the established boundaries as well as limitation of radioactive aerosol emissions from Shelter

- by :
- radioactive dust localization with protective polymeric covering on the surface of Shelter structures and debris
 - suppression of radioactive dust from the air



Upgraded system of dust suppression is intended for localization and suppression of radioactive dust within Unit 4 CH debris



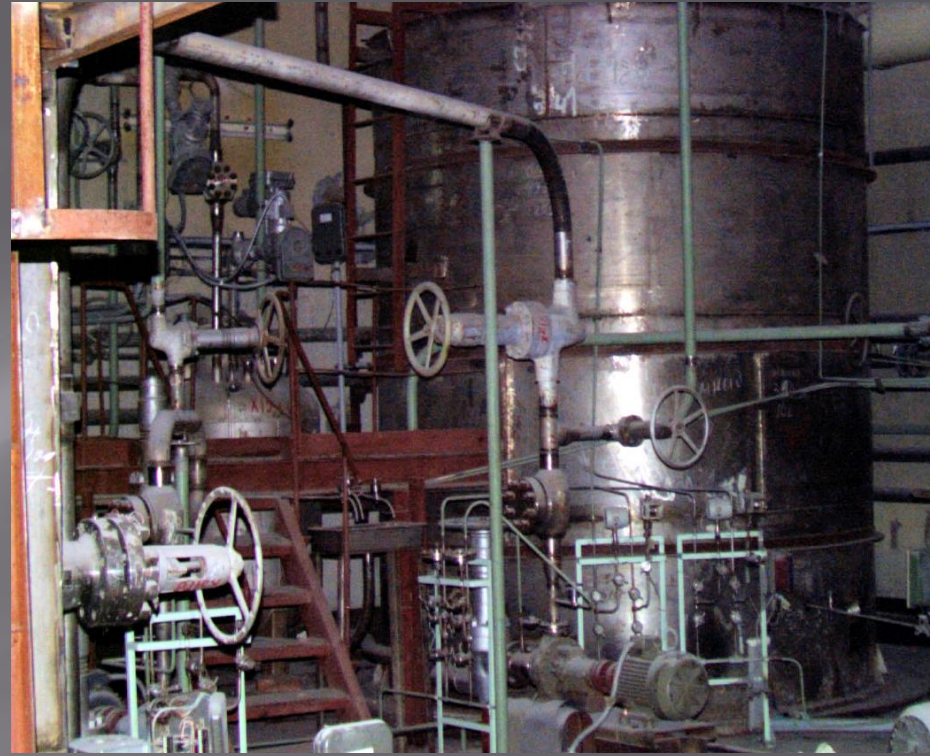
Timely detection, confining and extinguishing of fire in Shelter premises, on its roofs and within its local area

Fire fighting equipment:



- automatic fire alarm units in the Shelter premises
- automatic gaseous fire suppression units in electrical rooms
- automatic powder fire suppression units in Shelter ventilation centers
- water-based system “Suhotrub” for fire extinguishing in Shelter rooms, on its roofs and within the local area
- fire stops and fire-proof doors

Management of liquid radioactive waste (LRW)

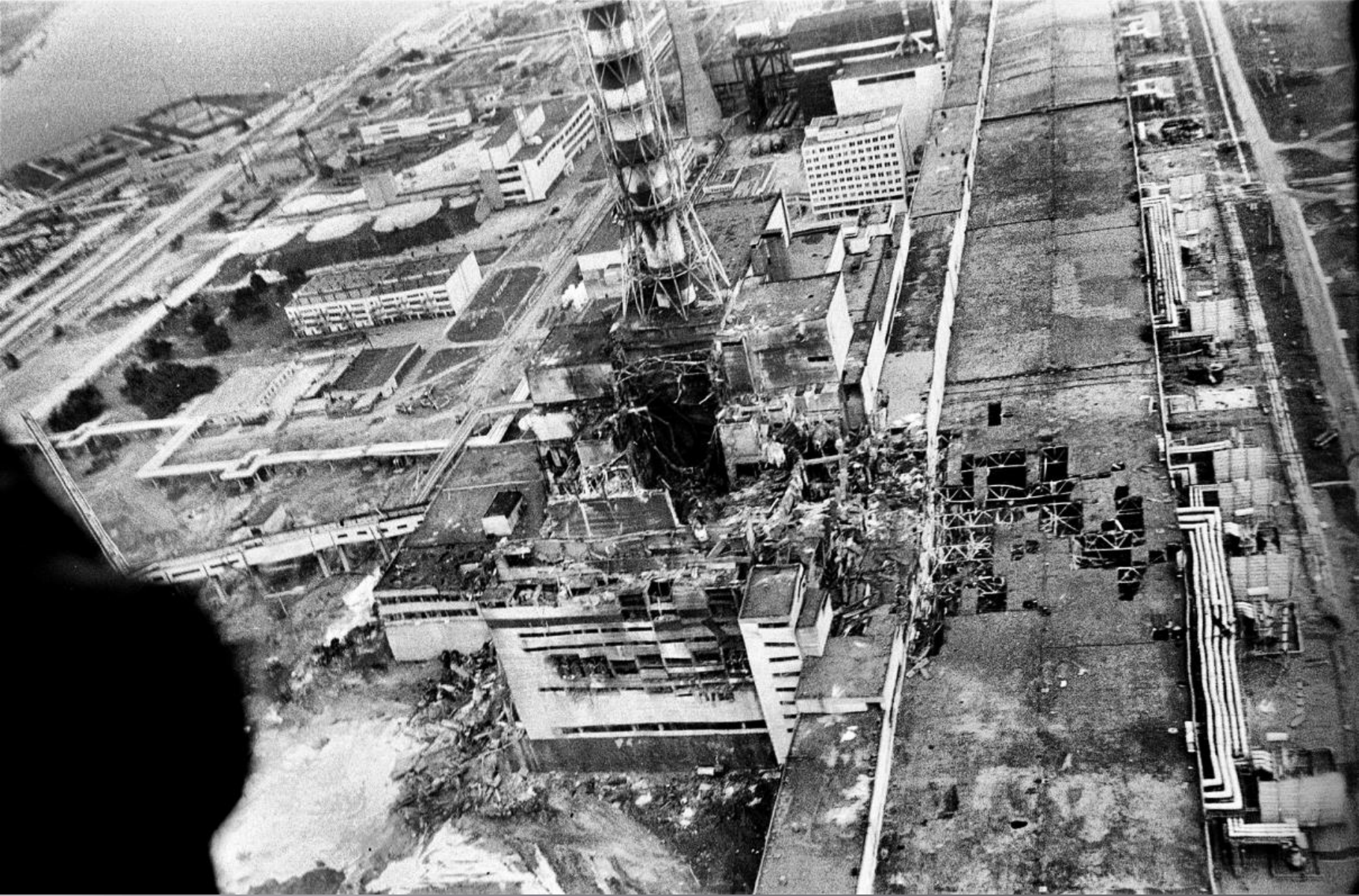


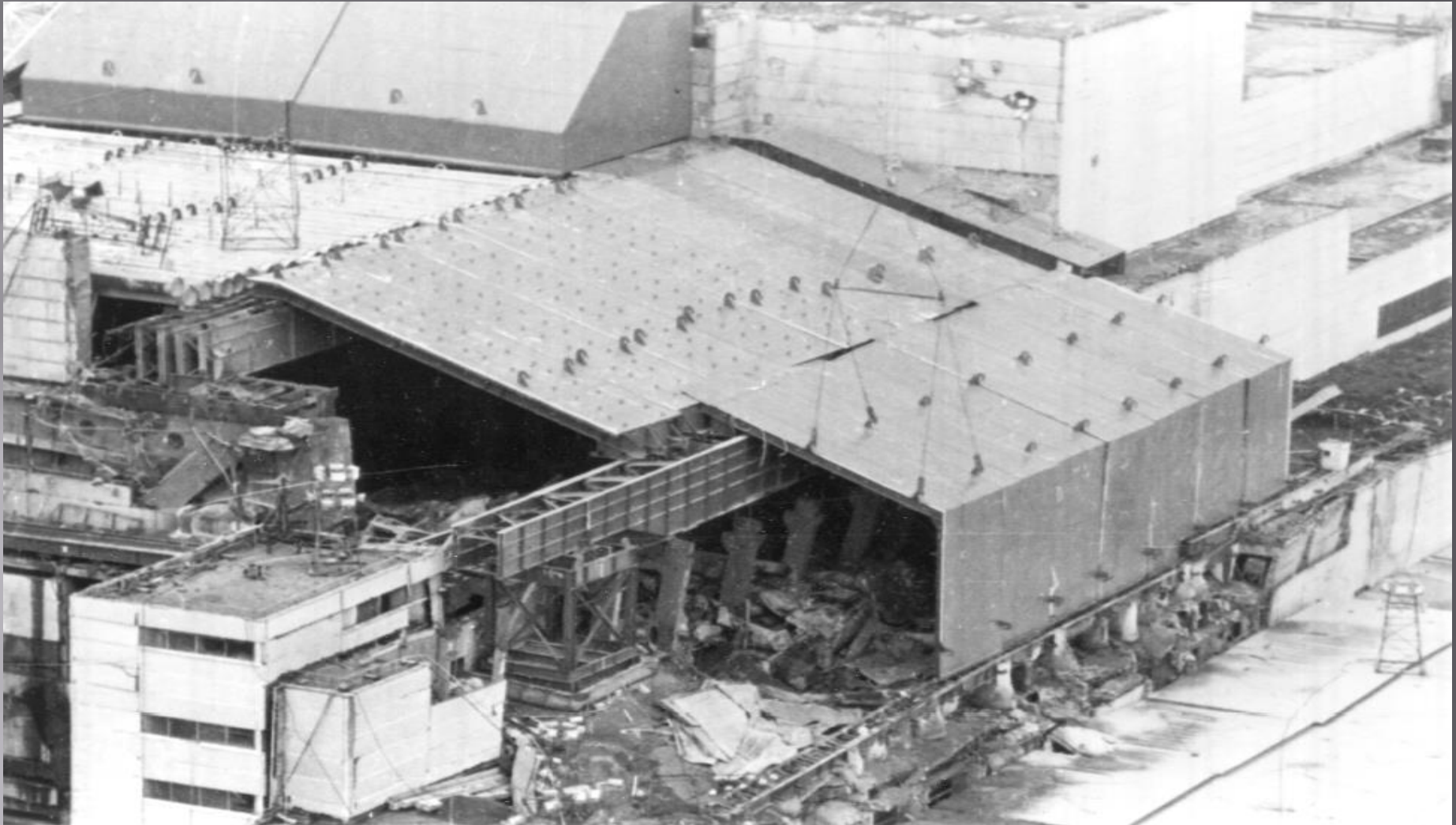
Within 2016, about 3,500m³ of radioactively contaminated water (RCW) have been collected and pumped out from Shelter premises for processing.

Management of solid radioactive waste (SRW)

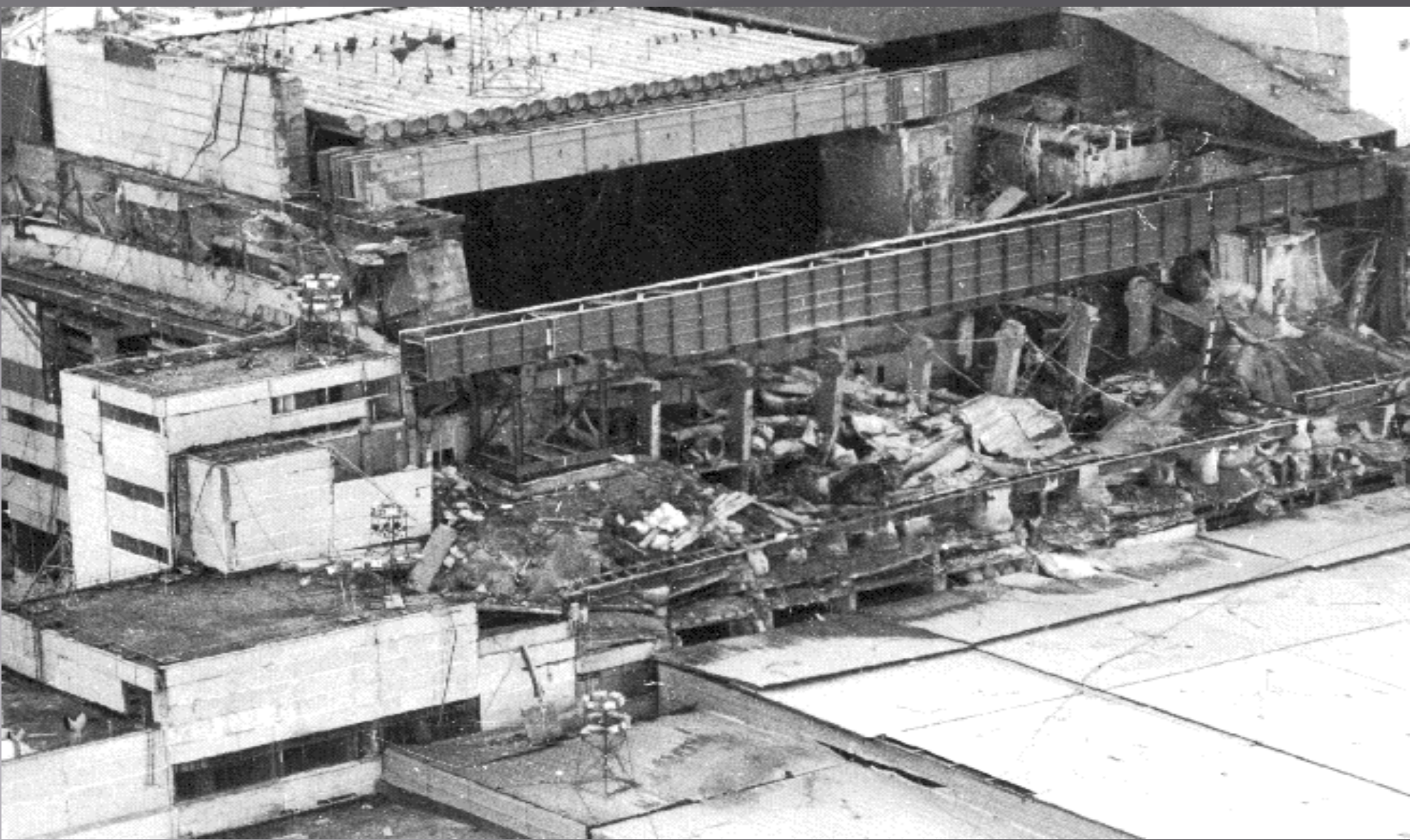


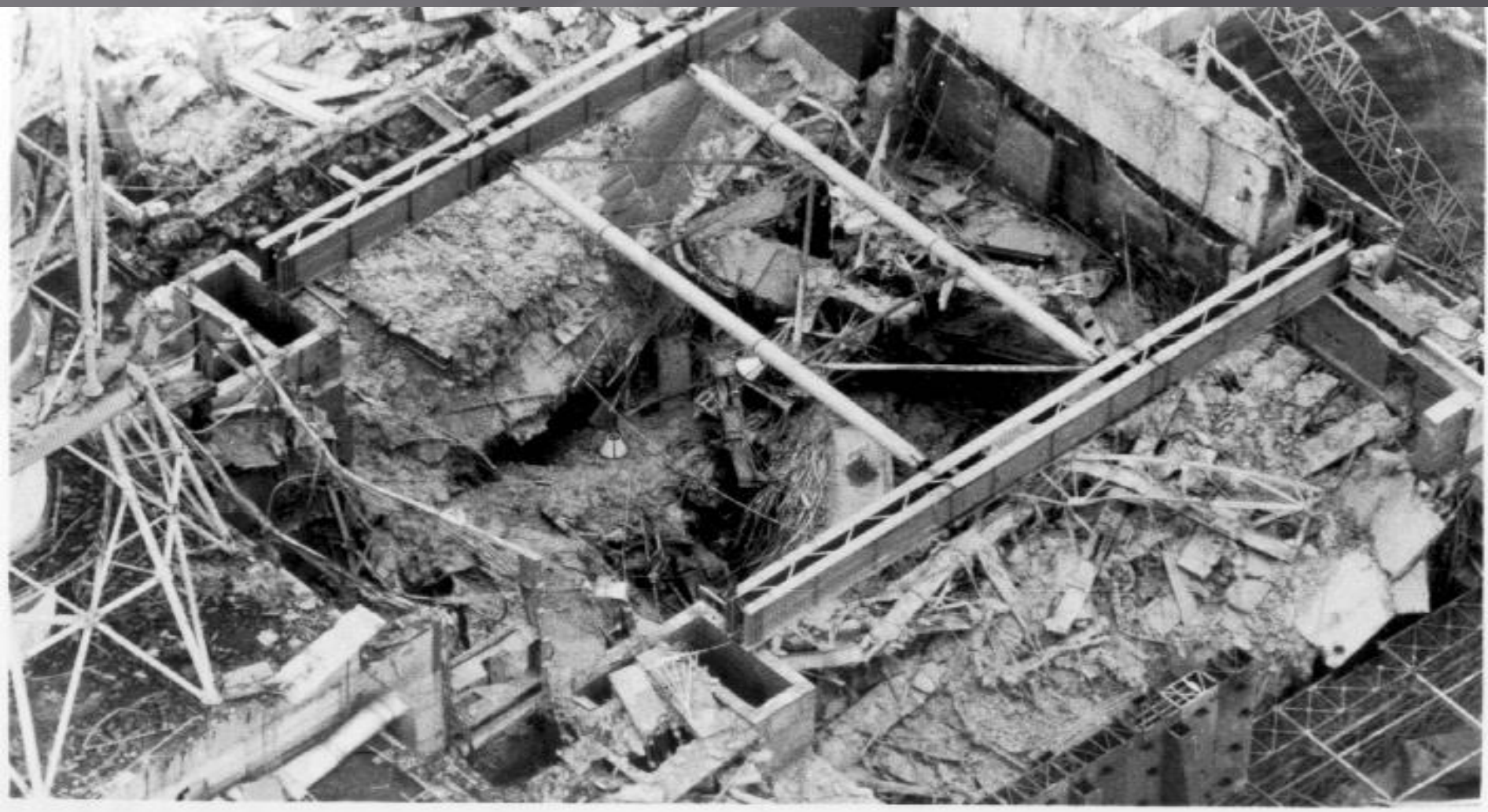
Within 2016, 6000 m³ of low- and intermediate-level SRW have been collected, sorted out and removed for disposal, and 8 m³ of high-level SRW have been placed for interim storage.





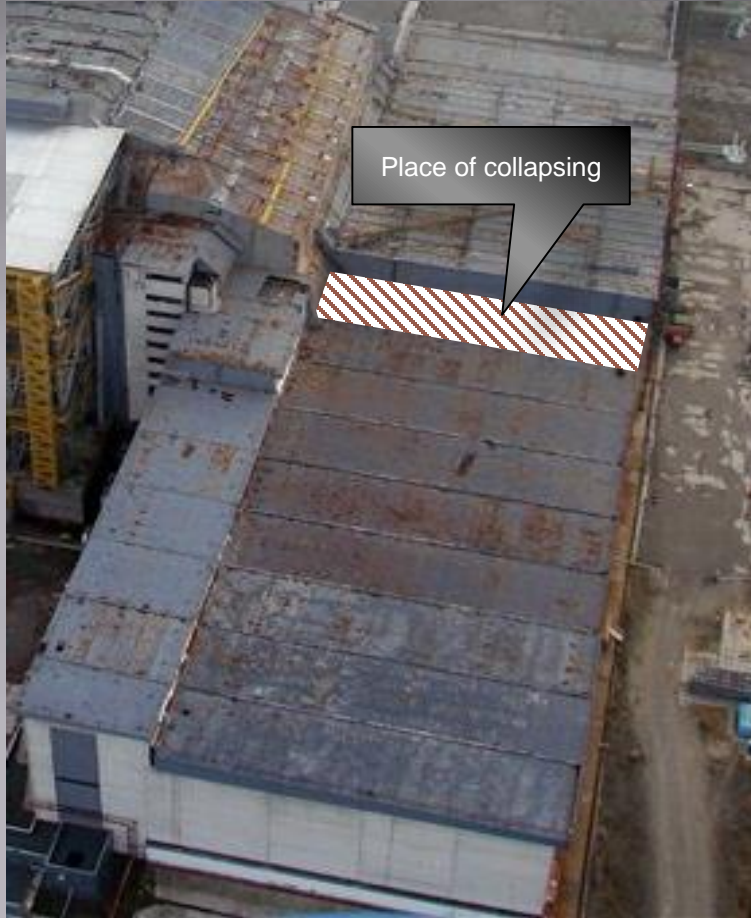








2013. Collapse of the building structures. On February 12, 2013, the roof structures of Generation II Block “Г” Turbine Hall within the axes 50 – 52 between rows A – Б as well as the wall slabs along row A of axes 48-52 collapsed at 14:03





Essential tasks

1. “NSC-Shelter” complex commissioning.
2. Shelter unstable building structure dismantling completion up to the end date of design service life of the stabilized structures (2023).
3. Determining the scenarios for implementation of 3-rd stage of Shelter Transformation Strategy.
4. Specifying short-term and long-term measures for Shelter transformation into ESS.