



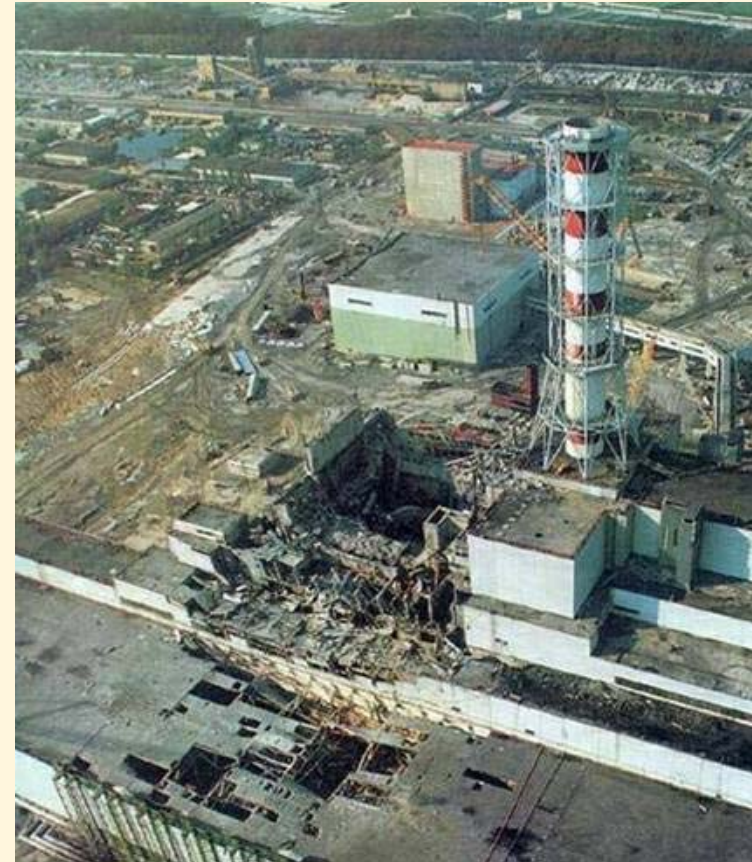
Science and Technology Center in Ukraine – STCU

Introductory Presentation
from STCU by Vic Korsun
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Seminar in Japan

“The Experience and Technology
of Russia, Ukraine, and Other
CIS Countries on Remediation
and Restoration of Environments”

February, 2012





STCU Mission since 1993

WMD Nonproliferation Through Cooperative Science

Engagement: Deterring the spread of WMD technical know-how by providing incentives to former Soviet weapons experts to work on multilateral, collaborative, civilian R&D activities (including support of research projects, contract R&D, travel, training).

- **Sustainable Redirection from Weapons R&D**: Assist former military scientists and technicians in their transition to permanent, sustainable, civilian research employment that contributes to their country's high-tech economy, improves its S&T capabilities, and addresses important national and international S&T issues.
- STCU provides training and supports scientific institutes and universities in Ukraine, Azerbaijan, Georgia, Moldova, and Uzbekistan.
- STCU has sponsored more than 1200 scientific projects at institutes and universities in these countries..





STCU's Government Partners:



More than 160 government projects from Canada, EU and the U.S.

Industrial Partners – Path to Sustainability

More than 155 commercial partners, some examples:



More than 140 partner projects



STCU projects Related to Chornobyl

1. STCU # 1396 “Scientific and Technical Grounds for Chornobyl NPP Radioactive Wastes Disposal in Deep Boreholes Completed in Korostensky Crystalline Massif”
 - **Ukrainian Scientific-Engineering Centre for Radioenvironmental Studies**
2. STCU # 1992 “Experimental Researches Of Resuspension Of The Radionuclides During Forest Fires In Chornobyl Zone”
 - **Ukrainian Institute of Agricultural Radiology (UIAR)**
3. STCU # 2704 “Hydrojet-cutting Prototype for Chornobyl NPP”
 - **Interbranch Research Institute of Mechanics Problems "RITM" of National Technical University of Ukraine "Kyiv Polytechnical Institute“**
 - **Detached department Atom-remont-service Chornobyl Nuclear Power Plant**
4. STCU # NN-40 “Application Of Telemedicine Technologies For Monitoring Of Thyroid Gland State Of Various Groups Of Patients Suffered From Chornobyl Accident”
 - **Ukrainian "Intermag" Science and Production Firm**
 - **Ukrainian Research Center for Radiation Medicine (CRM)**





STCU projects Related to Chornobyl

5. STCU # P003 “Ukrainian-US Scientific Protocol for the Study of Leukemia, Lymphoma and Other Hematological Diseases Among Clean Up Workers in Ukraine Following Chornobyl Accident”
 - **Ukrainian Research Center for Radiation Medicine (RCRM)**
6. STCU # P004 “Scientific Protocol for the study of thyroid cancer and other thyroid disorders in Ukraine following the Chornobyl accident”
 - **Ukrainian Institute of Endocrinology and Metabolism**
7. STCU # P085 “Health effects of Chornobyl accident”
 - **Ukrainian Research Center for Radiation Medicine**
8. STCU # P170 “Experimental Platform in Chornobyl”
 - **Ukrainian Institute of Geological Sciences (IGS); 2. Ukrainian Institute of Agricultural Radiology (UIAR)**
9. STCU # 4207 “Long-term prognosis of behavior of the fuel dust in Chrnobyl Shelter”
 - **Ukrainian Institute of Agricultural Radiology (UIAR NUBiP); 2. Institute for safety problems of nuclear power plants (ISP NPP NA)**



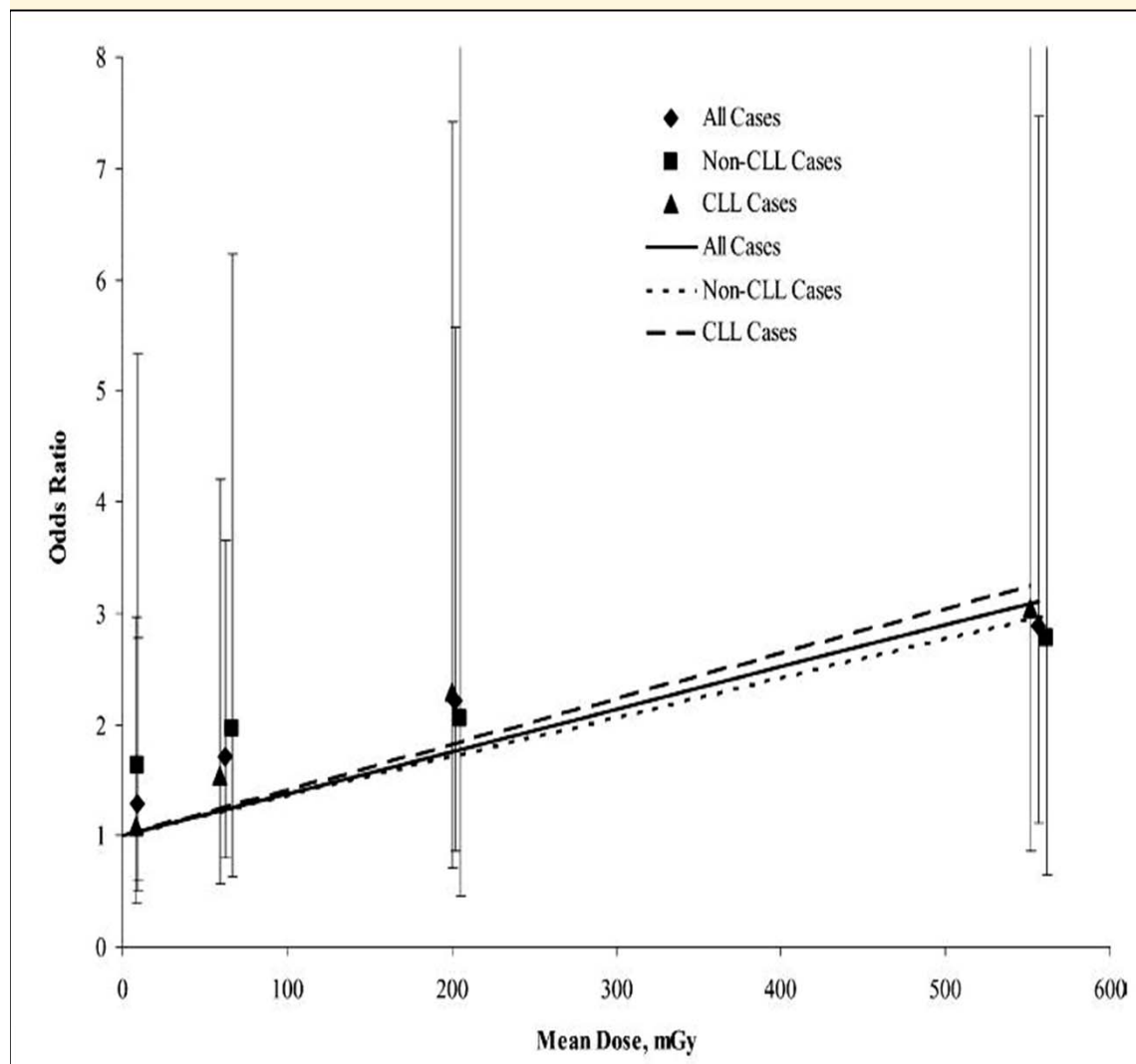


STCU projects Related to Chornobyl

10. STCU # 4129 “Development of technology and prototypes of equipment for the electrochemical radiological decontamination of industrial equipment”
 - **Institute of General and Inorganic Chemistry (IGIC);**
 - **Specialized Engineering Department and Pilot Plant (SED PP);**
 - **Institute for Nuclear Research (NRI)**
11. STCU # 1993 “Development of scientific fundamentals for the electrochemical radioactive decontamination of metal surfaces”
 - **Vernadsky Institute of General and Inorganic Chemistry;**
 - **Paton Electric Welding Institute;**
 - **Institute for Nuclear Research**
12. STCU # 808 “The support decision system in agricultural production branch in the radiation accident conditions”
 - **Ukrainian Institute of Agricultural Radiology**
13. STCU # 369 “Comprehensive Risk Assessment of the Consequences of the Chomobyl Accident”
 - **Ukrainian Radiation Training Center**



STCU Project # P-003 – Joint Study of Leukemia by Research Center for Radiation Medicine of Ukraine & U.S. National Cancer Institute



a) In a nested case-control study in a cohort of 110,645 male cleanup workers, the biggest by size and collective dose, the leukemia risks per Gray of irradiation were estimated to be 3,44 (95 % CI 0,47; 9,78; $p < 0,01$) that corresponds to hibakusha data.

b) Epidemiological study also shows elevated radiation risks of chronic lymphocytic leukemia.

c) The excess of leukemia was recorded for a 20-year period after exposure

d) Epidemiological studies in a cohort are continuing together with research to understand molecular basis of this radiogenic disease.

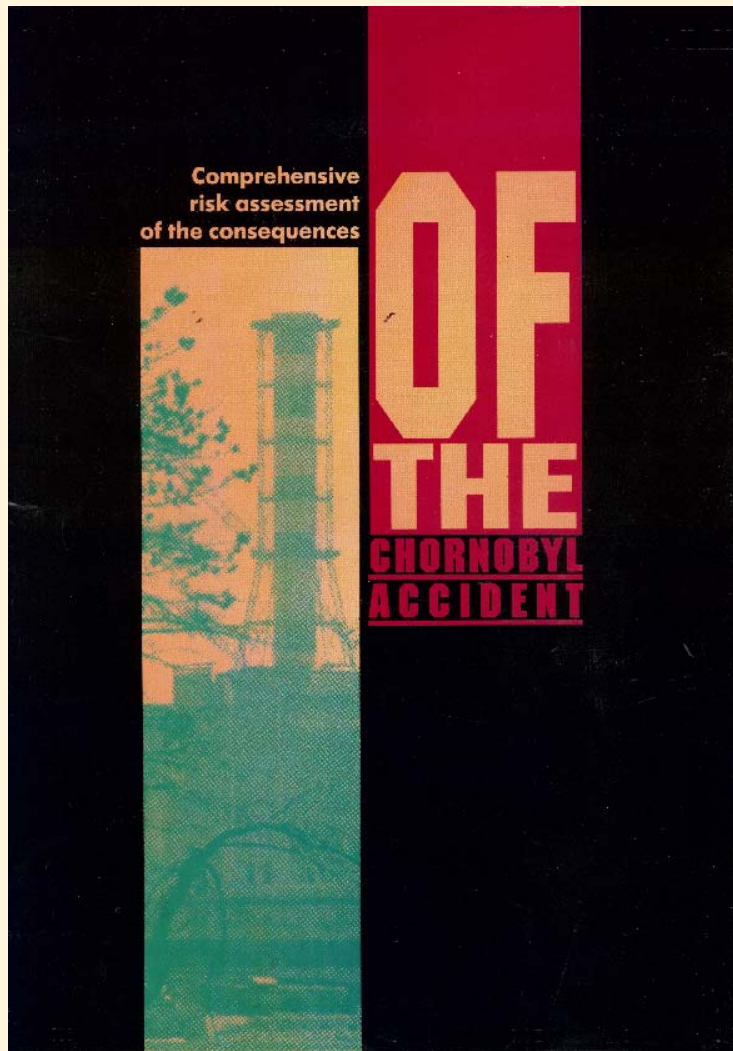
* Ukrainian-American Study of Leukemia and Related Disorders among Chornobyl Cleanup Workers from Ukraine: III. Radiation Risks. A. Romanenko, et al., *Rad. Res.* (2008)

STCU Project # P-004 Thyroid Pathology Study in Ukraine by Institute of Endocrinology and Metabolism & U.S. National Cancer Institute

- A prospective large-scale epidemiology and clinico-morphological cohort study aimed to reveal different forms of thyroid pathology, first of all thyroid cancer, in persons who were born between April 26, 1968, and April 26, 1986.
- During 1998-2007 4 biannual screening cycles were implemented. Retrieval rate achieved 77%. Total observation period of 74,000 person-years. A standardized procedure of clinical examinations included: thyroid palpation, ultrasound examination, blood collection followed by a determination of thyroid hormone levels, urinary iodine content test, and, if indicated, fine-needle aspiration. Compliance rate for FNA and thyroid surgery was 92% and 87% respectively.
- As a result of four cycles of screening examinations, 110 cohort members with thyroid cancer have been operated on during 1998-2008. The prevalence rate in the first screenings was observed about 3.5 cases per 1000 examined subjects.
- In 2009-2011 additionally 22 thyroid cancer cases were detected. In 2012 the fifth cycle of screening has been started.



STCU and Ukrainian Radiation Training Center Published Book

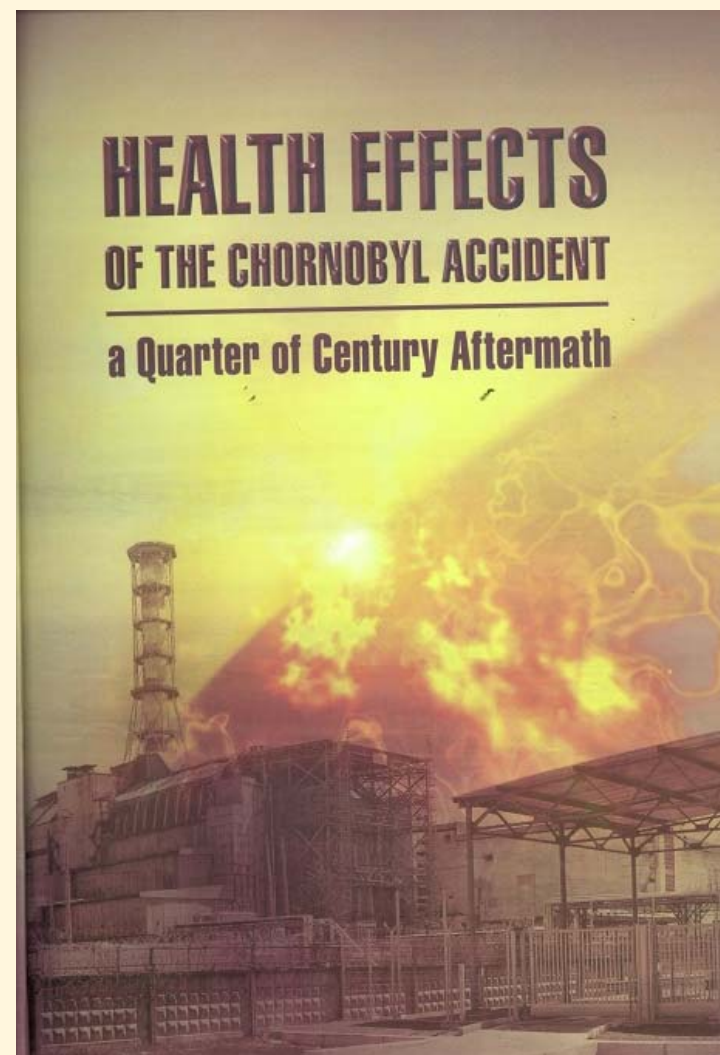


Comprehensive Risk Assessment of the Consequences of the Chernobyl Accident



Nagasaki University & Ukrainian Research Center
for Radiation Medicine Published Book Together

Health Effects of the Chornobyl Accident – A Quarter of Century Aftermath





26th April, 1986

- After finishing the test that was planned for 1:00 AM 25.04.1986 and then postponed to 1:23 AM 26.04.1986, AZ-5 button was pressed to reactor shutdown at 1:23,40 AM 26.04.1986.
- Last record in log book is “01:24 AM, Hard knocks. Control rods have stopped without reaching bottom edges.”
- Pushing of AZ-5 button became a direct impulse to start emergency process.

Specific details of the accident can be defined more exactly, but the main conclusions will remain the same: The accident was caused by underestimation and disregard to the possible negative effects of the known physical phenomenon. Improper practices of reactor creators to conceal information on known reactor shortcomings caused inadequate preparation of the personnel for actions during unscheduled situations.

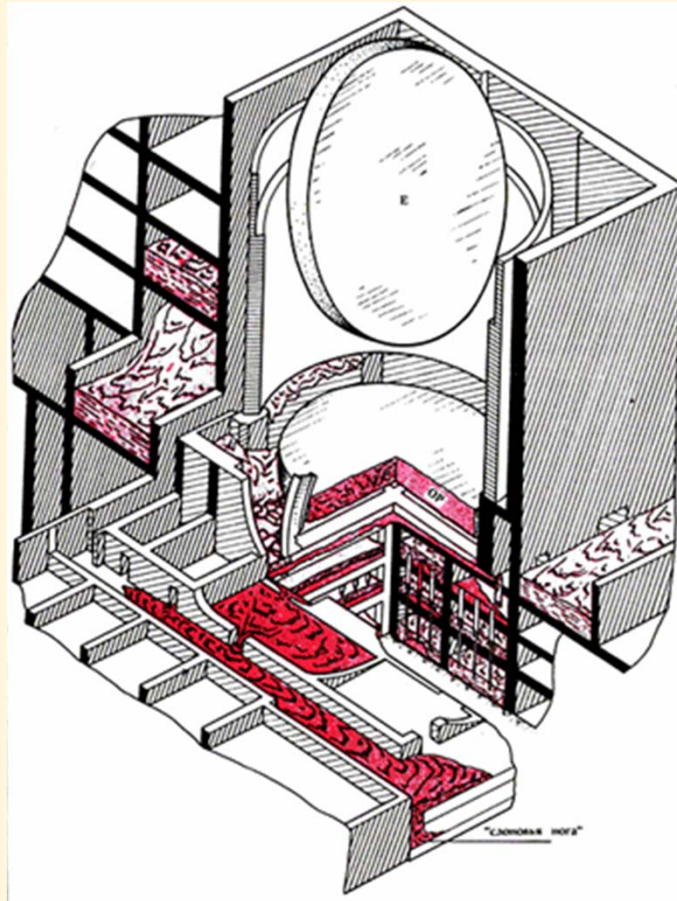
On site accident consequences



After accident
position of the reactor
top plate "Elena"



"Elephant's foot"



Disposition of melted fuel in
reactor building
(the reactor shaft is empty)



Cleanup of reactor
building roof from
fragments of fuel rods



The "Cascade wall"

Off site accident consequences

- By evening of April 26 the radiation levels increased and in some parts of the town of Pripjat reached hundreds of milli-Roentgens per hour. The Government Commission took the decision to prepare for evacuation of Pripjat residents.
- On the night of 26-27 April 1390 buses and 3 railway trains arrived from Kyiv and other neighboring towns.
- The evacuation began at 2 pm on April 27, 1986, and was carried out for about 3 hours.
- That day around 45 thousand people were evacuated. By the end of 1986 about 116 thousand residents were resettled from the ChNPP exclusion zone.



Evacuation of Pripjat residents



“Red forest”. The dead pine forest near the 4th block of ChNPP along the west direction



Dismantling of settlement (exclusion zone)



As a result of heroic efforts the shelter “Ukritie” was constructed and commissioned on 30.11.1986.



Conclusion

- Governmental activities and legislation should promote a radiation-protection culture that empowers local governments and citizens to be informed of their possible risks and exposure to radiation, and
- To develop approaches to best manage accidents with the help of government and industry experts.





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