

old, at which injuries to persons would be observed.

According to these derived distances, it is assumed that a first area extending for 220 m is characterized by lethal effects of an irradiance ( $>7$  Kw/mq). A second area extending from 220 m to 285 m, shows non-reversible damages for an irradiance ( $>5$  Kw/mq), while a third area from 285 m to 385 m presents reversible damages for irradiance ( $>3$  Kw/mq).

As a result, we can draft a "map of the consequences" which can greatly help experts and responsible authorities to deal with the occurrence of such an emergency.

### 060. Medical Economic and Environmental Justification for Remediation of Functioning Rbmk (Chernobyl) Reactors

*M. Capelli-Schellpfeffer, MD, Raphael C. Lee, MD, ScD,  
R. Stephen Berry, PhD*

University of Chicago, Chicago, Illinois USA

The 1986 Chernobyl nuclear disaster near Kiev, Ukraine led to the mobilization of enormous resources across Ukraine, Russia, and Europe. Acutely, the loss of life was minimized, in part, because of the actions taken to limit exposure to ionizing radiation. The potential long-term health effects of the Chernobyl nuclear disaster are yet to be determined. Meanwhile, reactors sharing the design features of Chernobyl, in particular graphite cores with similar shielding (RBMK reactors), remain a hazard to the environment. As long as these reactors operate, the possible recurrence of a catastrophe like Chernobyl can not be ignored as a threat to environmental protection, particularly in Europe.

Remediation of functioning reactors sharing the design features of Chernobyl is justified in this presentation based on an analysis of the potential [U.S.]\$19.2 billion medical economic impact of another disaster. These costs were determined by considering medical staffing, health facilities operations, and public health actions for 10 million people, relocation costs, and energy estimates based on the reported Chernobyl experience. A \$2 billion reactor cost for remediation of the functioning RBMK reactors was based on information from engineering sources. Thus, replacing the RBMK reactors maybe the most cost-effective strategy.

### 048. Considerations for Medical Long-Term Monitoring following a Nuclear Accident

*P.A. Dickstein, E. Stern*

Israel Atomic Energy Commission, Licensing Division,  
Tel-Aviv, Israel

Medical aspects of Chernobyl-type nuclear incidents may be classified into three main categories: 1) illness and physical damage; 2) dietary-related effects; and 3) mental consequences to the individuals exposed and to their relatives. There are sev-

eral aspects to be considered regarding the long-term medical follow-up of those who had been exposed to radiation resulting from Chernobyl-type accidents, such as the possible medical benefit to the individuals exposed, sociological and psychological effects of the monitoring procedures, the interest in carrying out epidemiological studies, moral and ethical issues, the existing medical infrastructure, and cost and administrative considerations. Experience based on the consequences of the Chernobyl accident indicates that these aspects must be weighted and evaluated by the decision-making authorities before a special long-term medical monitoring program is conducted. Based on a discussion of all the aspects, it is suggested to establish "follow-up criteria" for medical long-term monitoring.

### 051. Estimation of Exotoxigenic Influence on Children's Health

*E. Etkina, E. Pokshubina, I.Etkina, L. Lepilina*

Bashkir Medical Institute, Ufa, Russia

**Introduction:** The Republic of Bashkortostan is the largest chemical industry center in the Confederation of Independent States and one of the major world providers of herbicides, chloric and sulfuric organic compounds, and products for synthesis. Imperfections in the technology processes causes close contact of workers with highly toxic substances and dissemination of the atmosphere of nearby territory with exotoxigens.

**Objective and Methods:** This study was undertaken to understand better the biochemical and hormonal mechanisms of air pollution and their influence on health status of children (their pro-oxidant defense and endocrine system) whose parents (one or both) deal with highly toxic substances in unhealthy working conditions.

**Results:** The status examination demonstrated negative dynamics in the basic indices. Considerable decreases of pro-oxidant defences were especially marked in those children whose parents both had occupational injury. The most pronounced changes in hormonal regulations, in concentrations of insulin, estradiol (E2), and cortisol in particular were observed in the children from air-polluted regions.

**Conclusions:** The biochemical and hormonal indices used may be adopted widely as quite sensitive bio-indicators for estimations of the anthropogenic influences of exotoxigens on children's health. They can be applied to select children with high risk possibility of different somatic pathology.

### 061. Surfactant Induced Sealing of Radiopermeabilized Mammalian Cell Membranes

*Raphael C. Lee, MD, ScD, Daniel M. Canaday, MD, M.*

*Capelli Schellpfeffer, MD, Ralph R. Weichselbaum, MD*  
University of Chicago, Chicago, Illinois USA