

Session 6: STANDARDS AND PROTECTION

STUDY OF COMMERCIAL FREQUENCY ELECTROMAGNETIC FIELD EFFECTS ON HUMAN HEALTH AND THEIR HYGIENIC RATING CRITERIA.

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Introduction

Principal sources of occupational exposure to commercial frequency (CF) electromagnetic fields (EMF) are outdoor switchgears of high- (HV), super-high- (SHV) and ultra-high-voltage (UHV) substations and overhead transmission lines (TL). The staff operating this equipment is an adequate model for the study of CF EMF influence on human health, as they are systematically and most heavily exposed to this factor.

Until recently, possible unfavourable health-related effects of CF EMF have been considered only in terms of their electrical component which is subject to the Russian hygienic regulations covering both occupational and general population exposure. The probability of unfavourable health effects of the magnetic component has practically been ignored.

A systematic study of the health status of those occupationally exposed to CF EMF was begun in Russia as far back as 1960s, when medical examinations of the staff servicing 220, 330, 400 and 500 kV substations were conducted (Asanova et al., 1963; Sazonova, Morozov, 1969; Dumansky et al., 1977 et al). Those investigations performed by specialists of Kharkov Institute of Occupational Hygiene, Kiev Institute of General and Municipal Hygiene and LIOT Institute revealed a number of unfavourable changes in the health status of the personnel. Those operating 400 and 500 kV substations had neurological complaints (headache, inertia, greater fatigue, and sleepiness) and also complained of disorders of cardiovascular and gastrointestinal systems. Such complaints were accompanied by functional disorders of nervous and cardiovascular systems in the form of vegetative dysfunction, tendency to tachycardia and bradycardia, arterial hypertension or hypotension. Longer visuomotor reaction time, higher olfactory sensitivity threshold, poorer memory and diminished attention, as well as reduced pulse frequency were also reported. Peripheral blood changes were expressed through moderate thrombopenia, neutrophilic leukocytosis, lymphocytosis and monocytosis, tendency towards reticulopenia, reduction of Hb and erythrocyte