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FEATURES OF FORESTRY MANAGEMENT ON RADIOACTIVELY CONTAMINATED TERRITORIES

Scientifically grounded system and rational organization of forestry take into consideration zonal characteristics caused by various natural and economic factors. This gives the possibility to perform all forestry management measures differentially. Rational organization of forestry is only possible through an integrated forest zoning and considering regional features. Within each forest area the types of forest uses are established for each forest area considering purpose, fire-prevention and sanitary conditions, the level of radioactive contamination of vegetation and soil, the possibility of ensuring radiation and environmental safety.

Radioactive contamination of the territory by the radioactive emission of Chernobyl NPP is unprecedented in the world nuclear energy usage. It is necessary to note that the results of the studies of the state forest fund of Ukraine (3.2 million hectares) in 1991-1992 showed that 39% of forest areas had radioactive contamination of soil by ^{137}Cs more than 1 Ci/km^2 . Therefore, forestry activities in these areas have been limited, and on the area of 157 thousand hectares all types of forest operations were banned because of high levels of radioactive contamination by ^{137}Cs (more than 15 Ci/km^2).

To date, the main aim of forestry management is to obtain objective information about the radiation situation in forests, about the presence of radionuclides in forest products, about radiation situation in the workplace and staff radiation exposure. At the same time, economic efficiency of forestries on the contaminated areas is yet important. After the Chernobyl accident investigators took a number of organizational and practical measures to study the radiation situation in forests.

The scientists have developed guidelines on forestry management in conditions of radioactive contamination. These recommendations give the possibility to conduct forestry activities using differentiated approach under special regulations. The planning of the forestry management is carried out within selected zones of radioactive contamination using the results of radiation monitoring: the density of radioactive contamination of soil by ^{137}Cs , dose of gamma radiation, concentration of ^{137}Cs in forest products, as well as considering the type of site conditions, composition of tree species, their age, technology of works, labor protection and radiation safety.

The research allowed to divide the forestry enterprises of Ukraine according to their radioactive contamination level and the ability to use forest products into the following categories:

- group 1 – forestries, where plantations with ^{137}Cs soil contamination more than 1 Ci/km^2 are not found. Mode of forestry management on these areas remains traditional. Control of products for contamination in forestries and hunting grounds of this area is not performed.
- group 2 – forestries of forest-steppe and steppe zones of Ukraine, where forest areas are found with ^{137}Cs soil contamination up to 10 Ci/km^2 . Due to rich gray and dark gray forest soils and ashed black earth in these forests, a significant accumulation of

radionuclides in forest products is not foreseen. These forestries should focus on monitoring the contamination of non-timber products.

- group 3 – forestries of Polissia regions where there are forest areas with ^{137}Cs soil contamination up to 5 Ci/km^2 . In these forestries a significant radioactive contamination of forest products is not predicted either, but radiation monitoring should cover all aspects of production, especially harvesting of non-timber forest products.
- group 4 – forestries of Polissia regions with forest areas, where ^{137}Cs soil contamination density exceeds 5 Ci/km^2 . Due to the large mosaic of radioactive contamination of forest areas and features of the dynamics of radioactive contamination of products, these forestries should conduct regular tight radiation monitoring of all batches of products, and make changes to the system of forestry management.

Since Ukraine has intense, multipurpose forestry related to the exploitation of many vegetative and animal species, there is a need for detailed forest zoning according to the density of radioactive contamination. The basis for such kind of zoning is the need for working hours regulation, using the forest products and taking forest-protection measures. In accordance with current data on ^{137}Cs contamination of forests and forest products, forests are divided into three main zones, and each of them is divided into subzones (Table 1).

Table 1

**Distribution of forests by ^{137}Cs soil contamination
into zones and regulating measures**

Zone	Subzone	Density of ^{137}Cs soil contamination, (Ci/km^2)	Regulating measures
1	a	15,01-30,0	Control of working hours during emergency forest-protection operations
	b	>30,0	Development of special regime of fire-protection, forest-protection work
2	a	5,01-7,00	Limited use of fuel wood and lighter wood
	b	7,01-10,00	Limited use of treated timber, timber for storing food and household products
	c	10,01-15,00	Limited use of wood for other purposes
3	a	1,01-2,00	Limited use of wild edible mushrooms, berries and some herbs (heather, cowberry, buckwheat)
	b	2,01-5,00	Limited use of medicinal plants and berries, forest grasslands hay, coniferous paw

Thus, the developed grouping of forestries and further zoning of forests, along with the proved dependencies between the density of radioactive contamination of soil and the content of radionuclides in different forest products, are effective measures for forest management regulation on the areas contaminated as a result of the Chernobyl accident.

Specificity of forestry on the contaminated areas should take into account such important factors as modification of the radiation environment on the basis of

radionuclides decay, a large mosaic of forest ecosystems radioactive contamination, peculiarities of radionuclide migration and their accumulation by forest products in different site conditions, etc. All these factors require constant radiation monitoring of products and scientifically substantiated forestry management on the contaminated areas.