


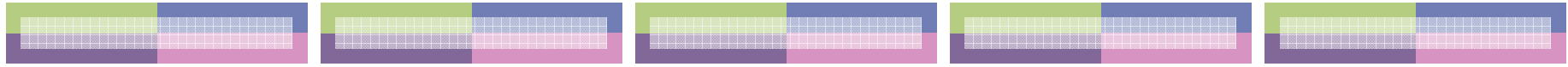


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**Dose assessment on marine biota
from existing and permissible
discharges of NPP**

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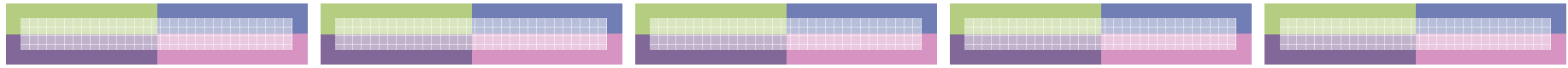




Method of assessment of radiation impact on the environment based on calculation of dose and ecological risk for biota was applied for the cooling pond of the Leningrad NPP.

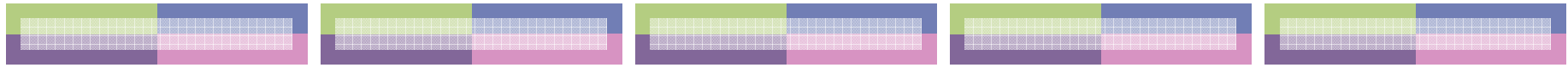
Doses to biota were estimated from the permissible discharges of the NPP, as well as from the current levels of technogenic radionuclides in marine environment using the radiation monitoring data.





Values of the permissible releases of 17 radionuclides were used as initial data for the dose assessment to biota of the Kopora Bay, cooling pond of the Leningrad NPP, as well as data of measurements of the radionuclides concentrations in marine water, the radionuclides distribution coefficients between water and bottom sediments, concentration factors of radionuclides in organisms.





The following groups of organisms were selected as the reference biota: sea birds, mollusks, algae and fish.

Dose rates for the **pelagic fish species** from the cooling pond of the Leningrad NPP is calculated to be $8,1 \cdot 10^{-10} - 2,5 \cdot 10^{-8}$ Gy/h,

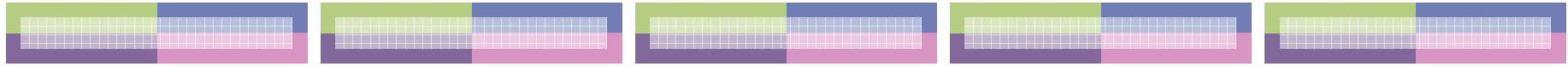
bottom fish species $1,8 \cdot 10^{-9} - 1,2 \cdot 10^{-7}$ Gy/h,

sea birds $5,9 \cdot 10^{-10} - 1,3 \cdot 10^{-7}$ Gy/h,

mollusks $8,9 \cdot 10^{-10} - 3,1 \cdot 10^{-6}$ Gy/h,


marine algae $9,6 \cdot 10^{-10} - 1,6 \cdot 10^{-6}$ Gy/h.





According to calculations, the highest doses from the permissible discharges of ^3H , ^{134}Cs , ^{137}Cs would be for the bottom fish, ^{131}I – marine algae, and from permissible discharges of other radionuclides – mollusks.







Total dose rate to the pelagic fish species of the Leningrad NPP's cooling pond, calculated on the basis of the radiation monitoring data, is $1,1 \cdot 10^{-8}$ Gy/h, bottom fish – $1,5 \cdot 10^{-8}$ Gy/h.

The main contributor to these dose rates is ^{137}Cs (about 80 %), which is caused by contamination of the Baltic Sea ecosystem with this radionuclide after the Chernobyl accident.

Total dose rate to mollusks of the Leningrad NPP's cooling pond is estimated as $2,2 \cdot 10^{-8}$ Gy/h, marine algae $1,0 \cdot 10^{-8}$ Gy/h, sea birds $5,8 \cdot 10^{-9}$ Gy/h.




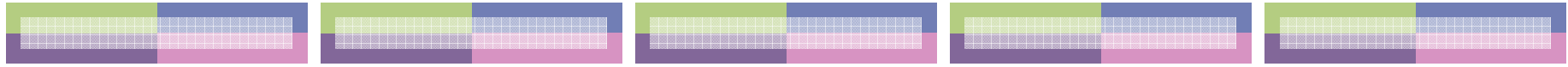


The following formula for ecological risk was used for the radioecological safety assessment:

$$R_j = \frac{D_j}{SD}$$

where D_j – dose rate to j -th reference biota species, Gy/h; SD – reference safety level for exposure of biota, Gy/h. Dose rate $SD=10^{-5}$ Gy/h was used as a screening value.





The conclusion was made that radiation exposure to biota of the Leningrad NPP's cooling pond at the normal operation of the NPP does not exceed the level of acceptable radiation risk and fits the criteria of the environmental safety.

Ecological risk for organisms from the Kopora Bay, calculated using the radiation monitoring data, does not exceed $3 \cdot 10^{-3}$.





Thank you for your attention !

