In 2005, scientists from the Institute of Hydrodynamics of the SB RAS (Novosibirsk) and the Institute of Physics and Power (Obninsk) numerically simulated various models of operation of georeactors. The time of the beginning of the simulated processes is 4 billion years ago. The calculations were different. The probabilities of both the existence of a georeactor to the present time and the cessation of its activity are equal.

Studies on the neutrino detector KamLAND (Japan) led to the detection of antineutrinos from the interior of the Earth – geoneutrinos. Lack of experiments on KamLAND: they cannot determine the distance to the source of particles, but only the direction. The solution of the problem was the project of integration of four neutrino detectors on four continents – in Japan, Canada, Italy and Antarctica. A network of neutrino detectors will allow to establish the exact location of antineutrino sources (georeactors) inside the Earth.

When considering the impact of a georeactor on the environment, it is important to consider three factors: cosmic rays, the Sun and Earth itself. The nucleus of the Earth is divided into a solid internal and external liquid. On the boundary between the liquid and solid nuclei, according to the hypothesis of Professor Rusov, a chain nuclear reaction takes place, which is accompanied by the release of enormous energy. Angular rotation speeds of nuclei and lithosphere are different. This difference affects the climate processes. As the nucleus velocity changes, the lithosphere begins to accelerate the rotation. As a result, friction with the atmosphere occurs, it is accompanied by the release of heat. The power of the georeactor will increase with increasing temperature in the zone of its operation.

At the current level of development of methods for detecting antineutrino allows to talk about georeactor still premature. However, with the improvement of experimental techniques and the creation of more accurate detectors to allow timely warn of imminent planetary danger.

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CHRONIC IRRADIATION OF SCOTTISH PINE TREES (PINUS SYLVESTRIS) IN THE NAROVLYANSKY AND VETKOVSKY PHYTOCENOSES: DOSIMETRY AND RADIOBIOLOGICAL EFFECTS

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The purpose of the research is to identify the effects of chronic internal and external radiation exposure for components of terrestrial ecosystems, a comprehensive study of Scottish pine trees. The experimental plan included over 30 young trees (up to 20 years old) selected from areas with varying levels of radioactive contamination. These pine trees were planted after the 1986 Chernobyl disaster mainly to prevent radionuclide resuspension and soil erosion. For each tree, the major morphological parameters and radioactive contamination values were identified. Cytological analyses were carried on for the selected trees representing all dose rate ranges. Dose rate/effect relationships for morphological changes and cytogenetic defects were identified and correlations for radiation effects occurring on the morphological and cellular level were established.

Keywords: Chernobyl, plant uptake, dosimetry, radiation effects.

In this research, quantitative dose rate/effect correlations were analysed for morphological and cytogenetic changes in Scottish pine trees exposed to chronic irradiation. Dose rates of 0,8 μGy $h^{-1}$and 39 μGy h^{-1} caused disappearance of the apical dominance in 10 % and 50 % of the sampled trees,respectively. This morphological effect and related to suppression of development can affect evolution of specific ecosystems in the experimental region, which probably has to be taken into consideration for the establishment of the predicted, no effect dose rate values and similar values for terrestrial ecosystems. Morphological changes are displayed to originally occur when the trees are 4 –8 years old, with a weak correlation between dynamics of their occurrence and the dose rate. Moreover, a connection was established between cytogenetic changes in cells of the seed germs and the upper meristem and morphological changes in trees. A possible mechanism explaining the influence of radiation induced morphoses was proposed based on the major empirical data obtained Chronic irradiation of Scottish Pine Trees (*Pinus Sylvestris*) in the experimental region during the researches, which support the assumption that the observed morphological changes result in certain genetic changes in cells of the apical meristem of the Scottish pine trees.

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SEWAGE TREATMENT AT LUNINETS COMMUNAL UNITARY ENTERPRISE WATER SUPPLY SEWERAGE "VODOKANAL" WITH THE APPLICATION OF THE BIOLOGICAL TREATMENT METHOD

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Despite the noted shortcomings, biological treatment of municipal wastewater and drains of many industries are widespread. In the Republic of Belarus there are more than 140 biological treatment facilities, including 72 facilities with a capacity of more than 1 million m^3 purified water per year, where 90 % of the total runoff in the Republic is treated.

Keywords: wastewater, biological cleaning, aerotenks, contaminants,activated sludge.

The purification facilities in Luninets were built in 1970 and the technological project provides for mechanical and biological wastewater treatment. The project is made up of:

- mechanical cleaning: a receiving chamber, a sand trap with a circular movement of sewage Ø 4 m – 2 pcs., primary two-level settling tanks Ø 12 m – 8 pcs. (3 of them were set out of operation at the time of reconstruction);
- biological cleaning: highly loaded filters Ø18 m – 4 pcs. (2 of them standby), secondary horizontal sedimentation tanks of two corridors 12 × 27 m – 2 pcs.

Combination of pollutants in the increasing wastewater is determined by characteristic of wastewater municipal, from the population and industrial effluents of enterprises. Biological wastewater treatment is based on the ability of microorganisms to use many organic and non-organic substances contained in wastewater as nutrients. Biological purification can be carried out in natural conditions in bioponds on the filtration and irrigation fields and in artificial treatment plants. In these structures, aerobic conditions can be created, with the use of technical oxygen, anaerobic conditions, or the process takes place in several stages with alternation of aerobic, anaerobic and anoxic conditions, when oxygen is contained only in a bound state. Microorganisms in such structures are either free or immobilized. Biological cleaning has the following advantages, due to peculiarities vital activity of microorganisms:

- a wide range of organic and inorganic compounds, including toxic ones;
- the formation of simple final products (carbon dioxide, nitrates, sulfates – under aerobic conditions and methane, ammonia, hydrogen sulfide – under anaerobic conditions). In both cases, biomass of microorganisms accumulates;
- no secondary water pollution.

Great problems in the operation of aerobic treatment facilities are caused by a high increase in the biomass of activated sludge. The costs for dehydration and disposal of excess activated sludge account for up to 40 % of the total cost of water treatment.

Average daily wastewater passes through water disposal facilities of the city and district is 17700 m^3 per day. The production capacity of treatment facilities is 5,5 thousand m^3 per day.