

HEALTH AND LABOUR SAFETY SPECIAL REGIONAL CONDITIONS SOUTH-UKRAINE NPP

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1 Introduction

South-Ukraine NPP (SUNPP) is situated in the steppe zone of Ukraine at a distance of 2.7 km from the Southern Buh River. It is situated in Arbuzinsky district, Mykolaiv region. The terrain of this territory is flat and intensively cut with ravines, bearers and valleys.

The satellite town, Yuzhnoukrainsk, with the population of about 41 000 inhabitants is located 2.5 km away from SUNPP. Another large settlement near SUNPP is Voznesensk (about 37 000 inhabitants). In general, about 143 000 inhabitants live in the 30-km control area of SUNPP. The density of population makes 50.7 persons/km² (average value in Ukraine is 75 persons/km²).

Almost the whole 30-km control area of SUNPP is agricultural. In the agriculture, the main place is taken with growing spring and winter wheat, barley, sunflowers, rape, soy beans and feed crops, vegetables and potatoes. In the industrial terms within the control area of SUNPP, apart from the South-Ukraine nuclear power complex (SUNPP, the Tashlyk Hydro-Accumulating Power Plant and the Oleksandrivka Hydro Power Plant), there are only industrial enterprises of local importance with small volumes of production.

The climate in the SUNPP area is moderately continental, with dry summer and unstable winter with little snow. The average annual air temperature is 8.6°C. The lowest temperature is in January and February; the absolute minimum is minus 34°C. The highest temperature is from June till August; the absolute maximum is about 35°C.

The winds throughout the year are mostly of the north-western and north-eastern directions. The highest average speed of the wind is from January till March (4.8-5.3 km/s), the lowest one is from July till October (3.4-3.6 km/s). The average number of days with the strong wind (15 m/s) is 30 days per year. Most often strong winds occur in late winter - early spring. The maximum wind speed reached 24-28 m/s gusting to 34 m/s.

2 Risks of Negative Effects of the Natural Origin

Due to the dry climate in summer, the control area of SUNPP has significant risks of steppe and forest fires. Directly near SUNPP there are no large forest areas, that is why the negative consequences of forest fires are limited.

The territory of the SUNPP 30-km zone lies within the Kirovohrad megablock of the Ukrainian fundamental crystalline formation and is quiet from the seismic and tectonic point of view. The frequency of earthquakes of 6 points according to MSK-64 scale is once per 1000 years, 7 points - once per 5000 years.

SUNPP is at a distance of 2.5 km from the Southern Buh River. For cooling of SUNPP, Tashlyk water reservoir is used. The NPP satellite town, Yuzhnoukrainsk, is situated on the bank of the Southern Buh River. The valley of the river creates a canyon of about 50 m height. There are practically no risks of floods and water-logging.

Summertime in the SUNPP area is quite hot, respectively there is a risk of overheating and thermal shocks.

Winter period in the SUNPP area is characterized by temperatures below zero. Short-term severe frosts and precipitation in the form of snow and sleet are possible. Respectively, in winter the existing risks of overcooling, snow or sleet significantly increase the risk of injury due to falling and road accidents.

Thunderstorms in the SUNPP area occur mainly from April till September. In winter they are very rare. The average number of thunderstorms per year is 15-20. During thunderstorms there is a risk of a lightning strike, which significantly increases while in the field or steppe.

3 Risks of Negative Effects of the Anthropogenic Origin

Under SUNPP normal operation conditions the risks of the hazardous irradiation exist only for personnel performing radiation hazardous works but which are eliminated by the observance of radiation safety rules. While performing other works and in off-work hours there are no risks of the hazardous irradiation under normal SUNPP operation. In case of an accident at SUNPP and depending on the nature of the accident, there is a risk of the radioactive contamination of the territory and the excess radiation. The observed contribution of SUNPP to the pollution of the air, reservoirs and soils does not exceed the admissible levels and in comparison with other sources of pollution is insignificant.

Within the control area of SUNPP apart from the South-Ukraine nuclear power complex there are only industrial enterprises of local importance with small volumes of production. Accordingly, there is no significant pollution of air and soil.

Despite the low level of development of industry directly in the SUNPP control area, from time to time there is a fish kill due to emissions of untreated or insufficiently treated residuary industrial and municipal waters up the stream of the Southern Buh River.

4 Risks of Infectious Diseases

Ukraine is one of the European countries most affected by HIV/AIDS. In general, in Ukraine the prevalence rate of HIV and AIDS infection is 323.7 and 75.2 persons per 100 thousand people accordingly. In Mykolaiv region these figures are higher and make accordingly 643.6 and 81.8 persons per 100 thousand people. It should be noted that the main ways of HIV and AIDS infection is through sex (57.8%) and through drugs (23.9%). The use of condoms in sexual relations and disposable syringes for any injections significantly reduces the risk of HIV/AIDS infection.

Ukraine belongs to the European countries of the 3rd category with a high index of tuberculosis (TB). As an average, it makes in Ukraine 59.5 persons per 100 thousand people. Herewith there is an interdependence of the spread of tuberculosis and HIV/AIDS and the spread of drug addiction. In Mykolaiv region, the TB infection is higher than the average value in the country and makes 71.8 per 100 thousand people.

The above mentioned preventive measures, as well as keeping proper hygiene rules, reduce the risk of the TB infection and the timely diagnostics makes its treatment easier.

Every summer the cholera agent can be found in the waters of the warmest Ukrainian regions, but cholera epidemics has not been registered since 1926. In the south-eastern regions of the country, including Mykolaiv region, some group outbreaks of the disease are registered. The last cholera outbreak was registered in Mykolaiv region in 1994-1995 and in Ukraine in 2011 in the city of Mariupol of Donetsk region. Outbreaks of the rota virus infection (acute viral disease, which is characterized by diarrhea, vomiting, weakness and fever) are registered annually during or after the epidemic of influenza. Cholera, rota virus infection etc. belong to the so-called 'diseases of dirty hands'. Following simple rules of hygiene dramatically reduces the risks of such diseases.

Annually in the cold season the number of acute respiratory viral infections (ARVI), including flu, goes up throughout Ukraine. Often the flu infection is of the epidemic nature. The risks of the ARVI infection in Yuzhnoukrainsk are comparable with the risks for other cities with 30-50 thousand of inhabitants, and at SUNPP it is comparable with the risks for any large national enterprise. As a rule, influenza is a droplet spread disease easily transmitted from one person to another. The radius of infection is 2 meters. The most frequent complication from influenza is pneumonia, which sometimes only during 4-5 days can lead to the death of a patient. Also the heart failure can often be the result of complications from influenza. Therefore, at the first symptoms of ARVI (fever, sore throat, cough, running nose, sore muscles) the ill person must by all means stay home.

SUNPP area belongs to the zone where there are some places of reproduction of ixodic ticks, the sting whereof may lead to the tick-borne borreliosis (Lyme disease), tick-borne viral encephalitis. Ticks are active in the spring-summer time. They may be found in forests, meadows, pastures, in parks and in public gardens. SUNPP area does not belong to the zone where it is recommended to take a course of vaccination against tick-borne viral encephalitis, respectively the risk of this infection is low. However, it is recommended to wear clothes with long sleeves and head wear for a walk in the forests and after visiting a forest it is recommended to examine the body to find ticks. During two weeks after the bite of a tick in case of the increase of fever or redness of the skin it is necessary to see a doctor.

5 Alcoholism and Drug Addiction

Commonly Ukraine is a country with a high level of consumption of alcoholic beverages. Mortality, caused by the alcohol, makes up 27.2 persons per 100 thousand people. The key categories of lethal cases is alcoholic cardiomyopathy (diffuse lesion of the heart muscle due to the long consumption of alcohol), accidental alcohol poisoning, alcoholic liver diseases, mental and behavioural disorders due to the consumption of alcohol. In addition to the listed direct effects, the excessive alcohol consumption significantly increases the risks associated with road accidents, death by drowning, falling from height, household injury, etc.

Mykolaiv region belongs to a number of the most criminogenic regions of Ukraine concerning the crimes related to drug trafficking. Non-medical use of drugs leads to a number of suicides, household and industrial accidents, direct deaths from the excess of the used drugs. Almost all drug addicts, who use opiates, have hepatitis; a significant number of them have AIDS and syphilis.

6 Risks of Food Poisoning

Food poisoning is a disease arising from taking the food, which contains harmful germs or poisonous substances. In Ukraine, nearly 30% of accidents are poisoning with poor food. The number of food poisoning grows in summertime due to high temperature.

In Ukraine, including Mykolaiv region, it is common to pick up and eat wild mushrooms. Mushroom poisoning, sometimes with lethal cases, is registered annually. The majority of poisonings are conditioned by eating agaric poisonous mushrooms (first of all, death-cups), which by mistake are taken for edible ones. Poisonings may also be caused by edible mushrooms, which were not treated properly by heat or grew in contaminated territories or along highways.

7 Other Risks

Mykolaiv region belongs to the regions of Ukraine with the relatively high level of crime. An additional factor of the aggravation of the criminogenic situation is the anti-terrorist operation (ATO), which is ongoing in Donetsk and Lugansk regions. Aggravation of the social and economic situation, growth of unemployment, a large number of illegal weapons lead to the aggravation of the crime situation.

The South-Ukraine NPP and its satellite town Yuzhnoukrainsk are situated near the Tashlyk water reservoir and the Southern Buh River. Accordingly, there are some risks of death by drowning in case of violating the rules of behaving on the water in summer or on the ice in winter.

An increase in the number of vehicles and road users increases the probability of accidents on highways; the number of people who could potentially be the victims of road accidents grows accordingly. In Ukraine there is one of the highest indicator of mortality in road accidents in Europe - 13.5 persons per 100 thousand people. Within the country, Mykolaiv region is one of the regions with the relatively low level of accidents on the roads. The population of the region makes 2.7% of the total population of Ukraine, while it accounts for about 1.7% of the total number of road accidents.

Risks of the household injures in Yuzhnoukrainsk are typical for the cities with 30-50 thousand of inhabitants.

A separate risk factor is that the terrain of the territory is intensively cut by ravines, bearers and valleys, and the bed of the Southern Buh River creates the canyon of about 50 m height. Accordingly, there are high risks of injury due to falling from a height.