

IMPACT NUCLEAR POWER PLANT KRŠKO ON THE ENVIRONMENT**Nena Hak and Stipe Lulić^(*)**

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The Sava river is among the largest rivers in the Republic of Croatia. It drains 95.000 square kilometers before entering the Danube River. The Sava river and its surroundings are being exploited in agriculture, forestry, power generation (one nuclear power plant and several thermal power plants), oil transportation, gravel extraction and recreation. At last, the Sava River is the major source of fresh water for industry and population.

Different authorized institutions from the Republic of Slovenia and the Republic of Croatia are included in programmes of nonradiological and radiological monitoring of Nuclear Power Plant Krško (NPPK).

Quarterly, the institutions from the Republic of Croatia, NPP Krško and the Ministry of Energy of the Republic of Croatia, submit public information in the Republic of Croatia about NPP Krško operation and its environmental impact.

NONRADIOLOGICAL IMPACT

Nonradiological monitoring programme of the Sava River and of the underground waters of the Sava River Basins is performed as a part of monitoring programme.

The monitoring network consists of 8 sampling sites situated on the Sava river and 15 sampling sites of the Sava river underground water, all of them in the Republic of Slovenia and the Republic of Croatia.

Water quality and quantity monitoring programme included about 40 parameters examined at each site.

Except the problems with increase temperature of water, low oxygen concentration and sometimes with increase of surface organics matters during the droughty periods, there are no problems with water quality. The most part of the water quality parameters are within the permitted range which is very important since drinking water supplies in Zagreb partly originate from the Sava River water.

RADIOLOGICAL IMPACT

Regular Nuclear Power Plant Krško radioactivity control comprises the supervision of the inventory of liquid and gaseous emissions at the source, and the independent supervision of the input of radionuclides into the larger environment (immission). The controlled environment area consists primarily of a 12 kilometers large circle around the object, where the largest values of imission could be expected, and where possible changes in the Sava river and the underground waters could first be noticed. The circle has been enlarged upon the territory of the Republic of Croatia (RC) from Jesenice on Dolenjsko until Podsused (30 km of air - line distance). As reference points relevant for the readiness in the case of accident, especially for the detection of iodine and aerosol air transport, the program comprises also

measuring points in the RC at larger distances (from 14 to 27 km) in the direction of Zagreb and its larger western surroundings (passive Thermoluminescent (TL) dosimeters in the arch of 42 km). Continuous control of emission is performed by the radiological service of Nuclear Power Plant Krško by routine procedures, supplemented by adequate measurements from other authorized institutions (intercomparison, parallel measurements of representative and other samples). Regular imission control was performed by the authorized institutions: Jožef Štefan Institute and Institute for Occupational Safety from Ljubljana and Rudjer Bošković Institute, Centre for Marine Research Zagreb and Institute for Medical Research and Occupational Health from Zagreb, based on the established annual program of the Community for Nuclear Safety of the Republic of Slovenia.

RADIOACTIVE CONTROL

According to the data obtained from the coordinator of the the radiological monitoring of the Nuclear Power Plant Krško for the Republic of Croatia, dr Stipe Lulić, Centre for Marine Research Zagreb, Ruđer Bošković Institute, environmental radiological impact of the Nuclear Power Plant Krško is still practicaly negligible. In the first nine months of the year 1992 the so called "most exposed individual" (practicaly non - existing since he would have to drink 730 liters of the Sava river water in a year, eat 16 kg of the fish from the river and breathe in 8000 m³ of the air in the close vicinity of the Nuclear Power Plant Krško) has received the effective dose of 6.37 μ Sv, which is only about 0.6 percent of the permitted effective dose he should receive in a year following the limitastions from the regulations on permitted limiting dose value per inabitant not professionally exposed to radiation is 1000 μ Sv.

Of the total measured artifical radiation in Jesenice on Dolenjsko , only 2.4 percent is induced from the Nuclear Power Plant Krško discharge.

RADIOACTIVE GASES CONTROL

Department for radiation protection of the Institute for Medical Research and Occupational Health of the University of Zagreb, Republic of Croatia, has measured radioactivity of gases in Nuclear Power Plant Krško collecting ventilation channel (before their discharge from the plant). According to the assertion of dr. Alica Bauman, Head of the Department, only iodine (¹³¹I) and xenon (¹³³Xe) of the 54-radionuclides-containing radioactive gases are found in the report. Results of the measurements are presented on the graphs. It can be observed that the radioactivity of the gases emission from the Nuclear Power Plant Krško is manifold lower that the permitted value at the place of discharge itself.