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Ecological Problems of Chernobyl Exclusion Zone and their Effect on Labor Regulations

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Abstract

The author raises an issue of ecological and socio-economic consequences of Chernobyl catastrophe as well as the current state of Exclusion Zone. The scale of contamination of the environment is unveiled; there have also been mentioned scientific facts of ecological restoration processes. It is emphasized that the most important consequences of the accident in Chernobyl was the socioecological damage which needs adequate juridical assessment and perfection in the sphere of labor relations in the Exclusion Zone. On the basis of drawn conclusions it is suggested to adopt special and individual Regulatory Legal Act on labor issues in the Exclusive Zone and to establish a single state authority on the Exclusive Zone affairs which will contribute to strengthening the environmental safety as well as anthropogenic restoration of natural resources.

Keywords: man-made environmental disaster, Chernobyl disaster, CNPP, radiation, radionuclides, environmental damage, Exclusive Zone (EZ), labor regulations, labor relations, Regulatory Legal Act (RLA)

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THE PROBLEM STATEMENT

26.04.1986, 00:23 (local time), the reactor of the fourth Chernobyl Nuclear Power Plant's generating unit exploded which was the beginning of the biggest anthropogenic (man-made) environmental disaster in human history.

The explosion and the fire that followed, which lasted for 10 days, led to a colossal emission of radioactive material from nuclear reactor and fatal consequences for people and the environment. Chernobyl disaster "was the unprecedented reason of people irradiation and the earth's biogeocenose (Bondarenko et al. 2015).

For Ukraine (at that time being a part of USSR) on the territory of which Chernobyl Nuclear Power Plant was situated (100 km from the capital – Kiev) the accident led to a serious environmental problem namely, the appearance of the Exclusive Zone. It is a heavily polluted 2598 km^2 area which, to a present day, experiences increased radioactive effects and is the permanent source of radionuclides movement to adjacent regions. occurred the biggest radionuclide emission into the atmosphere and the heaviest radioactive pollution of the environment in the history of civilization. The scale of pollution affected a substantial part of Europe, having touched the atmospheric, water and land environment as well as people settlement and infrastructure. The greatest damage was caused to three modern states, formed after the collapse of USSR namely, Ukraine, Belarus, Russia.

Chernobyl disaster as well as its ecological implications also led to new socio-economic problems which, in their turn, caused juridical changes in the labor sphere of the Exclusion Zone, particularly in the sphere of its regulation.

MAIN ECOLOGICAL IMPLICATIONS OF CHERNOBYL DISASTER

As a consequence of explosion at Chernobyl Nuclear Power Plant (CNPP) there occurred the

Thus, more than 50 m. pCi of radioactive material was released into the atmosphere which in absolute volume was about Ebq 1 (Ecologicheskiye posledstciya avarii on Chernobyl Nuclear Power Plant i ich preodoleniye: dvadtsateletniy opyt 2006). Emissions consisted of radioactive gases, condensed aerosols and large quantity of fuel particles. More than 200 square kilometers of European territory was polluted with caesium 137 and the rate of it exceeded 37 CBq m^2 (Naslediye Chenobylya: vedichinskiye, ecologicheskiye I sochial'no-economicheskiye posledstviya I recomendatchii pravitel'stvam of Belarus, Russia and

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Ukraine 2005). 145 km^2 (more than 70%) of Ukraine, Belarus and Russia where the intensity of pollution amounted to more than 37 CBq (or 1 pCi/ km^2).

Contaminated area in Ukraine amounted to 15 thousand km^2 or almost one third of the country's territory. Consequences could have been even more disastrous if fall-out were equal – due to rains going through polluted air masses the biggest part of radioisotopes of strontium and plutonium accumulated in 100-kilometres zone from nuclear power plant.

During the acute period of the accident the power of radiation (beta-radiation dose) exceeded the acceptable level 10-100 times which led to the death of some especially sensitive to radiation organisms.

Open surface such as meadows, parks, streets, roads, squares, roofs and walls were especially exposed to pollution in settlements. Especially high concentration was found around houses where radioactive material was transferred from roofs to ground (Ecologicheskiye posledstciya avarii on Chernobyl Nuclear Power Plant i ich preodoleniye: dvadtsateletniy opyt 2006).

Agricultural grounds turned out to be polluted with radionuclides to a variable degree depending on the rate of fall-out and the stage of growth. The greatest danger is posed by the process of radionuclide absorption of plant roots from soil.

The highest levels of radioactive caesium absorption were registered in forest vegetation as well as in animals living there and in the height where the highest concentration namely, 137Cs was found in products of forest origin in consequence of constant regeneration of radioactive caesium in forest ecosystems. Especially high concentration of 137Cs was found in mushrooms, berries and game and these high rates have remained since the time of the accident. Intervention levels are still exceeded in forest foodstuffs of many counties. Specialists point out separate consequences of radioactive pollution even in North Arctic and Subarctic territories of Europe and also among Saami (Bondarenko et al. 2015).

Radionuclide pollution of aquatic environment turned out to be not less serious. Surface water systems (rivers, lakes, artificial reservoirs) were damaged in many European regions. In spite of the fact that aquatic environmental pollution rate quickly decreased during several weeks after the emission happened by means of dilution, physical decay and absorption of radionuclides by soil. Bioaccumulation of radioactive material in one food chain, particularly ceasium, led to substantial concentrations of radionuclides in fish, in the most damaged areas, as well as in some distant lakes like in Scandinavia and Germany, for example.

33 years later after the Chernobyl accident happened the ecological situation has greatly improved. First of all, due to natural decay of much radioactive material (there continue to be only long-lived and super-long-lived radionuclides of ceasium, strontium and tranuranic ones in the environment) and processes of environmental natural recovery. Thus, the author personally measured the level of radiation in Kiev and compared it with the data obtained from 30-kilometres Exclusion Zone. The difference turned out to be smallish and absolutely uncritical for the health and life of people and the ecosphere. In many settlements exposed to pollution the dose rate in the air was comparable to a background level before the accident. General dosimetric certification has started in Ukraine since 1991. According to its results as of 2006 the average individual certification dose (an averaged one taking into account the population in every settlement) amounted to 0,29 Sv and the collective dose was 661 people⋆Sv which is within the limits (Bondarenko et al. 2015).

Thus, key factors of Chernobyl disaster main consequences should be considered to be irradiation of background objects and their further radioactive pollution. As of today in consequence of natural processes the threat to life and habitation of people, flora and fauna is not posed.

MAIN SOCIO-ECONOMIC CONSEQUENCES OF CHERNOBYL DISASTER

Socio-economic consequences of Chernobyl disaster are large-scale and impressive.

Almost 5 thousand settlements in Ukraine, Belarus and Russia (2293 cities and settlements only in Ukraine) were exposed to radionuclide pollution. About 5 m. ha of land and 4920 км^2 of forests were withdrawn from circulation and restricted to utilize.

More than 100 thousand people and later 200 thousand of local citizens were evacuated from polluted areas of Ukraine, Belarus and Russia. 5 million people were considered to be injured by Chernobyl disaster.

About 600 thousand people (first of all liquidators of the disaster, firemen, military, police officers, plant workers and others) were directly exposed to radiation

injury. Only in Ukraine, according to The Committee of Chernobyl Disaster Liquidators, 94% of them were found sick. Disability among them has doubled for the last 10 years and the number of the dead in 2018, according to different estimations, amounts to 10-100 thousand people (The official site of Chonobyl Center 2018). According to a morbidity analysis of Exclusion Zone workers for 1986-1992 at that period there were seen the increase of chronic diseases. In the structure of occurrence such illnesses as (descending): digestion, nervous system, organs of sense, respiratory organs, blood circulation and physical disorders (Vokhmekov et al. 1994). Also, the fall-out in other areas was the cause for irradiation of people in subsequent years. Thus, United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) made three categories of citizens exposed to ionizing radiation such as: 1) workers who directly took part in the disaster (during the emergency conditions or during later period of clean-up; 2) the population of polluted areas that was evacuated in 1986; 3) the population of polluted areas that was not evacuated (The official site of UNSCEAR 2019). This authoritative international organization mentions over 6 thousand cases of thyroid cancer among children and youngsters of Ukraine, Belarus and Russia, who were exposed to irradiation during the disaster in the period before 2005 as well as the increase in a number of other dangerous illnesses of the population of these areas in subsequent years.

The damage caused by short-term and long-term consequences of the disaster are colossal and it is hard to be calculated. Thus, Belarus specialists think that for their country economic damage is estimated to be $235bn (with the expectation of 30-years of recovery period) (Valion 2016). Ukraine annually sends about 4% of its budget to overcome the disaster consequences.

In that sense extremely significant findings of UN evaluation mission are namely, "Gumanitarnie Posledstviya Avarii on Chernobyl Nuclear Power Plant. Strategiya reabilitachii.": "Bolee chem 15-letniy opyt mashtabnych issledovaniy pozvolyayt sdelat' vyvod chto naibolee tyazholye posledstviya avarii on Chernoby Nuclear Power Plant realizovalis' ne v radiologicheskich proyavleniyach a v sochial'no-economicheskoy' sphere… Ochenochnaya missiya UN recomendovala mirnovu soobshestvu schitat' chto neitral'naya rol' v programme reabilitachii dolzhna prenadlezhat' meram po economicheskomu i obshestvennomy vozrozhdeniy" (Gumanitarnye posledstviya avarii on Chernobyl Nuclear Power Plant Station. Strategiya reabilitachii 2002).

LEGAL PROBLEMS OF LABOR REGULATIONS IN THE EXCLUSION ZONE

The story of Chernobyl Exclusion Zone begins with 27.04.1986 when the Government of Ukrainian Soviet Socialist Republic made a decision to create 30 kilometers Exclusive Zone around Chernobyl Nuclear Power Plant and to evacuate people living in that territory (Pripyat, Chernobyl and villages).

Today Chernobyl Exclusive Zone (CEZ, EZ) is the 2598 km territory of Ukraine polluted with radionuclides as a result of Chernobyl disaster and was withdrawn form use with the special form of government carried out by State Agency of Ukraine on Exclusion Zone Management (SAUEZM). According to the Legislation of Ukraine "On legal regime of the territory exposed to radioactive contamination as a result of Chernobyl disaster" the main purpose is to minimize the environmental threat of the Exclusion Zone as well as to make it environmentally safe for the population of Ukraine throughout its keeping (Pro pravoviy regime territorii scho zaznala redioactyvnogo zabrudnenya v naslidok Chornobylskoii catastrophy 1991).

Thus, CEZ will long be used as a barrier on the road of possible transfer of radionuclides through natural or man-made canals.

The complexity of a problem of legal-normative labor regulations of CEZ workers is explained in many aspects by more than 800 present documents (laws, sublegislative and local legal-normative acts) of Ukraine in the sphere of the disaster, its consequences as well as the Exclusion Zone activity, SAUEZM and a PE "Management of the functioning of the Chernobyl nuclear power plant" (Maluga 2016).

In our opinion, the non-system of this regulatory massive, the absence of single state-legal approaches and principles to Chernobyl problem greatly complicates legal process of labor regulations of today's Exclusion Zone workers.

As used here we mention one legal feature that is: today Ukraine does not have any special legal-normative act regulating employer-employee relations of Chernobyl zone. These legal relationship are regulated by the general acts namely, Labor Code of Ukraine (LCU) as well as by the Legislation of Ukraine "On legal regime of

the territory exposed to radioactive contamination as a result of Chernobyl disaster" mentioned above and by some other adjacent documents.

Meanwhile, features of work in the radioactive polluted zone, regime nature of works, occupational risk connected with the health and life hazard as well as the increased psychological tension provide solid legal grounds to consider professional activity of CEZ workers to be especially intensive, difficult and requiring strong qualifications. Moreover, based on high degree of social and moral responsibility workers of such category face with it would be useful to work up a special single normative act (maybe at the level of government regulation), which would take into account all the mentioned above specificity aspects of work in the Exclusion zone. Among other things, such an approach would correspond to the spirit of International Labour Organization recommendations which has accented their attention on the problems of labor relationship regulations emerging as a result of dynamic development of modern world economy since 1998.

It is important to point out that a man-made factor, which accompanies the work in CEZ is a modern theory of industrial law, objective basis of payment differentiation and labor regulations (Dovbush 2017). Such given legal foundation is implemented in the rules of Resolutions of The Cabinet of Ministers of Ukraine № 831 от 10.09.2008. Thus, according to the act from 01.01.2016 permanent workers of CEZ, police constantly serving in EZ are given additional payment at the rate of 150% of minimum wage proportionally to hours worked. Temporary employees are also supposed to be given additional payments as well as single daily allowances. Employees who are sent on a mission to a project construction connected with the clean-up of Chernobyl disaster are paid 75% of an average wage of the main work. Remuneration of labor workers busy in a special processing, utilization, raw materials investigation with the increased radioactivity in consequence of Chernobyl disaster as well as workers busy in repairing and servicing of technology and equipment, their special processing, radiation monitoring are paid 25% increased tariff rates payments (on condition of the constant power of external irradiation dose of more than 50 Mr/h or the increase in the norm of surface pollution of technical equipment (Pro doplaty osobam yaki prachuut' u zoni vidchuzhennya: Postanova Cabinetu Ministriv Ukrayiny 2008). But in recent years real payments, according to the norms, were not carried out by virtue of objective and subjective reasons, in particular, in connection with poor financing from a state budget. Thus, in a Sectoral agreement between the State Agency of Ukraine on Management of the Exclusion Zone and The Trade Union of Employees of Nuclear Energy and Industry of Ukraine as of 2014-2015 (prolonged with the amendments as of 2016-2017, 2017-2018, 2018-2019) there are mentioned job securities (issue no.3) payment obligations and the security of it (issue no.4), observance of work-rest regime (issue no.5), guarantee of protection of labour and health (issue no.6), social protection (issue no.7) (The official site of SAUEZM 2019).

Multi-subordination and multi-regionalism of zone objects, where specialists work, complicate the coordination of labor regulations in the Exclusion Zone. Thus, State Agency of Ukraine on Exclusion Zone Management accountable for radiation and radio-ecological monitoring and for the actions connected with it is the central executive authority the activity of which is directed and coordinated by the Cabinet of Ministers of Ukraine through the Minister of Ecology and Natural Resources of Ukraine. Public enterprise "Management of the functioning of the Chernobyl nuclear power plant" accountable for the safe use and disposal of Chernobyl power generating units as well as for the transformation of the object namely, "Ukrytiye" into environmentally safe system subordinated to the Ministry of Ecology and Natural Recourses of Ukraine. Another range of objects is related to State Emergency Service of Ukraine, National Academy of Sciences of Ukraine and to National Nuclear Energy Generating Company of Ukraine. Security and perimeter protection of the Exclusion Zone and inside it is carried out by the Security Service of Ukraine and some other security agencies. Though formally labor regulations are regulated by State normative-legal acts (NLA), in practice workers and servants of these numerous state agencies, organs and plants follow their departmental local normative-legal acts which complicates regulations of labor relationship in the Exclusive Zone.

CONCLUSION

Chernobyl disaster, which happened in 1986, was the biggest man-made ecologic catastrophe in human history. Its ecological and socio-economic consequences do not have analogues in the scale and value.

33 years after the disaster damaged ecosystems have significantly recovered but social results still serious. Chernobyl Exclusive Zone continues to be an artificial barrier on the road to radioactive and radiological spread to adjacent areas and so on. The work of thousands of people carried out their professional duties in the Exclusion Zone, its meaning for the safety of people and nature is undervalued and legally regulated.

Thus, the author thinks that it is necessary to give recommendations:

1. At the legislative level it is needed to work up and adopt single sublegislative normative-legal act (most probably a special Government Regulation), which would adequately take into account specific conditions of work and professional load in the Exclusion Zone but at the same time would not contradict main principles of the Labor Code of Ukraine.

2. On the organizational and managerial level it is useful to revise multi-subordination of the Exclusion Zone objects and to create a single state structure accountable for security, monitoring and restorative action as well as to endow with the right of "the first voting" on the issues of its competence, including labor regulations.

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