Do We Have Reliable Tool?
Considering the Efficiency of Chornobyl Legislation

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Among experts involved in the Chornobyl Disaster issues, one can often come across an opinion that the Chornobyl legislation is not part of the nuclear legislation. Therefore, it should be measured with a different yardstick. The nuclear legislation indeed does not identify Chornobyl-related laws as its part, rather referring to them for any Chornobyl Disaster issues like radiation protection measures, social security, and damage reimbursements. At the same time the makers of Chornobyl laws themselves admit that the issues of affected public social security and the Disaster's environmental after-effects are inseparable from radiation safety and radiological protection of population issues [1], having a far broader context than just that of Chornobyl.

On the year of Chornobyl Disaster 20th anniversary we find it reasonable to look back and see if we have learnt all the lessons taught by Chornobyl. It is an analysis of lessons-learned and recognition of mistakes that can significantly contribute to further progress in the area. The author of this text is convinced that common sense is a tool universal enough to study even such an extraordinary subject as the Chornobyl legislation, and attempts to analyze its efficiency will undoubtedly contribute if not to direct improvement of the situation, then at least to finding right ways to do so.

Efficiency of any means and measures is determined by their ability to achieve the set goal in the fixed time constraints and using determined resources. Of primary importance here is scientific validity of the goal itself, the relevant tasks to be carried out for goal attainment, ways to fulfil these tasks, and appropriate terms and resources allocated for it.

Today, 20 years after the Chornobyl Disaster, we have to admit that its consequences have not been overcome yet and that raises the issue of Chornobyl legislation as a means to overcome the Disaster consequences. Sad as it is, a major part of measures initiated in line with the Chornobyl legislation happen to have two common features – none of them were carried through and none of them satisfied hopes and expectations. The main reason for their sad fortune is usually claimed to be lack of funds allocated for their implementation. However, there is one more reason of no less importance, which is rarely realized and even less frequently mentioned – it is lack of scientific justification for these measures.

You will find no published information that by the time the Ukrainian SSR Verkhovna Rada (Parliament) approved Chornobyl laws in February 1991, there had existed detailed calculations of their implementation costs, however, back then it was clear this would be a serious challenge for Ukraine to tackle. The Ukrainian SSR Verkhovna Rada Decree № 797 dated February 28, 1991 "On the Order of Implementation of the Law of Ukrainian SSR "On Status and Social Protection of Population Suffered from Chornobyl Catastrophe" among other things charged the Ukrainian SSR Council of Ministers with following action items:

"- suggest to the USSR Cabinet of Ministers that 100% USSR Budget funding be allocated to cover the implementation of activities and measures mitigating the Chornobyl Accident consequences.

In case that proposal is rejected, reduce money deductions to the USSR budget assigned for financing activities and measures mitigating the Chornobyl Accident consequences."

One can find statistical information about the costs incurred by Ukraine to mitigate the Chornobyl Disaster consequences, and correlation data on planned and actual budget expense aimed at financing necessary measures stipulated by the Chornobyl legislation beginning with 1992 [2, 3]. But you will find no figures of funding needed to implement the complete set of measures according to the Chornobyl legislation, nor their correlation with the planned and/or actual cost to cover them earlier than 1996 [2, 4] (Table 1). Despite some discrepancies in the figures provided in the sources, analysis of the available data enables us to come to a number of conclusions.

First, financial requirements stipulated by the current legislation consistently tend to grow, going up as higher as 4.4 times in the 1996 through 2004 period. The tendency is caused by two reasons: inflation factors and increased cost of living on the one hand, and constant "improvement" of the Chornobyl legislation by amendments and addenda eventually resulting in multiplying amounts and numbers of benefits and compensations and widening the circle of people eligible for them on the other hand.

Second, there is a stable tendency towards increasing the gap between figures planned in the State Budget and those needed for the Chornobyl law implementation. In 1996 – 1998 planned financing reached 44–57% of the requirement, in 1999 – 2002 it went down to 21–29%, and 2003 – 2004 it made as little as 11% of the legally stipulated expenses. Paradoxical as it is, lawmakers keep increasing the expenses legally stipulated by the Chornobyl law, yet at the same time they limit budgeting of Chornobyl programmes by suspending articles and paragraphs of the laws at the point of adopting the State Budget Law of Ukraine, constantly limiting the scope of measures funded by the State Budget, a tendency obviously caused by awareness of the country's inability to finance the whole set of programmes and also by doubts as for these benefits and compensations being valid.

The author of the text worked in 1991 – 2002 for the MinChornobyl (later the Ministry of Emergencies) Department for Public Radiation Protection and can with confidence state that during the whole period no attempts to substantiate or at least analyze the benefits and compensations stipulated by the Law of Ukraine "On Status and Social Protection of Population Suffered from Chornobyl Catastrophe" [5] were made in terms of radiological protection.

Third, all plans for financing Chornobyl programmes adopted by 1999 were never fulfilled, actual funding covering 55–87% of the plan, and it was in 2000 only that funding drew close to the planned.

The notion of a gap between the legally stipulated requirement and financial resources at the

Table 1. Status of financing the Chornobyl accident consequences elimination and affected population social security associated measures in 1996 – 2005. (million of UAH) [4].

Years	Legally stipulated requirement	Budgeted for the given year	% to the require-ment	Actually financed	% of financed to budgeted	Outstanding debt at the beginning of the given year
1996	3363.32	1794.56	53.4	1527.88	85.1	160.59
1997	5681.72	2513.00	44.2	1746.59	69.5	310.04
1998	4548.5	2606.00	57.3	1432.26	55.0	457.75
1999	6015.95	1746.80	29.0	1535.51	87.9	763.21
2000	7479.25	1812.89	24.2	1809.63	99.8	931.48
2001	8744.46	1843.99	21.08	1925.02	104.4	786.4
2002	9957.8	2144.5	21.5	2002.8	93.4	729.3*
2003	126567.4	1381.16	11.0	1381.16	100.0	760.3**
2004	14872.5	1710.97	11.5			685.4

* including 634.6 for social protection. ** including 596.4 for social protection.

State's disposal does not seem to be something new. It was already in the National Report dedicated to the Chornobyl Disaster 10th anniversary prepared by the Ministry of Chornobyl of Ukraine, where Clause 6.6. "Development of the Legal Basis for Population Protection from the Consequences of Chornobyl Catastrophe" stated a disparity between the legislation and economical potential of the country, being a source of constant social tension [3].

Under the given conditions Ukrainian authorities were naturally forced to seek help on behalf of the international community. The issue of international assistance for Ukraine to remedy the Chornobyl Disaster consequences could make up the subject for a separate study, while we will limit ourselves to stating that Ukraine has received substantial assistance, yet its volumes tend to shrink in the recent years, making sense to revisit the validity of assistance requests and that of Chornobyl legislation itself. The situation gets clearer if viewed in retrospect.

One of the key moments that determined further ways of planning and implementing the measures of public protection against the Chornobyl Disaster consequences, was "Concept of Popular Residence on Territories of Ukrainian SSR with Increased Levels of Radioactive Contamination as a Result of Chornobyl Accident" (hereafter referred to as the Concept) adopted by the Ukrainian SSR Verkhovna Rada in 1991 [6]. The Concept holds the main population radiation protection principle to be step-by-step resettlement of population from the affected areas to the radioecologically clean regions against a temporary criterion of soil radionuclide (caesium, strontium, plutonium) contamination density.

The main argument substantiating this principle referred to unavailability of comprehensive data as to the radiological situation on the Ukrainian territory and additional public exposure doses received since the ChNPP Accident and those that could yet be received throughout the residence on contaminated territories.

This principle and radioactive contamination density criterion served the basis for contaminated area zoning stipulated by the laws "On the Legal Regime of the Territory Subjected to Radioactive Contamination as a Result of the Chornobyl Catastrophe" and "On Status and Social Protection of Population Suffered from Chornobyl Catastrophe".

On July 23, 1991, the Cabinet of Ministers of Ukraine adopted Decree № 106 "On Implementing the Ukrainian SSR Verkhovna Rada Decrees "On the Legal Regime of the Territory Subjected to Radioactive Contamination as a Result of the Chornobyl Catastrophe" and "On Status and Social Protection of Population Suffered from Chornobyl Catastrophe", which identified a series of measures to implement the current legislation on public protection against adverse factors of Chornobyl Disaster and mitigation of its consequences, as well as listing settlements referred to the radioactive contamination zones (numbering 2293 settlements)

It should be noted that the Concept and the Chornobyl laws originally featured essential inconsistency and internal conflicts that drew Chornobyl law experts' attention [7-12]. Thus, the Concept initially states that the system of countermeasures on territories with high-level radioactive contamination is not efficient (while not specifying what particular countermeasures are meant), which may cause a drive for resettlement, and the statement is followed by a proposal to implement a system of countermeasures on territories with lower radioactive contamination levels. Experts are well aware that countermeasures are more efficient on territories with higher contamination levels. Therefore, the Concept puts forth measures known to be inefficient a priori.

Furthermore, according to Clause 1 of the Law of Ukraine "On the Legal Regime of the Territory Subjected to Radioactive Contamination as a Result of the Chornobyl Catastrophe" [13], the territories contaminated due to the Chornobyl Disaster include those whose residents could be exposed to a dose over 1.0 mSv (0.1 rem) a year. A semantically similar statement is present in Clause 3 of the Law of

Ukraine "On Status and Social Protection of Population Suffered from Chornobyl Catastrophe" [5] which provides for residence and work for people without radiological restriction if their additional exposure dose due to living on the affected territories does not exceed 1.0 mSv (0.1 rem) a year. These regulations are in perfect compliance with respective international recommendations [14, 15] and Ukrainian national nuclear legislation provisions coordinated with those recommendations [16, 17]. However, among radioactive contamination zones, Clause 2 of both laws mentioned identifies an enhanced radioecological monitoring zone (the so-called 4th zone) as the territories with soil contamination density exceeding the pre-Disaster level by 1.0 to 5.0 Ci/km^2 for cesium isotopes, or 0.02 to 0.15 Ci/km^2 for strontium, or 0.005 to 0.01 Ci/km^2 for plutonium, provided the calculated effective exposure dose with radionuclide migration coefficients for plants and other criteria taken into account exceeds a dose that had been received by the individual in the pre-Disaster period by 0.5 mSv (0.05 rem) a year.

That means some legal clauses consider the enhanced radioecological monitoring zone to be a territory unaffected by radioactive contamination and requiring no any radiation factor restrictions regarding population residence and activity, while according to other clauses of the same laws, this territory should undergo radiation protection measures and its residents receive benefits and compensations for living on a radioactively contaminated territory with relevant activity restrictions applied. By official statistics [4], the population of radioactively contaminated zones totals around 2.3 million people, of which 1.6 million are residents of the enhanced radioecological monitoring zone. It also has to be noted that by the Concept, the soil radionuclide contamination density is used as a temporary decision-making criterion until an individual effective exposure dose will be ascertained for the residents. Beginning in 1991, dosimetric passportization of settlements affected by the Chornobyl Disaster has been carried out in Ukraine on a regular basis. Individual effective exposure doses for residents of those settlements (so-called passport dose) and their dynamics are regularly published and are well known [18-27]. Today, as a result of the natural environment attenuation processes and counter-measures undertaken, the radionuclide content in the environment objects has gone down by 37% and by 1.5 – 2 and more times in agricultural produce, which is reducing in its turn the public external and internal exposure dose by 2-3 times as is reflected in the changed distribution of settlements by passport dose levels, see Table 2.

For comparison, the same Table refers the number of settlements in each radiation contamination zone according to the Cabinet of Ministers of Ukraine Decree № 106 dated July 23, 1991 that remains in force as of today except for 6 settlements in Volyn and Rivne Regions, which, according to a relevant

Table 2. Distribution of settlements (referred to radiation contamination zones accordingly to acting legislation) by additional exposure dose derived from dosimetric passportization data.

Year of passportization	Average exposure dose in the settlements, (mSv per year)			
	< 0.5	*0.5-0.99*	*1.0-4.99*	*> 5.0*
1996	1307	333	507	6
1997	1350	359	443	9
1998	1332	375	440	7
1999	1375	380	397	9
2000	1417	298	440	6
2001	1455	314	389	5
2002	1471	317	372	3
2003	1538	338	285	2
2004	1551	410	202	0
1991, Directive № 106 of Cabinet of Ministers	-	1290 (zone 4)	835 (zone 3)	92 (zone 2)

enactment [28], were transferred from the compulsory resettlement zone to the guaranteed voluntary resettlement zone category. From Table 2 it is evident that there are contrasting differences between the regulatory reference of the settlements to the zones of radioactive contamination and dosimetry realities of today. But now there is no approved mechanism for altering settlements radiation contamination zone attribution with the issue itself having lost its validity, becoming merely a political one instead.

Chornobyl legislation experts highlight one more detail. Up to 1998, NRP-76/87 national radiological protection standards had been in force in Ukraine stipulating that the permissible exposure dose for residents of the 30 km zone around NPPs in operation (Category B) be 5 mSv a year. Therefore, zone 4 and 3 residents enjoyed exposure dose reductions and were given benefits and compensations even provided the exposure dose did not exceed 1 mSv and 5 mSv per year respectively, while residents of zones neighbouring operating NPPs could be exposed to doses up to 5 mSv a year without any compensations, which entailed legal discrimination and social injustice [9].

National reports dedicated to the Chornobyl Disaster 10th and 15th anniversaries [2, 3] contained cautious criticism of the decision to resettle residents of the contaminated territories, especially in the period after 1990. But the national report is a documentary genre where criticism apparently has to be cautious. Although the paper [9] treated both the very idea of resettlement (which itself makes the key point of the Concept) and the way it was implemented with severe criticism, the present author only concluded that resettlement as a countermeasure turned out to be totally unjustified in terms of averted exposure doses and economical and socio-psychological aspects. Resettlement, the way it was stipulated by the Concept against the radionuclide area contamination, is not consistent with the scientific basics of human radiation protection– exposure dose is the only thing to measure potential adverse effects.

The research generally indicates that the Concept and respective laws were found not to abate but to further sharpen the public concern about their and their families' lives, which itself negatively affected their health. Moreover, benefits and compensations depending on the exposure dose value (radionuclide contamination of food and territory) stimulated the recipients of benefits to try and keep the exposure dose received instead of acting to reduce it. That is another negative aspect of the aforementioned laws [9].

According to experts, one essential drawback of the Concept and laws adopted on its basis is the prevalence of protectionist measures in respect to residents of contaminated territories rather than stimulating the residents' activity to reduce their exposure dose load [10].

In recent years the Government of Ukraine has made attempts to lift this conflict between the current legislation and economical capability of the country on the one hand, and between the level of social security offered to affected people and growing socio-psychological tension on the other, yet with no appreciable effect. Numerous claims to make changes and additions to the Chornobyl Catastrophe associated laws proposed to eliminate the controversies between certain clauses and regulations of the laws, to bring the current legislation in compliance with economical ability of the country and to set up a system of comprehensive security for the affected people, were rejected by relevant committees (formerly permanent commissions) of the Ukrainian Parliament under the pretext of incompliance with the effective Concept. It urged specialists to elaborate a new document as a basis for revision of relevant laws. For example, a document was prepared and approved by the Ukrainian Government, and was passed to the Verkhovna Rada in 1997 and 1998 for ratification, but in late 1999 it ended up to be withdrawn by the new government for validity check and further elaboration.

The last version of the Concept defining public security provisions in relation to the Chornobyl Disaster consequences was based on the internationally and scientifically acknowledged radiological

criteria and recommendations substantiated by experience and knowledge that domestic and foreign specialists had built up in different fields over years of practice in mitigating the Disaster consequences.

Understanding the importance of the Concept, the Verkhovna Rada of Ukraine with their Decree "On Parliamentary Hearings Dedicated to the Chornobyl Catastrophe 14th Anniversary" recommended the Ukrainian National Academy, Academy of Medical Sciences, and Academy of Agrarian Sciences to consider the draft Concept. The presidiums of all the mentioned academies supported it as a basis to further improve the current legislation.

In 2000-2001 the Government of Ukraine made more attempts to submit the new draft Concept for consideration by the Verkhovna Rada, but its committees' resistance resulted in the document being never discussed in the session hall. The story ended by the Cabinet of Ministers of Ukraine issuing a Decree dated 25.07.2002"On Approval of the Draft Concept for the Law of Ukraine "On Amending the Laws of Ukraine "On the Legal Regime of the Territory Subjected to Radioactive Contamination as a Result of the Chornobyl Catastrophe" and "On Status and Social Protection of Population Suffered from Chornobyl Catastrophe".

One more aspect worth noticing is a significant difference between exposure dose-based compensation amounts stipulated by the relevant Chornobyl laws and those provided for by the Nuclear legislation of Ukraine. The Law of Ukraine "On Protection of People against Ionizing Radiation" [16] contains Clause 19 "On Compensation for Exceeding of Basic Annual Exposure Dose Limit" providing for the yearly basic exposure dose limit excess based compensation to be given to people residing or temporarily staying on the territory of Ukraine in case of radiation contaminated food and drinking water forced to consumption, radiological insecure living, work and study conditions, which is completely attributable to the Chornobyl Disaster context.

The mentioned clause stipulates that compensation for the exceeding of annual basic exposure dose limit comprises 1.2 times of an individual minimum non-taxable income amount for every millisievert in excess of the set permissible radiation limit. According to the Law of Ukraine "On Personal Income Tax" [29] (Paragraph 22.5 of Clause 22.) in case other legal regulations refer to the minimum non-taxable income, the amount of 17 UAH is taken as a basis, except for administrative and criminal legislation regulations in the part of crime or law violation qualification for which the minimum non-taxable income amount is set at the level of a social tax privilege defined by Subparagraph 6.1.1 Paragraph 6.1 of Clause 6 of the Law for a given year (including stipulations of Paragraph 22.4 of Clause 22 of the Law).

Thus, according to the Ukrainian nuclear legislation, the yearly basic exposure dose limit excess based compensation makes 20.4 UAH for every millisievert in excess of the set permissible radiation limit (the set limit for population is 1 mSv a year). Getting back to Table 2, one can easily reckon that, in case residents of the affected territories were given compensations under the nuclear legislation in compliance with the 2004 dosimetric passportization of settlements attributed to the radiation contamination zones, only residents of 202 settlements would be entitled to claim compensations for excessive radiation (exceeding the basic dose limit) and this compensation amount would not exceed 81.6 UAH per individual a year as far as the maximum dose did not exceed 5 mSv and basic dose limit excess was no more than 4 mSv.

Total compensations amount provided by the Chornobyl legislation for residents of settlements belonging to radiation contamination zones happen to significantly exceed yearly basic exposure dose limit excess based compensation stipulated by the nuclear legislation which violates social equality principle.

To sum it up we can draw a conclusion that the Chornobyl legislation, despite its high humanistic trend, is inconsistent and contains significant internal controversies:

- directed at preserving the status quo and does not provide for internal mechanisms of adaptation to radiation situation changes on contaminated territories; prioritizes protectionist measures in respect to people rather than stimulating the people's activity aimed at their radiation load reduction, causes social passivity and paternalistic mood among contaminated regions residents;
- the scope of benefits and compensations stipulated by it is ungrounded from the perspective of radiological protection; total cost of its provisions is out of proportion with the economical ability of Ukraine;
- its provision for a yearly basic exposure dose limit excess based compensation does not comply with the nuclear legislation of Ukraine which is in violation of the social equality principle.

Thus, the Chornobyl legislation could never become an efficient tool of eliminating the Chornobyl Disaster consequences.

In our opinion one of the root-causes of this situation is that, trying for a lengthy period of time to cover up for their reluctance or inability to normalize the situation on the contaminated territories by means of stimulating the residents social mobilization and backing economic and business initiatives, authorities of all levels (however not the State power in general as there were officials who sought ways to improve the situation), perhaps even not being aware of it themselves, happened to be objectively interested in hyperbolizing the radiation threat. It was easier to hide their mistakes and inertia in a dense shade of the boosted nuclear monster, exposing the public to something that was so loved by our people - their uncompromised fight for enlarging and widening the benefits and compensations. Besides, as stated in [11], the Chornobyl legislation improvement issue runs into a resistance on behalf of a number of prominent Ukrainian scientists, mainly in medical sphere who seem to be subjectively interested in the problem conservation.

Do we see a way out from this complex situation? Well, the exit itself is not on the horizon yet, but the direction to it can be discerned. There are a number of possible options and all of them call for political will to bring order to the Chornobyl legislation on behalf of the Parliament, Cabinet of Ministers and the President of Ukraine.

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